**Atkore - AFC® Cable Systems, Inc.**

This product specification is written according to the Construction Specifications Institute *MasterFormat,* 2018 Update.

**SECTION 26 05 19**

#### **HCF-90® - Interlocked Galvanized Steel Armor - Type AC - Health Care Facilities**

1. GENERAL
   * + 1. RELATED DOCUMENTS
          1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
       2. SUMMARY
          1. This Section includes the following:

Steel Armored Cable (AC) –Health Care Facilities- HFC-90

Wiring connections and terminations.

Installation methods and procedures.

* + - * 1. Related Sections include the following:

Division 26 Section "Common Work Results for Electrical".

Division 26 Section "Grounding and Bonding for Electrical Systems".

Division 26 Section "Raceway and Boxes for Electrical Systems".

* + - 1. REFERENCES
         1. UL 4- Standard for Armored Cable
         2. UL 83 – Standard for Thermoplastic Insulated Wires and Cables
         3. UL1479 – Fire Tests of Through-Penetration Fire Stops (ASTM 814)
         4. UL 1581 – Reference Standard for Electrical Wires, Cables, and Flexible Cords
         5. UL 2556 – Wire and Cable Test Methods
         6. UL 514B – Conduit and Cable Fittings
         7. Federal Specification A-A-59544, Wire and Cable, Electrical (formerly J-C-30B)
         8. NFPA 70, NEC® 250.118(8), 300.22(C), 320, 392, 517.13, 518, 645
         9. ASTM International.
      2. SUBMITTALS
         1. Product Data: For each type of armor-clad cable and fitting indicated.
         2. Qualification Data: For testing agency.
         3. Field quality-control test reports.
      3. QUALITY ASSURANCE
         1. Electrical equipment and materials shall be new and within one year of manufacture, complying with the latest codes and standards. No used, re-built, refurbished and/or re-manufactured electrical equipment and materials shall be furnished on this project.
         2. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

Testing Agency's Field Supervisor: Person currently certified by the International Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

* + - * 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
        2. Steel Armored Cable (AC) –Health Care Facilities- HFC-90 shall be manufactured in accordance with UL 4 – Standard Armored Cable for installation in accordance with NFPA 70 (NEC).
      1. DELIVERY, STORAGE, AND HANDLING
         1. Deliver materials to site in unopened cartons, coils, reels or bundles as appropriate, clearly identified with manufacturer's name, Underwriter's or other approved label, grade or identifying number.

1. PRODUCTS
   * + 1. MANUFACTURERS
          1. Atkore - AFC® Cable Systems, Inc.

960 Flaherty Drive

New Bedford MA 02745

* + - 1. HFC-90 Type AC- HeALTH CARE FACILITIES
         1. Armored cable assemblies are offered in 12 or 10 AWG THHN in 2, 3, or 4 conductors. These 600V cables with THHN conductors have two paths to ground, which is a requirement of NEC 517. The outer metal jacket, in combination with a 16AWG, serves as one equipment grounding means, while the second is an additional full-size green copper ground. Atkore AFC Cable Systems® color codes HCF cable Green for easy identification.
         2. Current-Carrying Conductors: Soft annealed copper in compliance with the latest edition of ASTM B3 and/or B8.
         3. Insulated Conductor: The insulated conductor shall be Type THHN 90°C DRY with an extruded polypropylene protective covering. The Type THHN Insulated Conductor with protective covering shall be manufactured and tested in accordance with UL 83 and UL 4. Insulated conductor identification shall be in accordance with Section 2.4 COLOR CODES.
         4. Insulated Equipment Grounding Conductor: The equipment ground shall be a full-sized insulated conductor sized in accordance with Table 6.1 of UL 4. The grounding conductor shall be soft-annealed copper in compliance with the latest edition of ASTM B3 and/or B8.
         5. Grounding/Bonding Conductor: Full sized bare aluminum bonding/grounding conductor, sized in accordance with Table 5.1 or 5.2 of UL 4, working in combination with the armor to create a low resistance ground path. Aluminum bonding/grounding conductor shall be cabled with the current-carrying conductors and shall be in intimate contact with the metal armor.
         6. Armor shall be applied over the cabled wire assembly with an interlock in compliance with Section 7 of UL 4.
      2. fittings
         1. Fittings shall be UL listed and identified for use with armored cable.
      3. Color Codes
         1. Current-Carrying Conductors: Conductors are to be identified to preserve the following color code.

|  |  |  |
| --- | --- | --- |
|  | * + - * 1. 480Y/277 System | * + - * 1. 208Y/120V System |
| * + - * 1. Phase A | * + - * 1. Brown | * + - * 1. Black |
| * + - * 1. Phase B | * + - * 1. Orange | * + - * 1. Red |
| * + - * 1. Phase C | * + - * 1. Yellow | * + - * 1. Blue |
| * + - * 1. Neutral | * + - * 1. Gray | * + - * 1. White |
| * + - * 1. Insulated Ground | * + - * 1. Green | * + - * 1. Green |

* + - * 1. Armor: The armor of Health Care Cables (HFC) shall have a color of green

1. EXECUTION
   * + 1. INSTALLATION
          1. Pathways and Raceways are the support system for the infrastructure. All pathways shall be run perpendicular or parallel to the building structure. Armored Cable bend radius shall not be less than5 times the external diameter of the cable. All horizontal cable shall be properly supported every 72”. Infrastructure Support Systems include, but may not be limited to the following:

Properly supported Cable Trays

Independent Cable Hangers spaced no more than 72” apart

“Trapeze” style supports.

