
Nutriculture

Water-Soluble Fertilizer

SPOON-™

FEEDING



 **Plant
Marvel**

With over 95 years of pioneering quality products for the grower . . .

Established in 1922, Plant Marvel Laboratories pioneered and popularized the use of water soluble fertilizers. We introduced our original 12-31-14 General Purpose Hi Phosphate formulation in 1922 helping to fuel the growth of soiless growing and hydroponics. Some years later we found a way to incorporate soluble forms of minor and trace elements into our expanding line of soluble N-P-K fertilizers. It provided almost instant crop response because all nutrients were in a form the plants could utilize immediately. We called it **Nutriculture**.



We were again the first to develop Cal-Mag fertilizers - fertilizers that contained the secondary nutrients Calcium and Magnesium along with the major nutrients NPK and the minor trace elements. This became the first commercial all water soluble fertilizer to deliver a total nutrient feed to crops. Today our Nutriculture line of formulas boast more Cal Mag formulas than any one else.

The number of fertilizer formulas we keep in stock is over fifty, and we have developed another 200 or more special non-stock formulas. Each of these was designed to promote or overcome a specific growth characteristic.

Our facilities are state of the art with computer controlled batching and mixing to ensure quality control. Each batch is sampled and tested prior to shipment. Most product is produced within a day or two of receipt of an order to ensure the freshest stock goes out. Our Quality Assurance retains the samples of these batches for up to three years.

The formulations that follow are readily available through your supplier representative. In addition the back cover lists some of the secondary supplements and growing aids Plant Marvel has to offer.



Plant Marvel wants to know . . . *Can we help you grow?*

Nutriculture Conductivity Chart

Formulations and Conductivity in Millimhos (mmhos)

This chart has been developed as a reference to verify the accuracy of fertilizer injectors. The chart is designed to be used in the following manner:

1. Determine the conductivity of your clear irrigation water.
2. Determine the conductivity of your fertilizer solution after it has been proportioned (at the emitter as it is applied to the plants).
3. Subtract the value of 1. (clear water) from 2. (fertilizer solution).
4. Compare this answer with the values on the chart to determine the parts per million of nitrogen being injected.

An Example:

If a reading of irrigation water has a value of .2 mmhos and a value of 1.0 mmhos is obtained from the fertilizer-injected water using 20-20-20, the corrected value would be 1.0 - .2 = .80. A look at the chart indicates a value of .82 for 20-20-20 being injected at

200 PPM. With an allowance of + or - 10% this is well within range. To convert millimhos (mmhos) to micromhos (umhos) multiply by 1000.

The values on this chart were obtained under laboratory conditions using distilled water. The values obtained by the grower under field conditions could therefore, vary slightly (*10%) from values listed here. This chart is to be used with Plant Marvel's Nutriculture formulations. Other brands may be composed of different raw materials which would give different values, even though they are the same analysis.

FORMULA	PPM NITROGEN CONCENTRATION						
	50	100	150	200	300	400	500
4-25-35	1.30	2.60	3.90	5.20	7.80	10.40	13.00
5-40-17	1.43	2.85	4.28	5.70	8.55	11.40	14.25
7-40-17	.60	1.20	1.80	2.40	3.60	4.80	6.00
10-20-30	.50	.99	1.50	1.99	2.99	3.98	4.79
10-30-20	.48	.96	1.44	1.92	2.88	3.84	4.95
12-4-12	.17	.35	1.07	1.43	2.14	2.86	3.58
12-31-14	.42	.84	1.25	1.67	2.51	3.34	4.18
12-45-10	.36	.71	1.07	1.42	2.13	2.84	3.55
13-0-44	.48	.95	1.41	1.88	2.83	3.77	4.73
13-2-13	.37	.75	1.12	1.50	2.25	3.00	3.75
14-0-14	.37	.75	1.12	1.50	2.25	3.00	3.75
14-3-14	.39	.77	1.16	1.54	2.31	3.08	3.85
14-3-20	.35	.71	1.06	1.42	2.12	2.83	3.55
15-0-15	.34	.69	1.03	1.38	2.06	2.75	3.44
15-0-30	.36	.71	1.07	1.49	2.14	2.85	3.55
15-3-18	.35	.71	1.06	1.42	2.12	2.83	3.54
15-3-20	.35	.70	1.05	1.40	2.10	2.80	3.50
15-5-15	.36	.73	1.09	1.45	2.18	2.90	3.63
15-5-25	.38	.76	1.14	1.52	2.28	3.04	3.80
15-5-30	.37	.74	1.11	1.47	2.21	2.95	3.68
15-10-30	.35	.71	1.06	1.42	2.12	2.83	3.54
15-20-25	.33	.66	1.00	1.37	2.05	2.74	3.42
15-30-15	.32	.64	.96	1.28	1.93	2.57	3.21
16-3-16	.34	.68	1.02	1.36	2.04	2.72	3.06
16-4-12	.33	.68	1.01	1.35	2.04	2.70	3.37
17-0-17	.35	.70	1.05	1.40	2.10	2.80	3.50
17-5-17	.34	.68	1.01	1.37	2.04	2.70	3.40
17-17-17	.27	.54	.80	1.07	1.61	2.14	2.68
18-3-18	.34	.68	1.01	1.37	2.04	2.74	3.40
18-6-18	.34	.68	1.01	1.37	2.04	2.74	3.40
19-26-14	.21	.42	.63	.84	1.25	1.67	2.09
20-0-20	.21	.41	.62	.82	1.23	1.64	2.05
20-5-20	.33	.65	.98	1.30	1.96	2.62	3.25
20-5-30	.23	.47	.70	.93	1.39	1.86	2.33
20-7-19	.30	.60	.90	1.20	1.80	2.40	3.00
20-7-20	.33	.65	.99	1.30	1.95	2.60	3.25
20-10-20	.31	.62	.94	1.25	1.88	2.50	3.13
20-20-20	.21	.41	.62	.82	1.23	1.64	2.05
21-7-7 A	.31	.61	.92	1.22	1.83	2.44	3.05
21-7-7 N	.18	.36	.54	.72	1.07	1.43	1.80
21-8-18	.32	.64	.96	1.28	1.92	2.56	3.20
24-8-16	.21	.42	.63	.85	1.27	1.70	2.12
25-0-25	.15	.30	.45	.61	.92	1.22	1.52
25-5-20	.14	.30	.42	.61	.90	1.20	1.50
25-10-20	.16	.32	.49	.65	.98	1.30	1.63
25-15-10	.15	.31	.46	.62	.92	1.23	1.55
28-18-8	.10	.20	.30	.40	.60	.80	1.00
30-10-10	.11	.22	.33	.43	.66	.85	1.10

Feeding Nutriculture in PPM through a proportioner

Ounces of Fertilizer Required per Gallon of Water to Achieve 100 PPM

Select the percentage of fertilizer element in the left hand column and the ratio of the injector across the top of the chart. Where they meet is the amount of fertilizer required per gallon of concentrate solution to achieve **100 Parts Per Million**.

For other PPM concentrations multiply the required amount by desired PPM and divide by 100.

Example: To feed at 400 PPM Nitrogen using a proportioner set at a ratio of 1:100 and using a fertilizer with a Nitrogen content of 20%.

20% and 1:100 intersect at 6.66 ozs. The chart is at 100 PPM so $6.66 \times 400 / 100 = 26.64$ ozs.

If the tank feeding the proportioner holds 5 gals, multiply the 26.64 ozs by 5 to get the total fertilizer required.

