

**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 25 05 01 - EMCS: General Requirements.

**1.2 REFERENCES**

- .1 Institute of Electrical and Electronics Engineers (IEEE)/Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements.
  - .1 IEEE 802.3-2008, Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications.
- .2 Telecommunications Industries Association (TIA)/Electronic Industries Alliance (EIA)
  - .1 TIA/EIA 455-204-2000, FOTP-204 Measurement of Bandwidth on Multimode Fiber.
  - .2 TIA/EIA 492-2000, Specifications for Optical Waveguide Fibers (Includes all current TIA-492 & TIA/EIA-492 Standards).
  - .3 TIA-568-C.1-2009, Commercial Building Telecommunications Cabling Standards Set, Part 1 General Requirements.
  - .4 TIA-568-C.2-2009 Commercial Building Telecommunications Cabling Standards Set, Part 2 Balanced Twisted-Pair Cabling Components
  - .5 TIA-568-C.3-2008, Part 3 Optical Fiber Cabling Components Standard.
  - .6 ANSI/TIA/EIA-569-A-October 2004, Commercial Building Standard for Telecommunications Pathways and Spaces.
- .3 International Electrotechnical Commission (IEC)
  - .1 ISO/IEC 11801:2002, Information technology – Generic Cabling for Customer Premises.
  - .2 IEC 60793-1-21 Ed. 1.0:2001, Optical Fibres – Part 1-21: Measurement Methods and Test Procedures – Coating geometry.
  - .3 IEC 60793-2-10 Ed. 3.0 B:2007, Optical Fibres – Part 2-10: Product Specifications – Sectional Specification For Category A1 Multimode Fibres.
- .4 Treasury Board Information Technology Standard (TBITS).
  - .1 TBITS 6.9-2003, Profile for the Telecommunications Wiring System in Government Owned and Leased Buildings - Technical Specifications.

**1.3 DEFINITIONS**

- .1 Acronyms and definitions: refer to Section 25 05 01 - EMCS - General Requirements.

**1.4 SYSTEM DESCRIPTION**

- .1 Data communication network to link new Stand-alone Digital Controllers (SDCs) to existing EMCS network architectures in accordance with TIA/EIA-568, TIA/EIA-569-A and TBITS 6.9.
  - .1 Provide reliable and secure connectivity of adequate performance between different sections (segments) of network.
- .2 All equipment must be standard and specifically manufactured for this type of installation. Equipment must be tested and approved for this type of installation.
- .3 Data communication network to include, but not limited to:
  - .1 New EMCS-LAN segments, as shown on drawings.
  - .2 Network interface cards and fibre-to-cable interfaces.
  - .3 Network management hardware and software.
  - .4 Network components necessary for complete network.

**1.5 DESIGN REQUIREMENTS**

- .1 EMCS Local Area Network (EMCS-LAN).
  - .1 High speed, high performance, local area network over which computers communicate with each other directly on peer to peer basis in accordance with IEEE 802.3/Ethernet TCP/IP Standard.
  - .2 Data will be encoded in conformance with the ASHRAE BACnet protocol.
  - .3 High speed data transfer rate for alarm reporting, quick report generation from multiple controllers, upload/download information between network devices.
  - .4 Network devices and cables shall ensure a minimum operation rate of 100 Megabits per second.
  - .5 Dynamic Data Access.
    - .1 Network to provide capabilities for OWSs, either network resident or connected remotely, to access point status and application report data or execute control functions for other devices residing on network.
    - .2 Access shall be possible from any location on the primary network (Ethernet TCP/IP). This access should enable the user to read/write information as well as perform programming functions.
  - .6 Network Medium:
    - .1 Shielded twisted cable compatible with existing network protocol to be used within buildings.
    - .2 Fibre optic cable to be used between and within buildings. Provide necessary fibre-to-cable interfaces compatible with existing network protocol.

**Part 2 Products****2.1 ACTIVE COMPONENTS AND CABLES**

- .1 Ethernet Switches
  - .1 Industrial grade Ethernet switch complete with fibre optic and copper connection points.
  - .2 Switches shall ensure network operation at 100 Mbps.
  - .3 Din-rail compatible or provide mounting kit for installation inside panel.
- .2 Cables
  - .1 Depending on distances and noise and interference requirements, cables shall be category 6 copper or fibre optic (refer to drawings).
  - .2 Except for connection to switches (maximum 3 meters), cables (copper or fibre) shall be in conduits.

**2.2 OPTICAL FIBRE CABLE (OFC)**

- .1 Two(2) pair loose buffer tube 62.5/125 micrometre multi-mode graded index fibre: to TIA T568-C.1.

- .2 Design and Performance Specifications

Optical Fiber	62.5/125 $\mu$ m
Durability	500 mating cycles, <0.20 dB change
Tensile Strength	>25 lbs with <0.20 dB change
Thermal Cycling	-40° to +80° C., <0.30 dB change
Operating Temperature	-40° to +80° C.
High Temperature	80° C. For 96 Hrs. <0.3 dB change
Humidity	60° C. @ 95% RH. 96 Hrs. <0.3 dB change
Vibration (Mated pair)	10-55 Hz, 1.5mm P to P < 0.3dB change
Intermatability	Compliant with TIA 604-2
Insertion Loss	Based on 62.5/125 $\mu$ m fiber @850 nm

- .3 Fibre Specification

The fibre will be 62.5/125 $\mu$ m and meet the attributes outlined in the following detailed specifications:

- .1 TIA/EIA 492
- .2 IEC 60793-2-10 Ed. 3.0 Type A1B fibre
- .3 ISO/IEC 11801 Type OM1 fibre

The fibre must provide the following Effective Modal Bandwidth (EMB) at 850 um of larger than or equal to 385 MHz.km (EMB => 385 MHz.km). This shall be ensured by standardized laser bandwidth test procedures (Restricted Mode Launch Bandwidth (RML BW) measurement method described in TIA/EIA 455-204 and IEC 60793-1-21.) Each fibre shall be directly measure for laser performance without sampling.

The fibre shall support the following link lengths for the data rates indicated, where performance is assured by the bandwidth measurements described above: 1 Gb/s over 500m at 850 nm.

The fibre shall be manufactured by the Outside Vapour Deposition (OVD) process.

Cable Construction must be FT-6 rated PVC for outdoor use.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 EMCS-LAN:
  - .1 Installation of cables shall be by a specialized telecommunication installer. Provide a compliance certificate issued by the manufacturer for the authorized installer.
  - .2 After completion of the installation, installer to provide a verification report in accordance with applicable EIA/TIA standards.
  - .3 Installation must comply with all applicable EIA/TIA standards.

**END OF SECTION**