

## Distribution Center Warehouse Lighting Recommendations

10/26/06

### All Warehouse Areas - General

- Maintained light levels to meet or exceed the greater of ANSI/IESNA Standard RP-7-01 or the levels set forth below.
- Lighting power density not to exceed 0.60 watts per square foot for the entire building area, or 50% of the 2001 ASHRAE Standard 90.1 using the space by space method. To be validated to meet EPACK 2005 requirements for favorable tax treatment of capital invested in lighting system.
- Fluorescent Hi-bays to be equipped with program start electronic ballasts.
- Fluorescent lamps to be minimum 85 CRI and 41K color temperature.
- Individual fixture automatic occupancy sensor controls on all Hi-bay fixtures with the exception of stumble/egress lighting. Daylight and occupancy controls where appropriate.
- Fixtures suitable for operation up to 55c ambient temperatures to guard against shortened ballast life.
- All light levels are set forth as reasonable ranges to guard against waste related to over design. Light level values taken on horizontal plane at 36" AFF.

### Warehouse Light Levels - IESNA RP7-01 Illuminance Categories B, C, and D

- Shipping Docks: Range of 15-25fc. Target average of 20fc maintained.
- Hi-Piled Racked Storage Aisles: Range of 10-20fc. Target average of 15fc maintained.
- Open Bulk Storage: Range of 7.5-17.5fc. Target average of 12.5fc maintained.
- Active Order Pick Modules: Range of 25-35fc. Target average of 30fc maintained.

### Warehouse Lighting Automatic Controls

- Shipping Docks: Fixtures to be partially controlled for Hi-lo operation. Individual fixture occupancy sensor controls to be utilized with 360 degree coverage pattern. If sufficient skylights and natural lighting are present, combination daylight and occupancy controls to be utilized.
- Hi-Piled Racked Storage Aisles: Fixtures to be fully controlled for on-off operation. Individual fixture occupancy sensor controls to be utilized with aisle view coverage pattern. Cross traffic aisle fixtures to be partially controlled for Hi-lo operation.
- Open Bulk Storage: Fixtures to be partially controlled for Hi-lo operation. Individual fixture occupancy sensor controls to be utilized with 360 degree coverage pattern. If sufficient skylights and natural lighting are present, combination daylight and occupancy controls to be utilized.
- Active Order Pick Modules: To be controlled via zoned switch and contactor arrangement at a central entry location in the pick module area. Adequate constant on stumble/egress lighting to be provided to allow over-ride switches to be used. Occupancy based controls to be used on an aisle by aisle basis where practical.

Caution – The preceding are guidelines that we have found to be extremely functional, however light level requirements are subjective. Understanding, guiding, and meeting the owner occupiers expectations is critically important and is easily handled in advance of the project. Meeting undefined expectations after the fact is extremely difficult. A demonstration of delivered light levels in advance is always recommended.