	1:15	1:50	1:100	1:150	1:200	1:250	1:300	1:350	1:400	1:500
3%	6.7	22.2	44.4	66.6	88.9	111.1	133.3	155.5	177.7	222.1
4%	5.0	16.7	33.3	50.0	66.6	83.3	100.0	116.6	133.3	166.6
5%	4.0	13.3	26.7	40.0	53.3	66.6	80.0	93.3	106.6	133.3
6%	3.3	11.1	22.2	33.3	44.4	55.5	66.6	77.7	88.9	111.1
7%	2.9	9.5	19.0	28.6	38.1	47.6	57.1	66.6	76.2	95.2
8%	2.5	8.3	16.7	25.0	33.3	41.7	50.0	58.3	66.6	83.3
9%	2.2	7.4	14.8	22.2	29.6	37.0	44.4	51.8	59.2	74.0
10%	2.0	6.7	13.3	20.0	26.7	33.3	40.0	46.6	53.3	66.6
11%	1.8	6.1	12.1	18.2	24.2	30.3	36.3	42.4	48.5	60.6
12%	1.7	5.6	11.1	16.7	22.2	27.8	33.3	38.9	44.4	55.5
13%	1.5	5.1	10.3	15.4	20.5	25.6	30.8	35.9	41.0	51.3
14%	1.4	4.8	9.5	14.3	19.0	23.8	28.6	33.3	38.1	47.6
15%	1.3	4.4	8.9	13.3	17.8	22.2	26.7	31.1	35.5	44.4
16%	1.2	4.2	8.3	12.5	16.7	20.8	25.0	29.2	33.3	41.7
17%	1.2	3.9	7.8	11.8	15.7	19.6	23.5	27.4	31.4	39.2
18%	1.1	3.7	7.4	11.1	14.8	18.5	22.2	25.9	29.6	37.0
19%	1.1	3.5	7.0	10.5	14.0	17.5	21.0	24.6	28.1	35.1
20%	1.0	3.3	6.7	10.0	13.3	16.7	20.0	23.3	26.7	33.3
21%	1.0	3.2	6.3	9.5	12.7	15.9	19.0	22.2	25.4	31.7
22%	0.9	3.0	6.1	9.1	12.1	15.1	18.2	21.2	24.2	30.3
23%	0.9	2.9	5.8	8.7	11.6	14.5	17.4	20.3	23.2	29.0
24%	0.8	2.8	5.6	8.3	11.1	13.9	16.7	19.4	22.2	27.8
25%	0.8	2.7	5.3	8.0	10.7	13.3	16.0	18.7	21.3	26.7
26%	0.8	2.6	5.1	7.7	10.3	12.8	15.4	17.9	20.5	25.6
27%	0.7	2.5	4.9	7.4	9.9	12.3	14.8	17.3	19.7	24.7
28%	0.7	2.4	4.8	7.1	9.5	11.9	14.3	16.7	19.0	23.8
29%	0.7	2.3	4.6	6.9	9.2	11.5	13.8	16.1	18.4	23.0
30%	0.7	2.2	4.4	6.7	8.9	11.1	13.3	15.5	17.8	22.2

Grams of Fertilizer Required per Liter of Water to Achieve 100 PPM

	1:15	1:50	1:100	1:150	1:200	1:250	1:300	1:350	1:400	1:500
3%	50	166	333	499	665	832	998	1165	1331	1664
4%	37	125	250	374	499	624	749	873	998	1248
5%	30	100	200	299	399	499	599	699	799	998
6%	25	83	166	250	333	416	499	582	665	832
7%	21	71	143	214	285	356	428	499	570	713
8%	19	62	125	187	250	312	374	437	499	624
9%	17	55	111	166	222	277	333	388	444	555
10%	15	50	100	150	200	250	299	349	399	499
11%	14	45	91	136	181	227	272	318	363	454
12%	12	42	83	125	166	208	250	291	333	416
13%	12	38	77	115	154	192	230	269	307	384
14%	11	36	71	107	143	178	214	250	285	356
15%	10	33	67	100	133	166	200	233	266	333
16%	9.4	31	62	94	125	156	187	218	250	312
17%	8.8	29	59	88	117	147	176	206	235	294
18%	8.3	28	55	83	111	139	166	194	222	277
19%	7.9	26	53	79	105	131	158	184	210	263
20%	7.5	25	50	75	100	125	150	175	200	250
21%	7.1	24	48	71	95	119	143	166	190	238
22%	6.8	23	45	68	91	113	136	159	181	227
23%	6.5	22	43	65	87	108	130	152	174	217
24%	6.2	21	42	62	83	104	125	146	166	208
25%	6.0	20	40	60	80	100	120	140	160	200
26%	5.8	19	38	58	77	96	115	134	154	192
27%	5.5	18	37	55	74	92	111	129	148	185
28%	5.3	18	36	53	71	89	107	125	143	178
29%	5.2	17	34	52	69	86	103	120	138	172
30%	5.0	17	33	50	67	83	100	116	133	166



Hydroponic Special 3-15-26 PLUS

Hydroponic Special contains all the necessary elements to provide a basic diet for Hydroponic culture. It can be manipulated to provide virtually any combina-

tion of nutrients desired. Calcium Nitrate, Magnesium Sulfate, or any combination of the minor elements can be added.

Guaranteed Analysis (For continuous liquid feeding)			
3-15-26+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	3%	60	200 PPM as N
1.6% Ammoniacal Nitrogen			
2.4% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	15%	300	1000 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	26%	520	1733 PPM as K ₂ O
Magnesium (Mg)	3%	60	200 PPM as Mg
Sulfur (S)	6%	120	400 PPM as S
6% Combined Sulfur (S)			
Boron (B)	0.1%	2	1.5 PPM as B
Copper (Cu)	0.07%	1.4	3.0 PPM as Cu
0.07% Chelated Copper (Cu)			
Iron (Fe)	0.3%	60	20 PPM as Fe
0.3% Chelated Iron (Fe)			
Total Manganese (Mn)	0.1%	2	6.67 PPM as Mn
0.1% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.01%	0.2	0.7 PPM as Mo
Zinc (Zn)	0.04%	0.8	2.67 PPM as Zn
0.04% Chelated Zinc (Zn)			

Derived from Potassium Sulfate, Potassium Phosphate, Potassium Nitrate, Magnesium Sulfate, Borax, Sodium Molybdate and the EDTA form of Copper, Iron, Manganese, and Zinc. Potential basicity equivalent to 115 lbs. Calcium Carbonate per ton.

Bloom & Flower Plant Food 12-31-14 PLUS

Blooming & Flowering Plant Food 12-31-14^{PLUS} is used as an all purpose feed for greenhouse crops; especially useful to promote vigorous development of roots in seedlings and cuttings, for reducing shock to transplants and for finishing of blooming crops. To insure successful initiation of embryonic flower bud development 12-31-14

should be used exclusively during the early stages of growth of all crops. Sown seed can be watered in with this formula as well as cuttings when stuck. 12-31-14 can also be used as the watering in solution for any plant being shifted or transplanted. This formula also induces prolific blooms with flowers of deeper color and longer life as cut flowers.

Guaranteed Analysis (For continuous liquid feeding)			
12-31-14+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	12%	240	200 PPM as N
8.28% Ammoniacal Nitrogen			
3.72% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	31%	620	517 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	14%	280	233 PPM as K ₂ O
Magnesium (Mg)	0.05%	1.0	0.83 PPM as Mg
Sulphur (S)	3.0%	6.0	50 PPM as S
3% Combined Sulphur (S)			
Boron (B)	0.02%	0.4	0.33 PPM as B
Copper (Cu)	0.05%	1.0	0.83 PPM as Cu
0.05% Chelated Copper (Cu)			
Iron (Fe)	0.15%	3.0	2.50 PPM as Fe
0.15% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1.0	0.83 PPM as Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.0009%	0.018	0.015 PPM as Mo
Zinc (Zn)	0.06%	1.2	1.00 PPM as Zn
0.06% Chelated Zinc (Zn)			

Derived from Ammonium Phosphate, Ammonium Sulfate, Magnesium Sulfate, Borax, Sodium Molybdate and the EDTA form of Copper, Iron, Manganese and Zinc. Potential acidity equivalent to 697 lbs. Calcium Carbonate per ton.

