TotalGrow™ TG15A Broad Grow Spectrum Usage Guidelines

Sole Source (100% Artificial) Lighting					
Light Intensity	*Plant Size (in)*	*Fixture Spacing (ft)**	*Coverage (sq ft)*	*Target Height (ft)***	*Effective µmole/m2/s****
Low	0-6	3.5x5.5 - 4.5x6.5	20-30	2.5 - 4	75 -120
Medium	6-15	2.5x4.5 - 3.5x5.5	12-20	1.5 - 3	120 - 190
High	15-30	2x4 - 2.5x4.5	8-12	1 - 2	190 - 290
Highest	30 +	1x3 - 2x4	3-8	0.5 - 1	290 - 460

Supplemental (Greenhouse) Lighting					
Light Intensity	*Plant Size (in)*	*Fixture Spacing (ft)**	*Coverage (sq ft)*	*Target Height (ft)***	*Effective µmole/m2/s****
Low	0-6	8x10 - 10x12	80 - 120	7 - 9	20 - 30
Medium	6-15	6x8 - 8x10	50 - 80	5 - 7	30 - 50
High	15-30	4x6 - 6x8	25 - 50	3 - 5	50 - 90
Highest	30 +	2x4 - 4x6	10 - 25	1 - 3	90 - 230

Note: Based on a large grid of fixtures or reflective walls. Less coverage is achieved by lights without reflective walls or neighboring lights.

*Using 2' greater spacing between fixtures parallel to the long edge maximizes uniformity, but other options are also effective.

**Lower Heights will decrease uniformity. Higher heights increase light spillage outside of a grow area and should only be used for large installations if possible.

***Effective µmole/m2/s PAR represents a 25% spectral advantage over non-optimized PAR sources and 85% of initial output to represent average lifetime output.

High Pressure Sodium (HPS) Replacement	
HPS Fixture Power	*TG15A Equivalent Fixtures*
400W HPS	1 - 1.5
600W HPS	1.5 - 2.5
1000W HPS	2.5 - 4
Result: 40-70% Power Savings	

Multiple TG15A Fixture Luminance

Average µmole/m2/s Effective PAR by Spacing

Long Side Centers (ft) \ Short Side Centers (ft)	1	2	3	4	5	6	7	8	9	10	11
3	762	381	254	191	152	127	109	95	85	76	69
4	572	286	191	143	114	95	82	71	64	57	52
5	457	229	152	114	91	76	65	57	51	46	42
6	381	191	127	95	76	64	54	48	42	38	35
7	327	163	109	82	65	54	47	41	36	33	30
8	286	143	95	71	57	48	41	36	32	29	26
9	254	127	85	64	51	42	36	32	28	25	23
10	229	114	76	57	46	38	33	29	25	23	21
11	208	104	69	52	42	35	30	26	23	21	19
12	191	95	64	48	38	32	27	24	21	19	17
13	176	88	59	44	35	29	25	22	20	18	16

Minimum Heights by Spacing

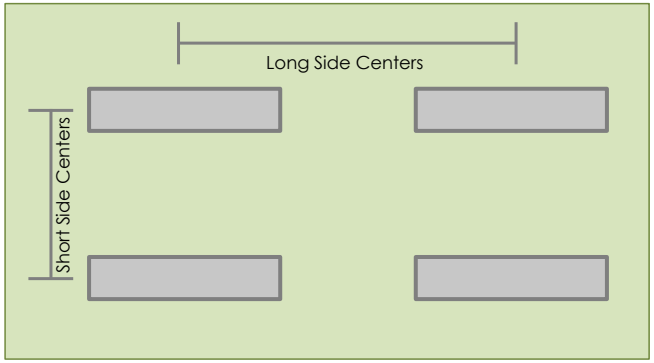
Long Side Centers (ft) \ Short Side Centers (ft)	1	2	3	4	5	6	7	8	9	10	11
3	0.5	1	2	3	4	5	6	7	8	9	10
4	1	1	2	3	4	5	6	7	8	9	10
5	2	2	2	3	4	5	6	7	8	9	10
6	3	3	3	3	4	5	6	7	8	9	10
7	4	4	4	4	4	5	6	7	8	9	10
8	5	5	5	5	5	5	6	7	8	9	10
9	6	6	6	6	6	6	6	7	8	9	10
10	7	7	7	7	7	7	7	7	8	9	10
11	8	8	8	8	8	8	8	8	8	9	10
12	9	9	9	9	9	9	9	9	9	9	10
13	10	10	10	10	10	10	10	10	10	10	10

