

*Preparation of an enclosure, either for test of ingress protection in its own right, or as part of the requirements of explosion-protection techniques, must take into account:*

- The ability to resist impact tests
- Resistance to corrosion in whatever atmosphere the enclosure is to be placed in service
- Resistance to corrosion of solvents that might be present in service
- The ability to withstand the affects of Fungus, Vermin, Solar radiation, Moisture and
- Explosive atmospheres.

All electrical enclosures must be constructed in such a way as to prevent inadvertent contact with live parts within them.

The IP Code sets down double numeral and optional letter references to provide simple identification as to the tested design so that appropriate selection can be made for specific service application.

- The first numeral identifies the degree of protection against access to hazardous parts – IPXX. There are seven numbers (including zero '0') and the whole numbers also represent the protection against entry of solid foreign objects. "0" indicates there is no protection, e.g. IP00
- The second numeral identifies the degree of protection against ingress of water IP-X. There are up to eight whole numbers covering the water characteristics and zero "0" also means "non-protected".
- Letter references include 'A', 'B', 'C', 'D' covering protection of equipment and supplementary letters 'H', 'M', 'S', and 'W' covering protection of persons.

**For example,** the minimum IP Code for an Ex e motor Terminal Box is IP54.

Reference to the Tables in IEC 60529 should be made to ensure that the enclosure meets the relevant conditions of the "Ex" Standards or the application in which it is intended to use the enclosures whether it is a Safe Area or Hazardous Location. In-house tests are recommended to gain confidence in the design, before submitting the enclosures to a Testing Laboratory. Improvised test equipment may give the manufacturer an indication whether the equipment will pass or fail, before the controlled test in the dust and water areas of the laboratory.

It should be remembered that the numerals '7' and '8' of the water code signify "immersion". The lower numbers rise from protection against vertically

falling water drops, through spraying, to water jets with IPX6 being the most powerful jet. A test for IPX7 or IPX8 immersion does not mean that the enclosure is suitable to resist water jets and, therefore, the enclosure must be tested for IPX5 or IPX6 if there is the risk of water jets being applied during service. This would give, for example, the marking code as IPX5/IPX7 or IPX6/IPX7. IPX7 or IPX8 are restricted to specific use, whereas the dual marking gives greater flexibility of use for a given enclosure.

All of the above must be taken into account before presenting any enclosure for test and an understanding of the requirements of the Standard is essential to the ultimate success of the product when presented either as an empty enclosure or as part of the application for Certification to one or more of the types of explosion-protection techniques.

### **Testing for Explosion-protection technique**

It is important to recognise that, before an "Ex" enclosure is tested for IP Code, the order of tests laid down in the General Requirements Standard IEC 60079-0 or IEC 61241-0 must be followed. This includes the impact test and materials tests that are relevant to the enclosure. Heat, Cold, Humidity, Resistance to Light or shock of Impact may cause the enclosure to fail the IP tests. Therefore, it is wise to carry out development tests before submitting the product for Certification.