Super Start 12-45-10 PLUS

Super Start 12-45-10^{PLUS} is especially designed as a starter solution which aids plants in rooting faster. It helps overcome transplanting shock. Its nitrogen content is low enough to prevent burning and still promote new top growth. Super Start is widely used in greenhouse and nursery operations to correct and supplement low phosphorus

levels in established plantings. It is also very effective in promoting blossoming. Young vegetable plants being set in the field respond especially well to this starter formula. Use for seedling, transplants and rooted cuttings. Excellent for container azaleas and rhododendrons to promote compact growth and increase bud density.

Guaranteed Analysis (For continuous liquid feeding)			
12-45-10+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	12%	240	200 PPM as N
9.11% Ammoniacal Nitrogen			
2.89% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	45%	900	750 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	10%	200	167 PPM as K ₂ O
Magnesium (Mg)	0.05%	1.0	0.83 PPM as Mg
Sulfur (S)	0.31%	6.2	5.2 PPM as S
0.31% Combined Sulfur (S)			
Boron (B)	0.02%	0.4	0.33 PPM as B
Copper (Cu)	0.05%	1.0	0.83 PPM as Cu
0.05% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2.0	1.67 PPM as Fe
0.10% Chelated Iron (Fe)			
Total Manganese (Mn)	0.05%	1.0	0.83 PPM as Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.001%	0.02	0.0167 PPM as Mo
Zinc (Zn)	0.05%	1.0	0.83 PPM as Zn
0.05% Chelated Zinc (Zn)			

Derived from Ammonium Sulfate, Ammonium Phosphate, Potassium Nitrate, Magnesium Sulfate, Borax, Sodium Molybdate, and the EDTA forms of Copper, Iron, Manganese and Zinc. Potential acidity equivalent to 737 lbs. Calcium Carbonate per ton.

Plug Special 13-2-13 PLUS

with 6% Calcium & 3% Magnesium

If the proper nutrients are not available to the plant in the first few days of growth, a plant will not obtain its full growth potential. Plug Special 13-2-13^{PLUS} is designed to do just that. It is a formula with high nitrate nitrogen, calcium, magnesium, and minor elements, mostly derived from the chelated (EDTA) form, and all combined into a totally soluble mix. The trace elements are delicately balanced at levels that

have proven to perform well. This 13-2-13 formulation contains 2% P₂O₅ as well as a higher percentage of sulphur than our 14-0-14. Even though it contains calcium and phosphorus this formula will maintain its solubility over a broad pH range. Although designed for plug growing, this formula will work equally well on any crop that may be sensitive to ammoniacal nitrogen during low light periods.

Guaranteed Analysis (For continuous liquid feeding)			
13-2-13+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	13%	260	200 PPM as N
0.74% Ammoniacal Nitrogen			
12.26% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	2%	40	31 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	13%	260	200 PPM as K ₂ O
Calcium (Ca)	6%	120	92 PPM as Ca
Magnesium (Mg)	3%	60	46 PPM as Mg
Boron (B)	0.0017%	0.03	0.02 PPM as B
Copper (Cu)	0.03%	0.60	0.46 PPM as Cu
0.03% Chelated Copper (Cu)			
Iron (Fe)	0.05%	1.0	0.77 PPM as Fe
0.05% Chelated Iron (Fe)			
Manganese (Mn)	0.03%	0.60	0.46 PPM as Mn
0.03% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.0075%	0.15	0.12 PPM as Mo
Zinc (Zn)	0.028%	0.56	0.43 PPM as Zn
0.028% Chelated Zinc (Zn)			

Derived from Ammonium Phosphate, Potassium Nitrate, Magnesium Nitrate, Calcium Nitrate, Borax, Sodium Molybdate and the EDTA form of Copper, Iron, Manganese, and Zinc. Potential basicity equivalent to 233 lbs. Calcium Carbonate per ton.

Plug Special 14-0-14 PLUS

6% Calcium & 3% Magnesium

Plug Special 14-0-14^{PLUS} is a plug growing formula with high nitrate nitrogen, calcium, magnesium, and minor elements, mostly derived from the sulfate form, and all combined into a totally soluble mix. The trace elements are delicately balanced at levels that have proven to perform

well. This formula will work well when phosphate is not a problem or is being supplied separately. Although designed for plug growing, this formula will work equally well on any crop that may be sensitive to ammoniacal nitrogen during low light periods.

Guaranteed Analysis (For continuous liquid feeding)			
14-0-14+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	14%	280	200 PPM as N
13.05% Nitrate Nitrogen			
0.95% Ammoniacal Nitrogen			
Soluble Potash (K ₂ O)	14%	280	200 PPM as K ₂ O
Calcium (Ca)	6%	120	86 PPM as Ca
Magnesium (Mg)	3%	60	43 PPM as Mg
Boron (B)	0.02%	0.41	0.29 PPM as B
Copper (Cu)	0.05%	1.0	0.73 PPM as Cu
0.05% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2.00	1.42 PPM as Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1.0	0.78 PPM as Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.0009%	0.018	0.01 PPM as Mo
Zinc (Zn)	0.05%	1.06	0.76 PPM as Zn
0.05% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Potassium Nitrate, Magnesium Nitrate, Calcium Nitrate, Borax, Sodium Molybdate and the EDTA form of Copper, Iron, Manganese, and Zinc. Potential basicity equivalent to 239 lbs. Calcium Carbonate per ton.

Poinsettia Cal-Mag 14-3-14 PLUS

This Cal-Mag formula is specifically designed for poinsettia production. It supplies most of its nitrogen in the nitrate form and is an ideal feed for crops responsive to nitrate nitrogen. It is also an ideal source of calcium and magnesium that is immediately available to overcome

a calcium deficiency. It will maintain solubility in the concentrate tank when calcium nitrate and/or magnesium nitrate are added. To avoid calcium precipitation do not mix with fertilizers or other materials containing phosphorus or sulfur compounds.

Guaranteed Analysis (For continuous liquid feeding)			
10-30-20+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	14%	280	200 PPM as N
1.94% Ammoniacal Nitrogen			
12.08% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	3%	60	43 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	14%	280	200 PPM as K ₂ O
Calcium (Ca)	6.0%	121	86 PPM as Ca
Magnesium (Mg)	2.0%	40	29 PPM as Mg
Boron (B)	0.01%	0.2	0.14 PPM as B
Copper (Cu)	0.01%	0.2	0.14 PPM as Cu
0.01% Chelated Copper (Cu)			
Iron (Fe)	0.12%	2.4	1.71 PPM as Fe
0.12% Chelated Iron (Fe)			
Manganese (Mn)	0.06%	1.2	0.86 PPM as Mn
0.06% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.08%	1.6	1.14 PPM as Mo
Zinc (Zn)	0.07%	1.4	1.0 PPM as Zn
0.07% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Monoammonium Phosphate, Potassium Nitrate, Calcium Nitrate, Magnesium Nitrate, Borax, Sodium Molybdate, Copper EDTA, Iron EDTA, Iron EDDHA, Manganese EDTA and Zinc EDTA. Potential basicity equivalent to 116 lbs. Calcium Carbonate per ton.

