

Comparison of Enclosure Standards

ENCLOSURES :

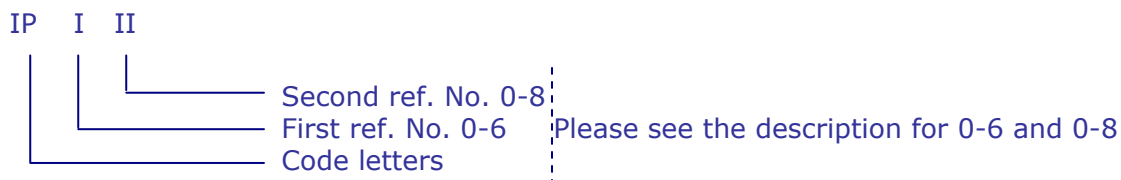
Enclosures play a vital role in the performance of electrical and C&I system. Many organizations like NEMA (National Electrical Manufacturers Association), UL (Underwriters Laboratories), CSA (Canadian Standards Association), IEC (International Commission), VDE (Institute of German Electronics Engineers) and TUV (Rheinland of North America) are available to certify enclosure's ability to resist external environmental influences.

AMERICAN STANDARDS :

In North America NEMA, UL and CSA are the commonly recognized organization. UL and CSA both require enclosed testing by qualified evaluator labs. NEMA does not require independent testing and leaves compliance up to the manufacturer.

EUROPEAN STANDARDS :

In Europe, IEC ratings are adopted which are based on performance criteria similar to NEMA with different interpretations of enclosure performance. IEC does not specify degrees of protection against risk of explosions or conditions such as moisture or corrosive vapors as NEMA does. IEC enclosure classifications and designations can not be exactly equated with NEMA enclosure type numbers. IEC uses IP (Ingress Protection) ratings to define the degree of protection provided by an enclosure using a two digit numerical classification. The first number defines the degree of protection against solid objects and the second number defines the degree of protection against water as detailed below:



INDIAN STANDARDS :

In India most of electrical apparatus / Instruments manufactures follow IEC Standards

DESCRIPTION OF FIRST REFERENCE 0-6		DESCRIPTION OF SECOND REFERENCE 0-8	
0	No Protection	0	No Protection
1	Protection against large foreign bodies	1	Protection against large vertically falling dripwater
2	Protection against medium-sized foreign bodies	2	Protection against drip water falling at a slant
3	Protection against small foreign bodies	3	Protection against splash water
4	Protection against granular foreign bodies	4	Protection against spray water
5	Protection against dust deposits	5	Protection against water jets
6	Protection against ingress of dust	6	Protection against flooding
		7	Protection against immersion
		8	Protection against submersion

COMPARISON		
NEMA, UL & CSA, TYPE RATING	Equivalent IEC (IP) IEC (IP) Classification	Abbreviated protection description
1	IP 23	Indoor Protection from contact with contents
2	IP 30	Indoor with limited protection from dirt & water
3	IP 64	Outdoor with some protection from rain, sleet winblown dust and ice damage
3R	IP 32	Outdoor with some protection from rain, sleet and ice damage
4	IP 66	Indoor and outdoor with some protection from wind blown dust, rain, splashing water, hose directed water and ice damage.
4X	IP 66	Indoor and outdoor with some protection from corrosion, wind blown dust, rain, splashing water, hose directed water and ice damage.
6	IP 67	Indoor and outdoor with some protection from hose directed water, entry of water during submersion at limited depth. ice damage.
12	IP 55	Indoor with protection against dust, spraying water, oil, and non corrosive liquids.
13	IP 65	Indoor and outdoor with protection against dust, spraying water, oil, and non corrosive liquids.

Ref : Abstract from DIN40050 BI.1 engl. Preisgr.4, and control Engineering