* + - * 1. In existing buildings, the preferred method of support is independently supported cable hangers. These hangers are to be suitable for installation of AC Cable.
        2. Wiring shall be installed in compliance with the latest version of the National Electrical Code and other applicable codes and standards as indicated elsewhere in these specifications.
        3. Bends in armored cable shall be made so that the cable will not be damaged. The radius of the curve of the inner edge of a bend shall not be less than 5times the diameter of the metallic sheath.
        4. Each branch circuit shall have its own neutral conductor from the branch circuit load back to the circuit breaker panelboard. Shared neutral conductors shall not be installed.
        5. All wiring shall be identified with permanent wire labels, using alphanumeric designations. Terminations and splices shall be identically labeled for the same wire (i.e. common conductors terminated in multiple locations). Wire labels shall agree with the circuit designations on the Construction Drawings.
        6. Conductors in Enclosures: Provide neat and workmanlike installation with conductors tied with nylon wire ties in terminal cabinets, gutters, and similar locations.
      1. Splices and Terminations
         1. Splices at junction boxes shall be made with an approved, insulated, live spring type connector such as those manufactured by Scotchlock, 3M or Ideal.
      2. fittings
         1. Fittings used for connecting armored cable to boxes, light fixtures or other equipment shall be UL listed and identified for such use, as noted in 2.3(A).
         2. Cable preparation for installation of fittings shall follow manufacturer’s instructions.
         3. The cable end shall be cleanly cut with armor clad cable rotary cutting tool to ensure flush seating of the cable into the fitting. Fitting securement screws shall be properly torqued.
      3. ARRANGEMENT AND SUPPORT
         1. Conductors in Enclosures: Provide neat and workmanlike installation with conductors tied with nylon wire ties in terminal cabinets, gutters and similar locations.
         2. Armor clad cables shall be securely fastened in place at intervals of not more than six feet, with suitable clamps or fasteners of approved type, and vertical runs shall be properly supported to present a secure installation.
         3. Armored cable installed parallel to framing members, such as studs, joist, or rafters, shall be supported so that the nearest outside surface of the cable is not less than 1-1/4 inches (31 mm) from the nearest edge of the framing member. Where this distance cannot be maintained, the cable shall be protected by a steel plate, sleeve, or equivalent that is at least 1/16-inch thick.
         4. Maintain at least 6‑inch clearance between armor clad cables and other piping systems. Maintain 12‑inch (300 mm) clearance between armor clad cables and heat sources such as flues, steam pipes, and heating appliances.
         5. No armored cable shall be fastened to other conduits or pipes or installed to prevent the ready removal of other pipes or ducts for repairs.
         6. Individual armored cables hung from roof structure or structural ceiling shall be supported by split-ring hangers and wrought-iron hanger rods. Where 3 or more armored cables are suspended from the ceiling in parallel runs, use steel channels, Unistrut or equal, hung from 1/2-inch (13 mm) rods to support the cables. The cables on these channels shall be held in place with armored cable clamps designed for the channel that is used.
         7. Secure armored cable support racks to concrete walls and ceilings by means of cast-in-place anchors; die-cast, rustproof alloy expansion shields; or cast flush anchors. Wooden plugs, plastic inserts, or gunpowder driven inserts shall not be used as a base to secure conduit supports.
         8. Armored cable shall be supported immediately on each side of a bend and not more than 1 foot (300 mm) from an enclosure where a run of armored cable ends.
         9. Use of cable tray:

Basket, ladder rack, or ventilated cable tray may be utilized for support of armored cabling.

The sum of the cross-sectional areas of cables shall not exceed the maximum allowable cable fill area allowed by NEC Tables 392.22(A), 392.22(A)(5) and 392.22(A)(6).

Ampacity of cables installed in cable tray shall meet the requirements of NEC 392.80.

* + - * 1. Terminating armored cables into panelboards:

Provide a junction box within plenum space with sweep elbows down to panelboard, or

Use a ladder tray mounted vertically above the panelboard. Strap cables to rungs and install cover on cable tray.

* + - 1. INSPECTION AND TESTS
         1. General: The electrical installation shall be inspected and tested to ensure safety to building occupants and operating personnel and conformity to Code authorities and Subcontract documents. Field tests shall be performed in conformance with the National Electrical Testing Association (NETA) Standards.
         2. All fittings and locknuts shall be re-examined for tightness. A continuity test is to be performed at each connection as a final means of inspection for tightness of joints.