Poinsettia Cal-Mag Special 14-3-20 PLUS

Poinsettia Cal-Mag Special is a non acidifying ready source of available calcium and magnesium in a totally soluble form that is immediately available to the plant. Poinsettia Cal-Mag Special has most of its Nitrogen in the Nitrate form making it ideal as a dark weather feed where the conversion of Nitrogen to the Nitrate form in the soil media could be a problem. This formula was designed to meet the nutritional needs of a poinsettia crop. Potash has been elevated to

promote bract size and color. It will also produce sturdier stems that will help reduce breakage when elevating. High calcium will push leaf expansion, prevent interveinal chlorosis and improve photosynthesis. Molybdenum has been elevated to meet the demands of a poinsettia crop in converting this high nitrate based fertilizer into an amine within the plant. Iron has also been increased to allow production at a media pH range of 6.5 to 6.7.

Guaranteed Analysis (For continuous liquid feeding)			
14-3-20+	Percent	Lbs/Ton	Concentration
Total Nitrogen (N)	14%	300	200 PPM as N
1.72% Ammoniacal N			
12.28% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	3%	60	43 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	20%	400	285 PPM as K ₂ O
Calcium (Ca)	4.0%	80	57 PPM as Ca
Magnesium (Mg)	2.0%	40	29 PPM as Mg
Boron (B)	0.02%	0.4	0.29 PPM as B
Copper (Cu)	0.03%	0.6	0.43 PPM as Cu
0.03% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2	1.5 PPM as Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.03%	0.6	0.43 PPM as Mn
0.03% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.07%	1.43	1.02 PPM as Mo
Zinc (Zn)	0.025%	0.5	0.36 PPM as Zn
0.025% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Ammonium Phosphate, Calcium Nitrate, Potassium Nitrate, Magnesium Nitrate, Borax, Sodium Molybdate, and the EDTA form of Copper, Iron, Manganese and Zinc. Potential basicity equivalent to 176 lbs. Calcium Carbonate per ton.

Hi-Cal Special 15-0-15 PLUS

with 10.5% Calcium

Hi-Cal Special 15-0-15^{PLUS} is a plug growing formula with high nitrate nitrogen, calcium, magnesium, and minor elements, most derived from the sulfate form, and all combined into a totally soluble mix. The trace elements are delicately balanced at levels that have proven to perform

well. This formula will work well when phosphate is not a problem or is being supplied separately. Although designed for plug growing, this formula will work equally well on any crop that may be sensitive to ammoniacal nitrogen during low light periods.

Guaranteed Analysis (For continuous liquid feeding)			
15-0-15+	Percent	Lbs/Ton	Concentration
Total Nitrogen (N)	15%	300	200 PPM as N
13% Nitrate Nitrogen			
2% Urea Nitrogen			
Soluble Potash (K ₂ O)	15%	300	200 PPM as K ₂ O
Calcium (Ca)	10.50%	210	140 PPM as Ca
Magnesium (Mg)	0.3%	6	5.07 PPM as Mg
Sulfur (S)	0.12%	2.4	1.6 PPM as S
Boron (B)	0.02%	0.40	0.27 PPM as B
Copper (Cu)	0.05%	1.0	0.67 PPM as Cu
0.05% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2.0	1.33 PPM as Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1.0	0.67 PPM as Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.0009%	0.02	0.01 PPM as Mo
Zinc (Zn)	0.05%	1.0	0.67 PPM as Zn
0.05% Chelated Zinc (Zn)			

Derived from Potassium Nitrate, Calcium Nitrate, Magnesium Sulfate, Urea, Borax, Sodium Molybdate and the EDTA form of Copper, Iron, Manganese and Zinc. Potential basicity equivalent to 319 lbs. Calcium Carbonate per ton.

Pansy Special 15-3-20 PLUS

With 3.75% Calcium & 1% Magnesium

Pansy Special 15-3-20^{PLUS} contains Calcium, Magnesium and a very high ratio of Nitrogen in the preferred nitrate form. The nitrate will produce good, hard growth,

while the phosphorous levels will keep the Pansies short and compact. The stepped-up amount of potash will insure good and healthy cell wall development.

Guaranteed Analysis (For continuous liquid feeding)			
15-3-20+	Percent	Lbs/Ton	Concentration
Total Nitrogen (N)	15%	300	200 PPM as N
2.99% Ammoniacal Nitrogen			
12.01% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	3.0%	60	40 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	20%	400	267 PPM as K ₂ O
Calcium (Ca)	3.75%	75	47 PPM as Ca
Magnesium (Mg)	1.0%	20	13 PPM as Mg
1.0% Water Soluble Magnesium (Mg)			
Boron (B)	0.03%	0.60	0.40 PPM as B
Copper (Cu)	0.01%	0.2	0.13 PPM as Cu
0.01% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2.0	1.33 PPM as Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1.0	0.67 PPM as Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.0079%	0.158	0.105 PPM as Mo
Zinc (Zn)	0.02%	0.40	0.27 PPM as Zn
0.02% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Ammonium Phosphate, Potassium Nitrate, Calcium Nitrate, Magnesium Nitrate, Borax, Sodium Molybdate and the EDTA form of Copper, Iron, Manganese and Zinc. Potential basicity equivalent to 40 lbs. Calcium Carbonate per ton.

Bedding Plant Cal Mag Special 15-3-20 PLUS

This high Nitrate blend was designed specifically for bedding plants. The K to N ratio will promote short, compact, and toned plants. Some critical micronutrient levels have been elevated to provide sufficient results with minimal Nitrogen levels at hose end. This Bedding Plant Cal Mag Special 15-3-20^{PLUS} contains Calcium and Magnesium with increased Iron

Guaranteed Analysis (For continuous liquid feeding)			
15-3-20+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	15%	300	200 PPM as N
2.09% Ammoniacal Nitrogen			
12.91% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	3.0%	60	37.5 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	20%	400	250 PPM as K ₂ O
Calcium (Ca)	3.75%	75	47 PPM as Ca
Magnesium (Mg)	1.12%	22	14 PPM as Mg
1.12% Water Soluble Magnesium (Mg)			
Boron (B)	0.01%	0.2	0.13 PPM as B
Copper (Cu)	0.01%	0.2	0.13 PPM as Cu
0.01% Chelated Copper (Cu)			
Iron (Fe)	0.15%	3.0	1.88 PPM as Fe
0.15% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1.0	0.63 PPM as Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.0079%	0.158	0.10 PPM as Mo
Zinc (Zn)	0.02%	0.42	0.27 PPM as Zn
0.02% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Ammonium Phosphate, Potassium Nitrate, Calcium Nitrate, Magnesium Nitrate, Borax, Sodium Molybdate and the EDTA form of Copper, Manganese and Zinc with Iron in a 75:25 ratio of EDTA to DTPA. Potential basicity equivalent to 40 lbs. Calcium Carbonate per ton.

Poinsettia Special 15-5-25 PLUS

With high levels of nitrate nitrogen (72%), magnesium (1.35%) low boron, but with increased levels of trace elements including higher levels of molybdenum, Poinsettia Special 15-5-25^{PLUS} has been specially formulated for poinsettias unique fertility requirements. It promotes excellent color, sturdy stems better control of growth. It can generally be used throughout the crops growing cycle or in combination with Nutriculture

Hi-Cal 15-0-15 which will provide calcium. Begin use early in the plant growth cycle providing 250-300 PPM Nitrogen as a constant feed. Regulate the concentration based on growth response and weather conditions. After pinching, reduce level of fertilization for 7-10 days to encourage stem elongation. When Bracts begin to develop color, reduce fertilizer rates to 200 PPM Nitrogen or less.

Guaranteed Analysis (For continuous liquid feeding)			
15-5-25+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	15%	300	200 PPM as N
4.22% Ammoniacal Nitrogen			
10.78% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	5%	100	67 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	25%	500	333 PPM as K ₂ O
Magnesium (Mg)	1.35%	27	18 PPM as Mg
Sulfur (S)	1.82%	36	24 PPM as S
1.82% Combined Sulfur (S)			
Boron (B)	0.02%	0.40	0.27 PPM as B
Copper (Cu)	0.05%	1.0	0.67 PPM as Cu
0.05% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2.0	1.33 PPM as Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1.0	0.67 PPM Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.0733%	1.5	1.00 PPM as Mo
Zinc (Zn)	0.05%	1.0	0.67 PPM as Zn
0.05% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Ammonium Phosphate, Potassium Nitrate, Magnesium Sulfate, Borax, Sodium Molybdate, and the EDTA form of Copper, Iron, Manganese and Zinc. Potential acidity equivalent to 50 lbs. Calcium Carbonate per ton.

