



Cable Solutions for the Water Treatment Industry



Marmon Industrial Energy & Infrastructure is one of the most reputable industrial cable manufacturers in the world. Manufactured in the United States of America with rigorous attention to detail and quality standards, Marmon IEI's products are specified by many industry leaders for some of the most challenging projects. As part of the Marmon Group and Berkshire Hathaway, Marmon IEI has the financial backing, technical support, and resource sharing of other Marmon Wire & Cable companies, giving Marmon IEI an advantage when dealing with even the most complex requirements. Marmon IEI's core strengths include the ability to design cables to meet the stringent requirements of our customers, fast delivery to meet on-site needs, and the capability to meet various regulatory standards.

INSTRUMENTATION

Instrumentation cables monitor process parameters such as pressure, flow rate, and temperature by transmitting high-quality, low voltage signals to the instrumentation and process control room. These cables are typically multiple twisted-pair configurations with each pair gathering one set of process data. Shielding, a Marmon IEI innovation, prevents noise and interference and helps to maintain signal quality.

CONTROL

Control cables carry power to change process parameters from the control room to the remote equipment. Control cables are typically comprised of 14 AWG and larger conductors, with additional grounding conductors and shielding included as needed.

CIRCUIT INTEGRITY

Circuit Integrity cables are meant to perform in the event of a fire emergency. These specialty cables are typically installed in critical circuits, allowing for extended control and monitoring times, even in an emergency situation.

DIGITAL DATA

Digital Data cables, such as Fieldbus and Category cables, are serial, two-way, digital communication cables specifically designed for process monitoring. Communication is provided via twisted-pairs of conductors with specific electrical characteristics and construction features depending upon the certification.

THERMOCOUPLE EXTENSION

Thermocouple Extension cables allow for the remote monitoring of thermocouples from a central location. These cables are available in several common thermocouple types.

COMPOSITE CABLES

Composite cables combine the above types into one convenient package, providing for an all-in-one solution. These cables are especially helpful when space or ease of installation is a concern.

Instrumentation and Control Cables, configurations and options:

CONDUCTORS

Bare, tinned, or nickel-plated annealed copper and most thermocouple alloys, in solid, 7-strand, or 19-strand configurations from 20 AWG to 8 AWG are common in Marmon IEI's products. Additional sizes, metric conductors, and alternative stranding options are available upon request.

INSULATIONS

Marmon IEI offers both thermoset and thermoplastic insulation compounds including PVC, PVC/Nylon, XLPE, HDPE, and Silicone. Specialty compounds are available upon request.

JACKETS

Jackets, sometimes known as sheaths, are provided in similar compounds as the insulation. These compounds include PVC, CPE, TPN (LSZH), LDPE, HDPE, Nylon, and Polyurethane, some of which are available in low-temperature capable versions. Specialty compounds may also be available upon request.

SHIELDING

Marmon IEI, the innovator of EMI shielding, provides a variety of options in shielding to prevent noise and interference and helps to maintain signal quality. Typical shields are an aluminum tape with polyester backing. Drain wires are combined with the shield and are in contact with the conductive side of the tape, allowing for easy termination and grounding. Additional shielding materials, such as copper, are also available. Braided shields are also available.



APPROVALS & RATING

Marmon IEI manufactures cables to various construction standards and voltage ratings. Marmon IEI offers products that can comply with domestic and international standards, as well as various material and cable test standards.

- **Design Standards:**
Most Marmon IEI products are manufactured to Underwriter's Laboratories (UL) standards such as UL 13 (PLTC), UL 2250 (ITC), UL 1277 (TC), UL 1569 (MC), and UL 2225 (MC-HL). Other common standards used for Marmon IEI products include ICEA S-73-532, BS 5308, BS EN 50288-7, IEC 60502, and AS/NZS 5000.
- **Conductors:**
Marmon IEI's conductors are certified to ASTM B3, B33, & B8, when applicable. Compliance with IEC 60228 and AS/NZS 1125 is also available.
- **Temperature Rating:**
Marmon IEI offers most products with temperature ratings from -50°C to 105°C, depending upon the cable's construction.
- **Flame Retardancy:**
Most of Marmon IEI's products have been certified to meet one or more of the following test standards: UL 1685, IEEE 1202, VW-1, FT4, and/or IEC 60332.
- **Fire Resistance:**
Circuit Integrity Cables are available in several configurations which comply with IEC 60331. Additional Fire Resistance compliance may be available upon special request.
- **Water, Oil, & Chemical Resistance:**
Marmon IEI's products meet the standard UL requirements for water, oil, and chemical resistance. Resistance to a specific material varies by compound and construction. Compliance to additional test standards may also be available.
- **Sunlight (Ultraviolet) Resistance:**
Marmon IEI's products comply with the UL requirements for ultraviolet exposure and are marked as "Sunlight Resistant." Compliance to additional test standards may also be available.
- **In-ground Use:**
Most of Marmon IEI's products are suitable for in-ground use. Applicable UL products are marked as "Direct Burial" cables.

