



**CONNECTION SYSTEMS
TRANSIT APPLICATIONS**



Ensure electrical and mechanical reliability with the engineered products and solutions of Shawcor's Connection Systems group

INTEGRITY IS BEHIND EVERYTHING WE DO.

By connecting, insulating, sealing and protecting the valuable assets and equipment systems of your operation, we assure the reliability of your electrical connectivity for a wide range of industrial processes over the lifespan of your installation. That reliability is what solves our customers' toughest challenges, and it starts with a specialization in application engineering.

But one thing remains constant: We put integrity first. It's the foundation on which we were built. And it's not just in how we operate – it's behind every product we engineer. It's part of every new project we take on. And it's the promise that we give our customers. They've trusted in us for 85 years to engineer and develop, build and innovate – but namely, to protect the assets that they rely on in the industries that keep our world running.

ENGINEERING CAPABILITIES

Shawcor is committed to leading the industry with innovative solutions that are proven, dependable and tested to the highest standards and precisely manufactured to your specifications.

Many customers rely on our unique in-house design capability and expertise to tackle projects of all scopes and sizes. We provide comprehensive services, advanced in-house materials and product research as well as product development and pre-qualification testing.

We offer customers much more than a catalogue of products. We provide the technical leadership and service responsiveness needed to meet all of your project deadlines as well as your performance requirements to produce a dependable and superior product.

TRANSIT PRODUCT OFFERING

Shawcor is a leading supplier of innovative connection systems in the transit market. We offer solutions that cover a variety of products that meet the needs of our customers in this challenging market.

Our product offerings cover:

- Signalling Cable
- Control Cable
- Power Cable
- Heat Shrink Cable Accessories
- Cold Shrink Cable Accessories

Our products are designed in adherence to industry specific standards; AREMA, CP-100, CSA, UL, ICEA, IEEE, ANSI and NFPA providing superior quality and safety. Safety is of the utmost importance to Shawcor and our products are designed with that in mind. With superior materials for fire resistance and/or Low Smoke Zero Halogen performance that creates a safe environment throughout the service life of the product.



Operational protection through reliable connections

SHAWCOR HAS SUPPLIED NEARLY 2 MILLION METERS OF TRANSPORTATION CABLE TO THE NORTH AMERICAN TRANSPORT INDUSTRY

Over the past 10 years Shawcor has supplied ShawFlex cable for several major North American transportation projects. We have the ability to design, develop, qualify

and manufacture custom cables, whether it is built to an engineering specification or a national specification such as CSA, AREMA or CP-100. Below is a summary of the major projects that we have worked on in this time period.

Project List

- Toronto Transit Commission (TTC) Spadina Extension
- Toronto Transit Commission ATC project
- Waterloo LRT
- Edmonton LRT
- Calgary LRT
- STM (Montreal)
- Vancouver RAV & Skytrain
- Vancouver Evergreen Line
- PATCO Rail Project

SIGNAL AND CONTROL CABLES

22 AWG to 2000 kcmil, 300 V - 5000 V

Application

Transmission of digital and analog signals for train management and control.

Features

- Wide range of choices covering AREMA, Canadian Pacific Railway and CSA requirements.
- Hazardous Locations (HL), CSA C22.2 No. 174
- Extreme Low Acid Gas Emission (AG14)
- Excellent in fire retardant and low smoke, CSA FT4 - ST1, IEEE1202, UL1685
- Super ozone resistance and sun light resistance can withstand prolonged outdoor exposure

Approval and Reference

- AREMA Part 10.3.16
- AREMA Part 10.3.17
- CSA C22.2 No. 38
- CSA C22.2 No. 239
- CSA C22.2 No. 131
- CSA C22.2 No. 174
- Canadian Pacific Railway, CP-100
- ICEA S-73-532
- ICEA S-95-658
- UL44
- UL1277
- UL13
- NFPA-130

Construction

Conductor:

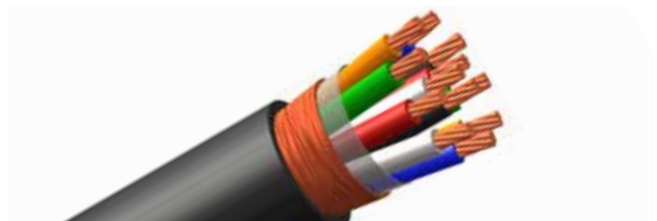
- Soft/Annealed, bare/tinned copper in accordance with ASTM B3/B33/B8, Class B, C or higher class stranding

Insulation: (vary by construction)

- Cross-Linked Polyethylene (XLPE), RW 90/XHHW-2 Rated Insulation
- High Performance Linear Low Density Polyethylene (LLDPE)
- Ethylene-Propylene Rubber (EPR), RHW-2, AREMA Part 10.3.19
- Cross-Linked Polyolefin Low Smoke , Zero Halogen (XLPO LSZH) (insulated conductor only)

Jacket: (vary by construction)

- Low Smoke Zero Halogen Thermoplastic Polyethylene (TP LSZH), AREMA Part 10.3.13
- High Performance Linear Low Density Polyethylene (LLDPE) AREMA 10.3.21
- Flame retardant, Low Smoke Zero Halogen Cross-Linked Polyolefin (LSZH XLPO), AREMA Part 10.3.13
- Chlorinated Polyethylene (XL CPE)



TRACTION POWER CABLE

1/0 AWG to 2000 kcmil / 600 V - 2000 V

Application

For using as positive power delivery, negative return, and bonding cables in transit traction power systems.