K-Mag 15-5-30 PLUS

This high potassium formula is ideal for overcoming potash deficiency or for building up hardiness and fibrous qualities of stems and leaves. May be applied in solution by a proportioner through sprinkler systems, by irriga-

tion or any conventional ground rig and may be applied in combination with most insecticides, herbicides and fungicides. Avoid applications during peak sunlight hours.

Guaranteed Analysis (For continuous liquid feeding)			
15-5-30+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	15%	300	200 PPM as N
2.82% Ammoniacal Nitrogen			
12.18% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	5%	100	67 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	30%	600	400 PPM as K ₂ O
Magnesium (Mg)	1.26%	25	16 PPM as Mg
Boron (B)	0.02%	0.4	0.27 PPM as B
Copper (Cu)	0.05%	1.0	0.67 PPM as Cu
Iron (Fe)	0.10%	2.0	1.33 PPM as Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1.0	0.67 PPM Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.0005%	0.01	0.01 PPM as Mo
Zinc (Zn)	0.03%	0.62	0.41 PPM as Zn
0.03% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Potassium Nitrate, Potassium Phosphate, Magnesium Nitrate, Sodium Molybdate, and the EDTA form of Iron, Manganese and Zinc. Potential basicity equivalent to 72 lbs. Calcium Carbonate per ton.

Pot Mum Special 15-10-30 PLUS

This formula is high in potash to help stiffen stems and promote hardy fibrous qualities. It is an excellent blend that will harden up any crop that requires a higher potash content but was specifically blended with pot Mums in mind.

Pot Mum Special 15-10-30^{PLUS} is the ideal feed to overcome nitrogen and potash deficiencies in mature pot mums. Promotes improved resistance to fungus diseases and increases the fibrous content in stems and leaves.

Guaranteed Analysis (For continuous liquid feeding)			
15-10-30+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	15%	300	200 PPM as N
3.98% Ammoniacal Nitrogen			
9.21% Nitrate Nitrogen			
1.81% Urea Nitrogen			
Available Phosphate (P ₂ O ₅)	10%	200	133 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	30%	600	400 PPM as K ₂ O
Magnesium (Mg)	0.05%	1.0	0.67 PPM as Mg
Sulfur (S)	1.97%	3.9	2.63 PPM as S
1.97% Combined Sulfur (S)			
Boron (B)	0.02%	0.4	0.27 PPM as B
Copper (Cu)	0.05%	1.0	0.67 PPM as Cu
0.05% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2.0	1.33 PPM as Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1.0	0.67 PPM as Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.0009%	0.018	0.012 PPM as Mo
Zinc (Zn)	0.05%	1.0	0.67 PPM as Zn
0.05% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Ammonium Sulfate, Ammonium Phosphate, Potassium Nitrate, Urea, Borax, Sodium Molybdate and the EDTA form of Copper, Iron, Manganese and Zinc. Potential acidity equivalent to 169 lbs. Calcium Carbonate per ton.

Cal Mag Special 16-3-16 PLUS

With Iron EDTA and EDDHA

Developed as an alternative to our Cal Mag 17-5-17+ to give greater control over vegetative growth without sacrificing the calcium and magnesium. It has a neutral potential acidity, and it also contains a combination of two different forms of iron chelates, EDTA and EDDHA, that makes iron available

over a broader pH range, as well as in wet soil conditions. It will ensure availability under alkaline soil conditions. It also helps control the tendency to stretch and promotes healthier growth while inducing excellent longer-keeping blooms.

Guaranteed Analysis (For continuous liquid feeding)			
16-3-16+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	16%	320	200 PPM as N
3.36% Ammoniacal Nitrogen			
12.64% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	3%	60	37.5 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	16%	320	200 PPM as K ₂ O
Calcium (Ca)	4%	82	51.13 PPM as Ca
Magnesium (Mg)	2.0%	41	25.75 PPM as Mg
Boron (B)	0.02%	0.4	0.25 PPM as B
Copper (Cu)	0.01%	0.2	0.13 PPM as Cu
0.01% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2.10	1.31 PPM as Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1	0.63 PPM as Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.008%	0.02	0.013 PPM as Mo
Zinc (Zn)	0.042%	0.84	0.53 PPM as Zn
0.042% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Potassium Phosphate, Potassium Nitrate, Calcium Nitrate, Magnesium Nitrate, Boric acid, Copper EDTA, Manganese EDTA, Iron EDTA, Iron EDDHA, Sodium Molybdate and Zinc EDTA. CAUTION: This fertilizer is to be used on soils which responds to molybdenum. Crops high in molybdenum are toxic to grazing animals. Potential basicity equivalent to 9 lbs. Calcium Carbonate per ton.

Easter Lily Special 16-4-12 PLUS

Easter Lily Special 16-4-12 was specifically formulated for lily crops, which, unlike other popular lily fertilizers, does not contain urea or excess fluorides. With a slight potential basicity, it will aid the

grower in maintaining media pH values over 6.0. It also helps control the tendency of lilies to stretch and promotes healthier growth while inducing excellent longer-keeping blooms.

Guaranteed Analysis (For continuous liquid feeding)			
16-4-12+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	16%	320	200 PPM as N
2.04% Ammoniacal Nitrogen			
13.96% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	4%	80	50 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	12%	240	150 PPM as K ₂ O
Magnesium (Mg)	0.05%	1.0	0.63 PPM as Mg
Boron (B)	0.007%	1.4	0.88 PPM as B
Copper (Cu)	0.0035%	0.07	0.043 PPM as Cu
0.0035% Chelated Copper (Cu)			
Iron (Fe)	0.05%	1.0	0.63 PPM as Fe
0.05% Chelated Iron (Fe)			
Manganese (Mn)	0.003%	0.06	0.038 PPM as Mn
0.003% Water Soluble Manganese (Mn)			
Molybdenum (Mo)	0.0009%	0.02	0.013 PPM as Mo
Zinc (Zn)	0.009%	0.18	0.113 PPM as Zn
0.009% Chelated Zinc (Zn)			

Derived from Ammonium Phosphate, Potassium Nitrate, Nitrate of Soda, magnesium sulfate, boric acid, Copper EDTA, Manganese EDTA, Iron EDTA, Sodium molybdate and zinc EDTA. Potential basicity equivalent to 176 lbs. Calcium Carbonate per ton.

Potted Plant Special 17-0-17 PLUS

4% Calcium & 2% Magnesium

Potted Plant Special 17-0-17^{PLUS} is an excellent Cal/Mag formulation. This analysis works well for the delivery of these two secondary micro-nutrients without having a dramatic impact on media pH. With 80% of its Nitrogen in the Nitrate form and

good amounts of both Calcium and Magnesium, this formulation is an excellent choice for Geraniums and other potted crops and is effective in controlling the color in Pink Hydrangeas and can be used as an occasional Lily food.

