

MICE, IP and harsh environments

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When today’s communications professionals are faced with designing a system infrastructure that will be placed in a environment that is not suitable for standard cable and connectors difficult decisions must be made. Designers must look to connectors and cable that are specifically designed for harsh environments.

The first step in specifying a connection system is to identify the specific type of environment the connectors and cable will be placed. Today’s environments can be defined using help from the various standards committees. To describe possible environmental conditions within industrial sites, the Telecommunications Infrastructure Association (TIA) has created Mechanical, Ingress, Climatic/Chemical and Electromagnetic (MICE) tables. MICE Level 1 describes a typical office environment. MICE 2 describes a slightly harsher setting. MICE 3 describes a heavy industrial environment. See (Table 1) below.

Protection against solid objects

0	No special protection
1	Protection against accidental touch by hands
2	Protection against objects such as fingers
3	Protection against tools and wires
4	Protection against tools, wires, small wires
5	Limited protection against dust
6	Protected from dust

Table 1

The MICE tables do not constitute a set of requirements for cabling, but they do provide a helpful context for evaluating your specific environment and selecting cabling systems that are compatible. Also consider that your cabling run may pass through multiple MICE environments. TIA specifies minimum requirements for the

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telecommunications infrastructure, including pathways and spaces within and between industrial buildings and structures...specifies cabling requirements, cabling distances, telecommunications outlet/connector configurations, and topologies...cabling specified by this standard is intended to support a wide range of different sites and applications (voice, data, text, video, industrial and building controls, security, fire alarm and image within industrial environments that can include wide ranges of temperature, humidity, electrical noise, shock, vibration, corrosive gases, dust and liquids.”

The second step is to determine the IP Code or ingress protection rating for the connector you will be using. As defined in international standard IEC 60529, IP Code classifies and rates the degrees of protection provided against the intrusion of solid objects, dust, accidental contact, water, and liquids. The numbers indicate the level with the conditions summarized in (tables 2) below. Where there is no protection rating with regard to one of the criteria, the number is replaced with the letter X. The first numbers relates to the intrusion of the solid objects. The second number relates to the intrusion of water and liquids present in the environment. The specifications beyond IP 67 connectors i.e., IP68 is defined by the manufacturer for submersion into liquids. Be careful to insure the specific need of your installation are being met. IP 67 connections come in Variant 1 quarter turn bayonet, Variant 4 Push pull style, Variant 5 for power over Ethernet, as well as variants 6 and 14. (metal and plastic versions are available). M 12 circular connectors are also available in IP 67.

Protection against liquids

0	No protection
1	Protection against vertically dropping condensation
2	Protection against direct sprays of water up to 15 degrees from vert.
3	Protection against direct sprays of water up to 60 degrees from vert.
4	Protection from sprays of water in all directions. Limited water ingress permitted
5	Protection from low pressure jets of water in all directions. Limited water ingress permitted
6	Nearly the same as # 5, except for ship decks
7	Protected against the effects of immersion in water to depth between 15 cm and 1 meter

Table 2

Finally, special care must be taken during installation to maintain the IP rating of the connections. Following all of the manufactures instructions for termination techniques must be followed. Proper testing of connections should be preformed after installation. Metz Connect provides a complete line if IP rated products including Variant 1, 4, 5, 6, 14 as well as M-12 D and X coded versions.

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