Square Feet Covered

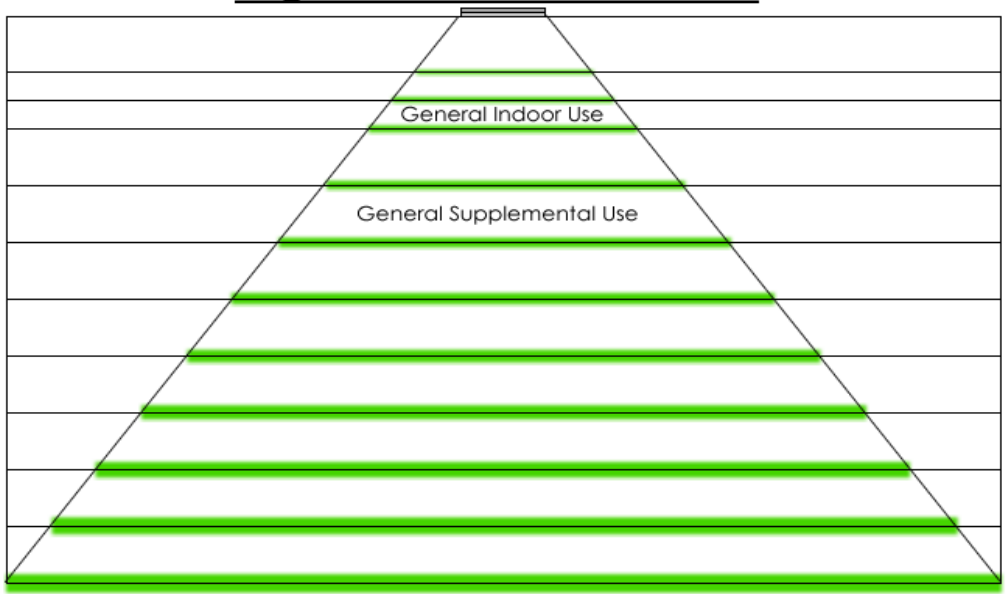
Long Side Centers (ft) \ Short Side Centers (ft)	1	2	3	4	5	6	7	8	9	10	11
3	3	6	9	12	15	18	21	24	27	30	33
4	4	8	12	16	20	24	28	32	36	40	44
5	5	10	15	20	25	30	35	40	45	50	55
6	6	12	18	24	30	36	42	48	54	60	66
7	7	14	21	28	35	42	49	56	63	70	77
8	8	16	24	32	40	48	56	64	72	80	88
9	9	18	27	36	45	54	63	72	81	90	99
10	10	20	30	40	50	60	70	80	90	100	110
11	11	22	33	44	55	66	77	88	99	110	121
12	12	24	36	48	60	72	84	96	108	120	132
13	13	26	39	52	65	78	91	104	117	130	143

Default Spacing/Heights/Coverage
Optimum (university recommended) general supplemental light level of 50 µmole/m2/s effective PAR
Common supplemental lighting range actually provided is approximately 20-40 µmole/m2/s effective PAR
Sole lighting (100% artificial) levels generally 100-300 µmole/m2/s effective PAR

Note: Multiple Fixture estimates based on completely surrounded fixtures; effective µmole/m2/s PAR represents a 25% spectral advantage over non-optimized PAR sources and 85% of initial output to represent average lifetime output.



Single TG15A Fixture Luminance



Height (ft.)	Coverage Area (ft.)	Average Effective Light
1	3x2	237 µmole*m-2*s-1
1.5	4x3	153 µmole*m-2*s-1
2	4x3	115 µmole*m-2*s-1
3	6x4	52 µmole*m-2*s-1
4	7x6	30 µmole*m-2*s-1
5	8x7	22 µmole*m-2*s-1
6	10x9	15 µmole*m-2*s-1
7	12x10	11 µmole*m-2*s-1
8	14x12	8.1 µmole*m-2*s-1
9	15x13	6.8 µmole*m-2*s-1
10	16x14	5.5 µmole*m^{-2}*s^{-1}

Note: Single fixture coverage areas defined as the region with >40% of the light intensity under center. Effective light represents a 25% spectral advantage over non-optimized PAR sources and 85% of initial output.