Guaranteed Analysis (For continuous liquid feeding)			
17-0-17+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	17%	340	200 PPM as N
3.4% Ammoniacal Nitrogen			
13.6% Nitrate Nitrogen			
Soluble Potash (K ₂ O)	17%	340	200 PPM as K ₂ O
Calcium (Ca)	4.0%	80	47 PPM as Ca
Magnesium (Mg)	2.0%	40	24 PPM as Mg
Boron (B)	0.02%	0.4	0.24 PPM as B
Copper (Cu)	0.01%	0.2	0.118 PPM as Cu
0.01% Chelated Copper (Cu)			
Iron (Fe)	0.075%	1.5	0.88 PPM as Fe
0.075% Chelated Iron (Fe)			
Manganese (Mn)	0.04%	0.8	0.47 PPM as Mn
0.04% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.0079%	0.15	0.088 PPM as Mo
Zinc (Zn)	0.02%	0.4	0.24 PPM as Zn
0.02% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Potassium Nitrate, Calcium Nitrate, Magnesium Nitrate, Borax, Sodium Molybdate, Copper EDTA, Iron EDTA, Manganese EDTA and Zinc EDTA. Potential basicity equivalent to 43 lbs. Calcium Carbonate per ton.

Cal-Mag 17-5-17 PLUS

With 4% Calcium and 1% Magnesium

This Cal Mag Special formula is probably very close to being the perfect fertilizer all in one bag. It contains all the major, secondary and minor elements almost any crop would need. NPK, Calcium, Magnesium, Six trace elements and a very high ratio of nitrogen in nitrate

form. The calcium to magnesium ratio is perfectly proportioned so that they will not impede one another's uptake by acting as antagonists. And while slightly on the acid side, this formula allows the delivery of these essential cations without a major impact on media pH.

Guaranteed Analysis (For continuous liquid feeding)			
17-5-17+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	17%	340	200 PPM as N
4.33% Ammoniacal Nitrogen			
12.67% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	5%	100	58.82 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	17%	340	200 PPM as K ₂ O
Calcium (Ca)	4.0%	80	48.20 PPM as Ca
Magnesium (Mg)	1.0%	22	13.2 PPM as Mg
1.0% Water Soluble Magnesium			
Boron (B)	0.02%	0.4	0.24 PPM as B
Copper (Cu)	0.02%	0.4	0.24 PPM as Cu
0.02% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2.0	1.2 PPM as Fe
0.10% Chelated Iron (Fe)			
Total Manganese (Mn)	0.05%	1	.59 PPM as Mn
0.05% Chelated (Mn)			
Molybdenum (Mo)	0.0007%	0.014	0.01 PPM as Mo
Zinc (Zn)	0.05%	1	0.59 PPM as Zn
0.05% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Potassium Nitrate, Calcium Nitrate, Magnesium Nitrate, Borax, Sodium Molybdate, Iron EDTA, Copper EDTA, Manganese EDTA and Zinc EDTA. Potential acidity is equal to 53 pounds calcium carbonate per ton. Caution: This fertilizer is to be used on soils which respond to molybdenum. Crops high in molybdenum are toxic to grazing animals.

Geranium & Bedding Plant Special 17-17-17 PLUS

Geranium and Bedding Plant Special 17-17-17^{PLUS} was developed to provide an almost neutral pH effect on the soil media and to deliver higher rates of nitrate nitrogen than provided for in our standard 20-20-20. Approximately 50% of the nitrogen contained in this formula is nitrate nitrogen. Approximately 75% of nitrogen in the

20-20-20 formula is ammoniacal nitrogen. Because of this, this formula will provide better control of nitrogen during low light periods, such as the dark winter months in the north. This is an excellent feed for geraniums and is widely used in pink hydrangeas and Easter lilies or anywhere that low pH is a problem.

Guaranteed Analysis (For continuous liquid feeding)			
17-17-17+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	17%	340	200 PPM as N
3.38% Ammoniacal Nitrogen			
8.02% Nitrate Nitrogen			
5.60% Urea Nitrogen			
Available Phosphate (P ₂ O ₅)	17%	340	200 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	17%	340	200 PPM as K ₂ O
Magnesium (Mg)	0.12%	2.4	1.4 PPM as Mg
Sulfur (S)	0.16%	3.2	1.88 PPM as S
0.16% Combined Sulfur (S)			
Boron (B)	0.02%	0.4	0.24 PPM as B
Copper (Cu)	0.05%	1.0	0.59 PPM as Cu
0.05% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2.0	1.18 PPM as Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1.0	0.59 PPM as Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.0075%	0.015	0.009 PPM as Mo
Zinc (Zn)	0.05%	1.0	0.59 PPM as Zn
0.05% Chelated Zinc (Zn)			

Derived from Ammonium Phosphate, Sodium Nitrate, Potassium Nitrate, Urea, Borax, Sodium Molybdate, Copper EDTA, Iron EDTA, Manganese EDTA and Zinc EDTA. Potential acidity equivalent to 239 lbs. Calcium Carbonate per ton.

Nutriculture®

Potted Plant Special 18-3-18 PLUS

With 6.65% Calcium

This formula contains calcium and a very high ratio of its nitrogen in nitrate form and is ideal for potted plants or other crops with high calcium requirements and as a gen-

eral purpose feed for Geraniums and plants that are grown in low light situations. It has a almost neutral pH that will minimize any impact on media pH.

Guaranteed Analysis (For continuous liquid feeding)			
18-3-18+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	18%	360	200 PPM as N
4.24% Ammoniacal Nitrogen			
13.76% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	3%	120	66.67 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	18%	360	200 PPM as K ₂ O
Calcium (Ca)	6.65%	133	73.9 PPM as Ca
Magnesium (Mg)	0.18%	3.6	2 PPM as Mg
Boron (B)	0.02%	0.4	0.2 PPM as B
Copper (Cu)	0.02%	0.4	0.2 PPM as Cu
0.02% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2.0	1.16 PPM as Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.03%	0.6	0.33 PPM as Mn
0.03% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.005%	0.1	0.06 PPM as Mo
Zinc (Zn)	0.015%	0.3	0.17 PPM as Zn
0.015% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Potassium Nitrate, Calcium Nitrate, Ammonium Phosphate, Magnesium Sulfate, Borax, Sodium Molybdate, Copper EDTA, Iron EDTA, Manganese EDTA and Zinc EDTA. Potential acidity equivalent to 25 lbs. Calcium Carbonate per ton.

General Purpose/Alkaline Water 20-7-20 PLUS

General Purpose 20-7-20 PLUS is similar to a 20-10-20 in its nitrate to ammonium ratio but has the ability to neutralize 1-1/2 times as many bicarbonates making this analysis ideal for growers with high alkalinity.

Guaranteed Analysis (For Continuous Liquid Feed)			
20-7-20+ Alkaline	Percentage	Lbs/Ton	Concentration at
Total Nitrogen (N)	20%	400	200 PPM as N
8.26% Ammoniacal Nitrogen			
11.74% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	7%	140	70 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	20%	400	200 PPM as K ₂ O
Sulfur (S)	1.6%	32.8	16.4 PPM as S
1.6% Combined Sulfur (S)			
Boron (B)	0.03%	0.60	0.30 PPM as B
Copper (Cu)	0.01%	0.2	0.1 PPM as Cu
0.01% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2.0	1.0 PPM as Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1.0	0.50 PPM as Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.007%	0.14	0.07 PPM as Mo
Zinc (Zn)	0.02%	0.40	0.20 PPM as Zn
0.02% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Ammonium Sulfate, Potassium Phosphate, Borax, Sodium Molybdate, Copper EDTA, Iron EDTA, Manganese EDTA and Zinc EDTA. Potential acidity equivalent to 524 lbs. Calcium Carbonate per ton.

Acid Special 21-7-7 PLUS

An effective formula that will help in lowering pH when irrigation water or media are high in alkalinity. Generally used as an occasional feed for correcting these problems in most crops and as a basic feed for acid loving woody ornamentals and foliage plants. Commonly used as a foliar application or root feed on ornamentals, turf and nursery stock. Best results are obtained by monitoring media pH on a regular

basis during use of this formula. It will provide immediate but gentle nourishment in a form of application that can overcome and bypass other nutrient complications due to high soil pH problems, and because amounts applied are tuned to the plants immediate needs there is minimal runoff or other environmental problems.

