CERTOLUX
SPECIALTY LUMINAIRES

Clean Room Classifications

ISO Class	Maximum Number of Particles in Air (particles in each cubic meter equal to or greater than the specified size)						Federal STD 209E Class
	Particle size						
	> 0.1 µm	> 0.2 µm	> 0.3 µm	> 0.5 µm	> 1 µm	> 5 µm	
ISO Class 1	10	2					NA
ISO Class 2	100	24	10	4			NA
ISO Class 3	1000	237	102	35	8		1
ISO Class 4	10,000	2,370	1,020	352	83		10
ISO Class 5	100,000	23,700	10,200	3,520	832	29	100
ISO Class 6	1,000,000	237,000	102,000	35,200	8,320	293	1000
ISO Class 7				352,000	83,200	2930	10000
ISO Class 8				3,520,000	832,000	29,300	100000
ISO Class 9				35,200,000	8,320,000	293,000	NA

IP (Ingress Protection) and NEMA Classifications (comparison)

IP Classifications

Ingress Protection class of enclosures is according to IEC 529 stated in the form of IP classification. It is a two digit coding system which is shown below.

First Digit

Protection against contact and ingress of solid objects

0	No special protection
1	Protected against ingress solid objects with a diameter of more than 50mm. No protection against deliberate access, e.g. with a hand, but large surfaces of the body are prevented from approach
2	Protected against penetration by solid objects with a diameter of more than 12mm. Fingers or similar objects prevented from approach
3	Protected against ingress of solid objects with a diameter of more than 2.5mm. Tools, wires etc. with a thickness of more than 2.5mm are prevented from approach
4	Protected against ingress of solid objects with a diameter of more than 1mm. Tools, wires etc. with a thickness of more than 1mm are prevented from approach
5	Protected against harmful dust deposits. Ingress of dust is not totally prevented but the dust must not enter in sufficient quantity to interface with satisfactory operation of the equipment. Complete protection against contact.
6	Protection against ingress of dust (dust tight). Complete protection against contact.

Second Digit

Protection against ingress of water

0	No special protection
1	Protection against dripping water falling vertically. No harmful effect must be produced. (vertically falling drops)
2	Protection against dripping water falling vertically. There must be no harmful effect when the equipment (enclosure) is tilted at an angle up to 15° from its normal position. (drops falling at an angle)
3	Protection against water falling at any angle up to 60° from the vertical. There must be no harmful effect (spray water).
4	Protection against water splashed against the equipment (enclosure) from any direction. There must be no harmful effect (splashing water).
5	Protection against water projected from a nozzle against the equipment (enclosure) from any direction. There must be no harmful effect (water jet).
6	Protection against heavy seas or powerful water jets. water must not enter the equipment (enclosure) in harmful quantities (splashing over).
7	Protection against water when the equipment (enclosure) is immersed in water under defined conditions of pressure and time. Water must not enter in harmful quantities (immersion).
8	The equipment (enclosure) is suitable for continuous submersion on water under conditions which must be specified by the manufacturer (submersion).

NEMA/UL Classifications

NEMA performance criteria and test methods are used by Underwriters Laboratories as guidelines for investigation and list of electrical enclosures.

Approximate IP(Ingress Protection) equivalents in red.

1 IP30	Indoor use primarily to provide a degree of protection against contact with the enclosure equipment and against a limited amount of falling dirt.
2 IP31	Indoor use to provide a degree of protection against limited amounts of falling water and dirt.
3 IP64	Outdoor use to provide a degree of protection against windblown dust, rain and sleet, undamaged by the formation of ice on the enclosure.
3R IP32	Outdoor use to provide a degree of protection against rain and sleet, undamaged by the formation of ice on the enclosure.
4 (X) IP66	Indoor or outdoor use to provide a degree of protection against splashing water, windblown dust and rain, hose directed water, undamaged by the formation of ice on the enclosure. (Resist corrosion).
12/12K IP65	Indoor use to provide a degree of protection against dust, falling dirt and dripping non corrosive liquids.
13 IP65	Indoor use to provide a degree of protection against dust and spraying of water, oil and non corrosive coolants.

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