Features

- High performance on oil, moisture, abrasion, sunlight resistant and crush and impact in harsh environment, typically for traction power circuit.
- Superior low smoke and flame retardant performance: CSA FT4-ST1, IEEE 1202, UL1685
- Jacket compound meets halogen content and smoke generation requirements of ICEA S-95-658, Table 4-2
- Excellent in Cold bend: -40°C
- Super ozone resistance can withstand prolonged outdoor exposure

Approval and Reference

- CSA C22.2 No.38, Type RW90
- UL 44, Type RHW-2
- ICEA S-95-686
- NFPA-130

Construction

Conductor:

- Soft/Annealed, bare/tinned copper in accordance with ASTM B3/B33/B8, Class B, C, G or higher class stranding

Insulation:

- EPR, Rated 90°C wet or dry with continuous operation, 600 V - 2000 V

Jacket:

- Flame retardant, Low Smoke Zero Halogen Cross-Linked Polyolefin (LSZH XLPO)



CABLES FOR STATION, CONTROL & POWER

22 AWG to 2000 kcmil, 300 V - 5000 V

Application

Power distribution for lighting installations, power receptacles and battery backups in the general station or anywhere that there is a concern of damage caused by smoke to instruments in your installation.

Features

- Low Smoke, limited toxic and corrosive gases emission compound provides a safe environment for personnel and equipment during a fire.
- Sunlight - and weather-resistant
- Direct burial rated
- Meets cold bend test at -40°C

Approval and Reference

- | | |
|---------------------|-----------------|
| ○ CSA C22.2 No. 38 | ○ IEEE1202 |
| ○ CSA C22.2 No. 230 | ○ UL1685 |
| ○ CSA C22.2 No. 239 | ○ ICEA S-73-532 |
| ○ CSA C22.2 No. 131 | ○ ICEA S-95-686 |
| ○ CSA C22.2 No. 174 | ○ UL44 |
| ○ CSA FT4 - ST1 | ○ UL1277 |
| ○ NFPA 130 | ○ UL13 |

Construction

Conductor:

- Bare/Tinned Copper Conductor ASTM B8/B33 Class B Stranding

Insulation: (vary by construction)

- Cross-Linked Polyethylene (XLPE), RW90/XHHW-2 Rated
- Ethylene-Propylene Rubber (EPR), RWU90/RHW-2
- Low Smoke, Zero Halogen Cross-Linked Polyolefin (LSZH XLPO), RW90 (insulated conductor only)

Jacket: (vary by construction)

- Low Smoke Zero Halogen Thermoplastic Polyethylene (TP LSZH)
- Flame retardant LAG PVC
- Chlorinated Polyethylene (CPE)



GROUNDING CONDUCTOR

8 AWG to 750 kcmil / 600 V - 2000 V

Application

Grounding metallic parts to ensure the integrity of electrical system and safety of people.

Features

- Solid green or green with dual yellow SAFE-T-STRIPES which resist installation wear and provide safe identification
- Meets CEC 22.1-15 Section 2-130 flame spread requirements
- Easily installed for equipment bonding/grounding
- Suitable for use in cable trays (as per the CEC)

Approval and Reference

- CSA C22.2 No. 230
- CSA C22.2 No. 38
- CSA FT4
- UL 1685
- XLPE (RW90 rated)
- 90°C wet/dry
- Direct burial rated

- Vertical Tray Flame Test Rated
- -40°C cold bend/impact rated
- UV sunlight resistant "SUN RES"

Construction

Conductor:

- Bare/Tinned Copper Conductor ASTM B8/B33 Class B Stranding

Insulation:

- UV Resistant Cross-Linked Polyethylene (XLPE), RW90 Rated Insulation

Jacket:

- FR PVC LAG outer green jacket



ACCESSORIES FOR LV/MV VOLTAGE CABLES

Heat Shrink & Cold Shrink, 600 V - 35 kV

Application

Accessories for power networks, terminations and joints for low and medium voltage cables, such as the application in transformers and switch gear equipment.

5 - 35 kV MV Cold Shrink Terminations TITAN Z Features

- All-in-one design incorporating stress control and sealing mastics
- Quick, consistent and easy to install. Offering fewest number of installation steps, saving time
- Patent pending stress control system based on Microvaristor (ZnO) technology that delivers exceptional discharge and impulse performance
- Excellent UV resistance and hydrophobic characteristics

Approval and Reference

- Tested to latest requirements of IEEE-48-2009, Class 1
- Tested at an independent accredited laboratory to ISO/IEC 17025:2005 standards

600 V - 1000 V Heat Shrink Products

- CFM: Medium Wall Cross-Linked Polyolefin Tubing, 3:1 Shrink Ratio

- CFW: Heavy Wall Cross-Linked Polyolefin Tubing, for electrical insulation and mechanical protection of cable joints and terminations
- FCFW: Heavy Wall Cross-Linked Polyolefin Tubing, for protecting electrical splices and terminations where maximum flame retardancy and exceptional installation and sealing characteristics are required

600 V - 1000 V Cold Shrink Products

- CSS: Cold applied splice sealing products offer excellent insulation and moisture proof sealing for in-line cable connector systems or elbow to cable jacket applications

Zero Halogen Heat Shrink Tubing

- CZT 200: Thin Wall Halogen Free XLPE tubing, low smoke generation for excellent fire safety characteristics, flame retardance.

600 V Professional Grade Vinyl Electrical Tape

- CET: All weather, professional grade pressure sensitive vinyl tape, 7 mil thickness, cold and weather resistant, flame retardant





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