Guaranteed Analysis (For continuous liquid feeding)			
20-20-20+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	21%	420	200 PPM as N
14.00% Ammoniacal Nitrogen			
2.10% Nitrate Nitrogen			
4.90% Urea Nitrogen			
Available Phosphate (P ₂ O ₅)	7%	140	66 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	7%	140	66 PPM as K ₂ O
Sulfur (S)	10%	200	96 PPM as S
Boron (B)	0.02%	0.4	0.1 PPM as B
Copper (Cu)	0.05%	1.0	0.4 PPM as Cu
Iron (Fe)	0.10%	2.0	0.9 PPM as Fe
Manganese (Mn)	0.05%	1.0	0.4 PPM as Mn
Molybdenum (Mo)	0.0009%	0.018	0.01 PPM as Mo
Zinc (Zn)	0.05%	1.0	0.4 PPM as Zn

Derived from Ammonium Sulfate, Ammonium Phosphate, Potassium Nitrate, Urea, Borax, Sodium Molybdate, Copper, Iron, Manganese and Zinc EDTA. Potential acidity equivalent to 1556 lbs. Calcium Carbonate per ton.

Mag-Iron Special 18-6-18 PLUS

Formulated for growers with high calcium bicarbonate water who need to compliment their magnesium level, while supplying additional iron to insure uptake at an elevated media pH. The higher iron levels are provided in two different chelated forms, EDTA and HDTPA. These will guaran-

tee uptake even at extremely high media pH levels. This formula is also recommended as an excellent choice for managing lush green controlled growth on annuals such as calibrachoa, petunias, vinca, roses etc. With over 60% of its Nitrogen in the Nitrate form it will also work well as a dark weather feed.

Guaranteed Analysis (For continuous liquid feeding)			
18-6-18+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	18%	360	200 PPM as N
7.15% Ammoniacal Nitrogen			
10.85% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	6%	120	66.67 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	18%	360	200 PPM as K ₂ O
Magnesium (Mg)	1.30%	26	14.5 PPM as Mg
Sulfur (S) (Combined)	2.35%	47	26.1 PPM as S
Boron (B)	0.02%	0.4	0.2 PPM as B
Copper (Cu)	0.02%	0.4	0.2 PPM as Cu
0.02% Chelated Copper (Cu)			
Iron (Fe)	0.20%	4.0	2.22 PPM as Fe
0.20% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1.0	0.5 PPM as Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.001%	0.02	0.01 PPM as Mo
Zinc (Zn)	0.05%	1.0	0.5 PPM as Zn
0.05% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Ammonium Sulfate, Potassium Nitrate, Potassium Phosphate, Magnesium Sulfate, Boron, Sodium Molybdate and the form of Copper EDTA, Iron EDTA, Iron DTPA, Manganese EDTA and Zinc EDTA. Potential acidity equivalent to 365 lbs. Calcium Carbonate per ton.

General Purpose 20-10-20 PLUS

General Purpose 20-10-20 PLUS is an all purpose feed with elevated levels of Nitrate Nitrogen to give better nutritional control when feeding the cool darker months. Commonly used as a foliar application or root feed on ornamentals, turf and nursery stock. Because it is formulated to provide a balance of both major

and minor elements, it is a safe choice when feeding a wide range of plant life with the same fertilizer. It will provide immediate but gentle nourishment in a form of application that can overcome and bypass other nutrient complication due to soil problems.

Guaranteed Analysis (For continuous liquid feeding)			
20-10-20+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	20%	400	200 PPM as N
12.10% Ammoniacal Nitrogen			
7.90% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	10%	200	100 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	20%	400	200 PPM as K ₂ O
Magnesium (Mg)	0.10%	2.0	1.0 PPM as Mg
0.10% Water Soluble Magnesium (Mg)			
Sulfur (S)	0.10%	2.0	1.0 PPM as S
Boron (B)	0.02%	0.40	0.20 PPM as B
Copper (Cu)	0.05%	1.0	0.50 PPM as Cu
0.05% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2.0	1.0 PPM as Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1.0	0.50 PPM as Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.01%	0.20	0.10 PPM as Mo
Zinc (Zn)	0.05%	1.0	0.50 PPM as Zn
0.05% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Potassium Phosphate, Potassium Nitrate, Borax, Sodium Molybdate, and Copper EDTA, Iron EDTA, Manganese EDTA and Zinc EDTA. Potential acidity equivalent to 420 lbs. Calcium Carbonate per ton.

Azalea Neutral 21-7-7

Azalea Neutral 21-7-7 PLUS is an effective formula that will help in lowering pH when irrigation water or media are high in alkalinity. Formulated for rhododendron crops where a neutral fertilizer is needed in order to avoid further media acidification,

it is generally used as an occasional feed for correcting these problems in most crops and as a basic feed for acid loving woody ornamentals and foliage plants. Commonly used as a foliar application or root feed on ornamentals, turf and nursery stock.

Guaranteed Analysis (For continuous liquid feeding)			
21-7-7+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	21%	420	200 PPM as N
1.42% Ammoniacal Nitrogen			
9.95% Nitrate Nitrogen			
9.63% Urea Nitrogen			
Available Phosphate (P ₂ O ₅)	7%	140	67 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	7%	140	67 PPM as K ₂ O
Magnesium (Mg) (Total)	0.05%	1.0	0.48 PPM as Mg
Sulfur (S)	0.07%	1.4	0.67 PPM as S
0.07% Combined Sulfur (S)			
Boron (B)	0.02%	0.40	0.19 PPM as B
Copper (Cu)	0.05%	1.0	0.48 PPM as Cu
0.05% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2.0	0.95 PPM as Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1.0	0.48 PPM as Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.0009%	0.02	0.01 PPM as Mo
Zinc (Zn)	0.05%	1.0	0.48 PPM as Zn
0.05% Chelated Zinc (Zn)			

Derived from Ammonium Phosphate, Sodium Nitrate, Potassium Nitrate, Urea, Magnesium Sulfate, Boric Acid, Sodium Molybdate, and the EDTA form of Copper, Iron, Manganese, and Zinc. Potential acidity equivalent to 150 lbs. Calcium Carbonate per ton.

Cal-Mag GP 20-5-20 PLUS

With 2% Calcium and .25% Magnesium

The GP stands for general purpose because this is probably one of the most useful nutritional blends ever developed. It can be used as a general feed for a variety of crops. Two thirds of its nitrogen is in the nitrate form making it an acceptable fertilizer for crops responsive to nitrate nitrogen during low light periods. The reduced amount of phosphorous will provide for greater control of inter nodal stretch and it is an excellent alternative to 20-10-20 that will provide other needed nutrients without pushing excessive

growth. It is also an ideal source of calcium as well as some magnesium that is immediately available. It will maintain solubility in the concentrate tank when additional calcium nitrate and/or magnesium nitrate are added. Proper balance of Ca, Mg, and K permits better utility of N. To avoid calcium precipitation do not mix with materials that contain phosphates or sulfates. Cal-Mag GP was designed for growers with relatively pure water as an ammonium based feed containing calcium and magnesium.

Guaranteed Analysis (For Continuous Liquid Feed)			
20-5-20+	Percentage	Lbs.Per	Concentration
Total Nitrogen	20%	400	200 PPM of N
6.67% Ammoniacal N			
13.33% Nitrate Nitrogen			
Available Phosphate (P ₂ O ₅)	5%	100	50 PPM of P ₂ O ₅
Soluble Potash (K ₂ O)	20%	400	200 PPM of K ₂ O
Calcium (Ca)	2.0%	40	20.9 PPM of Ca
Magnesium (Mg)	0.25%	5	2.6 PPM of Mg
Boron (B)	0.02%	0.4	0.2 PPM of B
Copper (Cu)	0.05%	1	0.5 PPM of Cu
0.05% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2	1.04 PPM of Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1	0.5 PPM of Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.002%	0.04	0.03 PPM of Mo
Zinc (Zn)	0.05%	1	0.51 PPM of Zn
0.05% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Potassium Phosphate, Potassium Nitrate, Calcium Nitrate, Magnesium Nitrate, Borax, Sodium Molybdate, and the EDTA form of Copper, Iron, Manganese and Zinc. Potential Acidity equivalent to 235 lbs. Calcium Carbonate per ton.

