Molex offers a wide range of Infrastructure Solutions Engineered Specifically for Harsh Environments

Brad® Products rugged design and construction provides easy installation and long-term reliability for Industrial Ethernet applications.

**Business Challenge:** Commercially Available Ethernet Components Are Typically Designed For Office Environments, Not For Use In Harsh-Duty Industrial Environments. Conditions that define the environment as harsh-duty can include the presence of vapor, weld spatter, extreme temperature fluctuation and vibration. However, in an automation plant setting, network components must be specifically designed and built to perform flawlessly in harsh environments. These harsh-duty conditions are defined as MICE environments in ISO/IEC 24702 and TIA-1005 standards. The environmental components break down into the following:

- **Mechanical:** shock, impact, vibration, bending/flexing, and crush
- **Ingress:** particulates (dust) ingress and liquid immersion
- **Climatic/Chemical:** temperature, thermal shock, humidity, UV, and chemical pollution
- **Electromagnetic:** electrostatic discharge, radiated and conducted radio frequency, surge (transient ground potential difference), and magnetic field

The MICE levels are broken down as follows:

- **MICE 1:** Essentially a description of the commercial office environment
- **MICE 2:** Light industrial environment: assembly, health care, material handling
- **MICE 3:** Industrial environment: automotive, machining, petro-chemical, foundry

Ethernet uses structured network architecture for connecting devices to one another. While the electrical characteristics are kept within strict bounds, the topology can be wired in many different ways. Renowned for speed of transfer, when one device needs to send out information to another on Ethernet, it begins the transmit immediately.

If no other traffic is detected during the transmit, the information arrives successfully at the target destination. If another device attempts to send out information at the same time, the two packets will collide and be destroyed. In an office environment, collisions and the resending of data is a common occurrence causing no harm. However, in a plant-floor environment determinism of the data is very important. Collisions and resending of data is not acceptable network behavior.

**Solution:** Through Its Line of Brad® Products, Molex Offers a Wide Range of Infrastructure Solutions For Harsh-Duty Industrial Ethernet.

- **Connectivity product M12 4-pin (2-pair) D-Coding connectors, cordsets and distribution boxes for sensor, actuator and bus network applications are based on the M12 design, has been a proven connector design in the MICE3 environment. The M12 connector is designed for Industrial Ethernet. The RJ-45 connector family uses the technology of industrial connector knowledge and isolates the connector interface from vibration, shock, and ingress of fluids. The cordsets feature a Teflon coating on coupling nuts, weld-spatter-resistant molding material and oil-resistant cable.

- **Industrial Ethernet switches route Ethernet messages intelligently, eliminating collisions and providing deterministic performance. Features include a vast selection of port configurations, formats designed for in-cabinet and on-machine for harsh environments, support of unmanaged/managed applications, and SNMP diagnostic software tool.

- **Network interfaces connect PCI bus computers running “soft” PLC, HMI/OI or SCADA applications, PACs and OEM devices using communication products embedded tools to Industrial Ethernet.

- **Control products network I/O available for both in-cabinet and harsh on-machine applications, provides a reliable solution for connecting industrial controllers communicating on Industrial Ethernet to I/O devices such as sensors.

- **The modular wiring systems meet the NFPA-79-2002 standard for soft-wired systems for industrial machinery. This code-compliant wiring system features rugged, factory-applied connector heads (NEMA 6P and IP67 rated, IP69K rated in stainless steel version) molded onto cables in a complete system.

**Benefits and ROI:** When designing an automation system that incorporates an Ethernet network, it is important to consider specific industrial environmental conditions. Brad infrastructure solutions for harsh-duty Industrial Ethernet will produce the benefits and return on your investment that are imperative for your company to stay competitive in today's global market arena.

To learn more about Brad automation products and solutions, call your Molex representative today or call 1-800-225-7724 or visit www.molex.com or www.woodhead.com