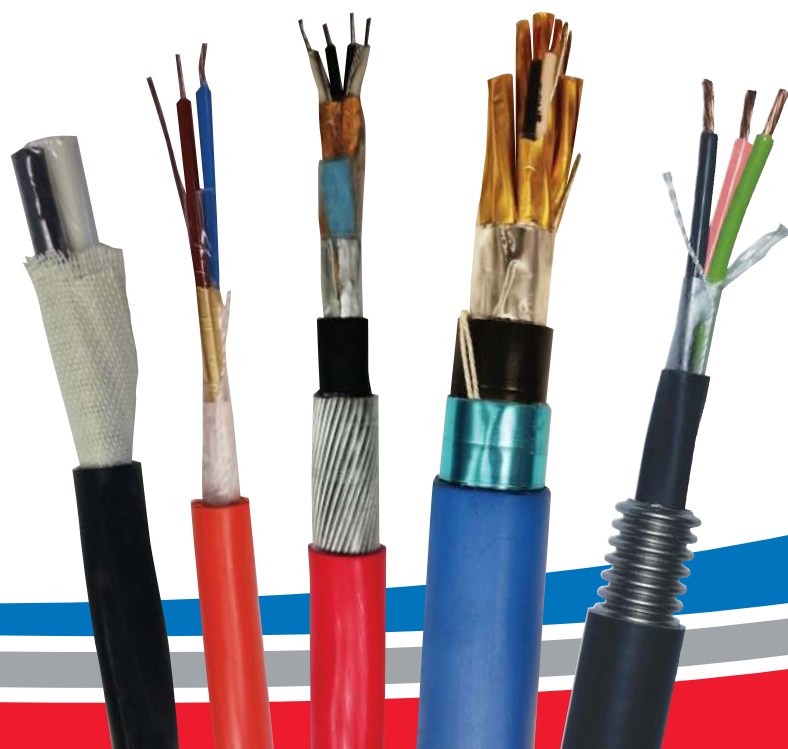
SPECIALTY RATINGS

- **ER (EXPOSED RUN)**
These cables provide additional impact and crush resistance, allowing the cable to be run outside of a cable tray or conduit. ER ratings are available for many constructions.
- **HL (HAZARDOUS LOCATIONS)**
Marmon IEI offers many cables which are suitable for use in Class I, Division 1, Division 2, Zone 1 and Zone 2. These cables meet very stringent construction and performance standards, ensuring safe operation in the most dangerous environments.
- **FIELD BUS**
Fieldbus cables can be certified to meet FieldComm FF-844 H1 and/or IEC 61158 standards.

ARMOR

Marmon IEI offers several armor options to provide additional protection for various applications. These armors have various benefits, and are ideally suited for various applications.

- **DEKABON®**
Marmon IEI's innovative Dekabon® chemical and moisture barrier provides a gas and liquid-tight metallic seal around a cable, making it ideal for use in-ground and near gasses and liquids.
- **GARDEX®**
This continuously-corrugated, welded aluminum armor is the most common method used to provide additional protection to cables used in hazardous locations. It offers great strength and a hermetic seal, eliminating the need for conduit.
- **SERVED WIRE ARMOR (SWA)**
Consisting of numerous strands of galvanized steel wire which are wrapped (served) around the cable. SWA provides a low-cost method to greatly increase the cable's cut-through resistance without sacrificing flexibility.
- **INTERLOCKED ARMOR (ILA)**
Available in both galvanized steel and aluminum, ILA offers cut-through resistance and also provides additional mechanical protection without sacrificing flexibility.
- **DUAL ARMOR**
When multiple layers of protection are required, Marmon IEI can help. Most armor types, such as SWA and Dekabon®, can be combined to provide even greater protection, even in the most demanding situations.



Packaging & Documentation

If requested prior to ordering, Marmon IEI can provide Certificates & Test Reports (Certificates of Conformance) for every item on an order shipment.

Custom reel tags can be printed to meet customer requirements if they are requested prior to placing an order.

Unless otherwise specified, cables are delivered on wooden reels from 16 up to 96 inches in diameter. On most reels, there is an option to add lagging (wooden planks nailed to the reels flanges) to prevent damage to the cable while in transit. Marmon IEI's wooden reels are heat-treated and comply with international phytosanitary requirements.

Cable ends (known as "pig tails") are left exposed on the outside of the reel to allow for final testing. They are sealed with heat-shrink caps during shipment.

CHEMICAL RESISTANCE GUIDE

CHEMICAL	JACKET MATERIAL					
	CPE	HDPE	LDPE	TPN	TPU	PVC
Activated Carbon	A	A	A	A	A	A
Alum	A	—	A	B	B	A
Ammonia	—	A	A	A	C	B
Bromine	C	C	B	C	C	C
Calcium Hydroxide	A	A	A	A	C	A
Chlorine	—	A	B	C	C	C
Ferric (Iron) Chloride	A	A	A	A	—	A
Ferric (Iron) Sulfate	A	—	A	A	A	A
Hydrochloric Acid	A	A	A	B	C	A
Hydrogen Peroxide	A	A	A	C	A	A
Ozone	A	B	B	A	B	A
Phosphorus	—	—	B	B	—	B
Potassium Permanganate	—	A	A	B	C	A
Sodium Chloride	A	A	A	A	A	B
Sodium Hydroxide	A	B	A	A	C	A
Sodium Hydrosulfide	—	—	—	A	B	—
Sodium Hypochlorite	A	A	B	B	C	A
Sulfur Dioxide	—	—	B	B	C	A
Sulfuric Acid	A	A	A	A	C	B

A	Resistant	Chemical should have no major effect on material.
B	Somewhat Resistant	Chemical may have minor effect on material.
C	Not Resistant	Chemical likely to have an effect on material.
—	Not Rated	No data available.

Actual performance may vary based on compound, environmental conditions, exposure, concentration, and/or other variables. Testing is recommended.

Gardex® is a registered trade mark of Marmon Specialty Cable

Dekabon® is a registered trade mark of Marmon Industrial Energy & Infrastructure



Marmon Industrial
Energy & Infrastructure

Marmon Industrial Energy & Infrastructure

1300 Industrial Boulevard
Mount Pleasant, Texas 75455

Phone: (903) 572-0657

Fax: (903) 572-6153

www.marmoniei.com