General Purpose Triple Twenty 20-20-20 PLUS

Nutriculture General Purpose 20-20-20 provides over 60% nutrient value in a 1-1-1 ratio which makes it suitable for general use in a wide variety of growing situations. It is widely used on containerized stock in the nursery industry and for greenhouse crops such as foliage

plants and bedding plants. For institutional and general landscape maintenance, it is ideal because it works well on turf, trees or shrubs as well as blooming plants and can be used as a single all purpose spray feed.

Guaranteed Analysis (For continuous liquid feeding)			
20-20-20+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	20%	400	200 PPM as N
3.98% Ammoniacal Nitrogen			
5.90% Nitrate Nitrogen			
10.12% Urea Nitrogen			
Available Phosphate (P ₂ O ₅)	20%	400	200 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	20%	400	200 PPM as K ₂ O
Magnesium (Mg)	0.10%	2.0	1.0 PPM as Mg
0.10% Water Soluble Magnesium (Mg)			
Sulfur (S)	0.14%	2.8	1.4 PPM as S
Boron (B)	0.02%	0.4	0.2 PPM as B
Copper (Cu)	0.02%	0.4	0.2 PPM as Cu
0.02% Chelated Copper (Cu)			
Iron (Fe)	0.05%	1.04	0.5 PPM as Fe
0.05% Chelated Iron (Fe)			
Manganese (Mn)	0.02%	0.4	0.2 PPM as Mn
0.02% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.0009%	0.018	0.01 PPM as Mo
Zinc (Zn)	0.02%	0.42	0.21 PPM as Zn
0.02% Chelated Zinc (Zn)			

Derived from Ammonium Nitrate, Ammonium Phosphate, Potassium Nitrate, Magnesium Sulfate, Urea, Boric Acid, Sodium Molybdate, and the EDTA form of Copper, Iron, Manganese and Zinc. Potential acidity equivalent to 515.7 lbs. Calcium Carbonate per ton.

Ornamental Special 30-10-10 PLUS

Ornamental Special 30-10-10 PLUS is a 3-1-1 ratio that produces excellent color, vigorous roots and rapid development of all nursery stock in containers or rows. It also promotes good color and lush foliage development in the greenhouse on ornamentals and is widely used on foliage plants and orchids. Its high potential acidity promotes the maintenance of pH on the acid

side. Its high ammoniacal nitrogen content, makes it an ideal feed for outdoor application in the warmer sunnier months. This formula's very low in biuret content, and it's high nitrogen meets the requirements for use with many forms of fir bark. Use on orchids, tropical foliage plants, container azaleas and nursery stock.

Guaranteed Analysis (For continuous liquid feeding)			
30-10-10+	Percent	Lbs/Ton	Concentration at
Total Nitrogen (N)	30%	600	200 PPM as N
3.10% Ammoniacal Nitrogen			
1.90% Nitrate Nitrogen			
25.00% Urea Nitrogen			
Available Phosphate (P ₂ O ₅)	10%	200	67 PPM as P ₂ O ₅
Soluble Potash (K ₂ O)	10%	200	67 PPM as K ₂ O
Magnesium (Mg)	0.05%	1.0	0.33 PPM as Mg
0.05% Water Soluble Magnesium (Mg)			
Sulphur (S) (Combined)	2.45%	49	16.33 PPM as S
Boron (B)	0.02%	0.4	0.13 PPM as B
Copper (Cu)	0.05%	1.0	0.33 PPM as Cu
0.05% Chelated Copper (Cu)			
Iron (Fe)	0.10%	2.0	0.67 PPM as Fe
0.10% Chelated Iron (Fe)			
Manganese (Mn)	0.05%	1.0	0.33 PPM as Mn
0.05% Chelated Manganese (Mn)			
Molybdenum (Mo)	0.0009%	.018	.006 PPM as Mo
Zinc (Zn)	0.05%	1	0.33 PPM as Zn
0.05% Chelated Zinc (Zn)			

Derived from Ammonium Phosphate, Ammonium Sulfate, Potassium Nitrate, Urea, Borax, Sodium Molybdate and the EDTA form of Copper, Iron, Manganese and Zinc. Potential acidity equivalent to 1117 lbs. Calcium Carbonate per ton.

Additional fertilizer materials

Aqua-Sol® Fe Chelated Irons

Three Irons with the most advanced chelation available to cover the complete pH spectrum. Completely soluble and compatible with most water based application materials.

Aqua-Sol® Fe 13% EDTA
Derived from Sodium Ferric Ethelenediaminetetraacetic Acid. For correction of Iron chlorosis in acid soils.

Aqua-Sol® Fe 11% DTPA
Derived from Diethelenediaminepentaacetic Acid. For correction of Iron deficiencies in slightly alkaline and calcareous conditions.

Aqua-Sol® Fe 6% EDDHA
Derived from Sodium Ferric Ethelenediamine di-(hydroxyphenylacetate) For correction of Iron deficiency in alkaline and calcareous conditions.

Mor-Green®

For use on Iron-deficient soils. Mor-Green is a preventive and cure of Iron chlorosis in lawns, trees and flowering shrubs. Unlike many irons, Plant Marvel's Mor-Green is 100 percent water-soluble, allowing extremely rapid green-up when applied as a soil treatment or foliar spray.

Elemental Iron (Fe) 7%
(10% as Fe_2O_3) Technical (Fe) Ethylenediamine Triacetate

OBR®

Organic Bicarbonate Reducer

Highly effective citric acid based treatment for buffering high bicarbonates and reducing pH in both the water and growing media.

Chemec® B

EDTA Chelated Trace Element Complex

Chemec is a completely soluble, high quality, concentrated micronutrient compound in chelated form.

Guaranteed Analysis
Magnesium (Mg) .. 1.58%
Boron (B)..... 1.3%
Copper (Cu) 0.10%
Iron (Fe)..... 7.0%
Manganese (Mn) 2.0%
Molybdenum (Mo) 0.06%
Zinc (Zn)..... 0.40%

Derived from Magnesium Sulphate, Boric Acid, Sodium Molybdate, Iron EDTA, Iron EDDHA, Copper EDTA, Manganese EDTA, and Zinc EDTA.

Molybdenum (1 oz. packages)

Pre-measured, easy-to-use packets of Mo for poinsettias' special needs.

Mag-Iron®

Mag-Iron is a highly effective source of Magnesium and Iron which are essential for the growth and development of plants.

Iron (Fe) 6%
Magnesium (Mg) 4.5%

Derived from Iron EDTA and Magnesium Sulfate, with Blue Tracer Dye.

Sol-Trace® Soluble Trace Element Mix

A non-chelated minor element mix that is highly soluble and designed for prevention or correction of micronutrient deficiencies through foliar application or as a supplement along with N-P-K fertilizer. Stops yellow leafing, stunting and die back caused by micronutrient deficiency.

Sulfur (S)..... 14.75%
Boron (B) 1.45%
Copper (Cu) 3.20%
Iron (Fe) 7.50%
Manganese (Mn)..... 8.15%
Molybdenum (Mo) ... 0.046%
Zinc (Zn) 4.50%
Derived from Boric acid, Sodium Molybdate and the sulfate form of Copper, Iron, Manganese, and Zinc.

Distributed By:

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