

SECTION 16781
MASTER TELEVISION ANTENNA SYSTEM (MTAS)

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. The extent of the master television antenna system (MTAS) work is hereby defined to include (but not by way of limitation) the furnishing and installing of a system.

1.2 QUALITY OF ASSURANCE

- A. Manufacturers: Firms regularly engaged in the manufacture of MTA systems of the type required, and which have been in satisfactory use for not less than five-years in similar services.
- B. Electrical Standards: Provide electrical products, which have been tested, listed and labeled by Underwriters Laboratories and comply with NEMA standards.

1.3 SUBMITTALS

- A. Submittals on MTA systems are required as follows:
 - 1. Shop Drawings.
 - 2. Riser Diagram.
 - 3. Wiring Diagram.
 - 4. Manufacturer's Data.
 - 5. Manufacturer's Product Warranty.
 - 6. Operating Instructions.
 - 7. Maintenance Manuals.

PART 2 PRODUCTS

- 2.1 Provide the required MTA system products in the sizes and capacities indicated, complying with the manufacturer's published product information.
- 2.2 Apply complete weatherproofing methods at the time of installations. Do not leave any coaxial fittings uncovered or exposed at any time during installation. Use a non-hardening silicone base compound.
- 2.3 The following specifications apply to all receiving antennas and their supporting structures. The references in all cases to apply to the entire structure for wind loading and stability.
 - A. Construct all supporting structures and antennas based on ASCE 7-98 for velocity of 140 mph; embedment of ITV tower shall be in accordance with actual soil condition.
 - B. Support parabolic antennas on structures whose twist and sway under 65 mph winds shall not exceed the following limit schedule:

1	Antenna Diameter	Twist	Sway
2	Six foot	3.5°	2.8°
 - C. Construct parabolic antennas to withstand wind forces per ASCE 7-98 on a minimum force as listed below. Consider these forces in the top loading of supporting structures. Submit manufacturer's specifications for any support structure other than a simple galvanized (inside and out) pipe of at least 3" inside diameter having an unsupported length of not more than 6'. Embed a minimum 4' of the supporting pipe into the concrete pole, properly secured and bonded to the concrete pole. Due to casting requirements the remaining 6' is field attached. Threaded connections alone are not acceptable provide additional fastening of the pipes by welding or bolting.

- D. Wind loadings table for parabolic antennas of solid sheet metal construction shall be as per ASCE 7-98 wind loads or minimum forces as follows:

1	Antenna Diameter	Force Lbs. (Minimum)
2	Six foot	2200
 - E. Support connecting leads between antennas and receivers against wind abrasion, and provide waterproof connectors according to manufacturer's recommendations. Antenna line shall be 50-Ohm Heliac, 3/8" Foam Dielectric, Andrew Part Number LDF2-50, or approved equal. Connectors shall be male "N" Type, Andrew Part Number L2PNM (silver plated body/gold plated pin). Antenna line runs from antenna connector to junction box at the base of the tower.
 - F. Receiver down converter (California Amplifier Model 130811) shall be; attached to antenna line "N" connector; transmission line "F" connector; and electrical ground at "J" box, at the base of the tower.
 - G. Each receiving antenna installation shall require the following submittal data:
 - 1 Calculations substantiating structural integrity of the tower and foundation or mounting assembly, certified by a Florida registered engineer.
 - 2 Layout of the concrete self-supporting tower with structural details showing specific construction procedures. Such drawing shall be complete.
 - 3 All design shall be governed by applicable sections of EIA Manual RS222-A, Manual of Steel Construction of the AISC, 1963 Standards of ACI, Florida Building Code or other nationally recognized codes for materials under consideration not stated above.
 - 4 All outside hardware, including tower hardware shall be hot-dipped galvanized or equivalent with same or better anti-rust characteristics for our tropical climate.
 - 5 Drawing of installed electrical ground system with verified test results (five Ohms or less).
 - H. May substitute alternate manufacturers on all equipment and cables, providing they equal or exceed the physical and electrical specifications of the indicated manufacturers. Submit alternate manufactured materials for approval 14 days prior to bid.
- 2.4 Provide hot-dipped galvanized steel or stainless steel structural metals supporting structures.
- 2.5 Protect self-supporting concrete tower from climbing by unauthorized personnel. Ladder rungs shall start 20' above ground on the side opposite antenna azimuth. Provide "U" shaped ladder rungs embedded in tower. Ladder rungs shall be spaced not less than 12" nor more than 20" apart.
- 2.6 Receiver output cables shall be in conduit from tower to building entry and protected against water and abrasion.
- A. Supporting structures for antennas shall have a certified grounding system. The system shall include as a minimum a lighting dissipater (para 2.14) at the top of the tower and a lighting suppressor Polyphaser Model IS-MT50LN-ME-in the junction box at the base of the tower. Install the system in accordance with NFPA 780. A contractor licensed in this field shall certify grounding system. Provide written certification to the District Project Manager.
- 2.7 Antenna height shall be no less than 100' above grade level unless pre-approved by School District.
- 2.8 Height and size of dish shall be selected to provide a 50 DB Carrier to noise ratio, at the output of the down converter receiver. May have to add a 2.5 GHz attenuator to the input of the down converter in very high signal areas, to prevent down converter overload.
- 2.9 Down converter receiver is California Amplifier Inc. Model #130811 with power supply model # 71109.
- 2.10 Furnish a down converter power, supply with the down converter.

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2.11 System distribution amplifier is Blonder-Tongue 450-50 or equal (QRF Model QDAX 450-50-2W).

2.12 Terminate all trunk lines in 75-ohm devices.

2.13 All feeder lines shall have a 30db return loss @ VHF when terminated in 75 Ohm.

2.14 A lightning dissipater is required to be the highest point of the tower. Use a Lightning Master Corp. Candelabrum Model CA-48-C or equivalent.

PART 3 EXECUTION

3.1 WIRING OF NEW/REMODELED/RENOVATED BUILDINGS

- A Trunk lines shall be copper shielded, solid copper core conductor, PVC jacketed, RG6 digital ready equal to Belden number 1694A.
- B Directional couplers taps (4 port), single port couplers, and splitters shall be spectrum rated 5 MHZ to 1000 MHZ. Couplers should be two-way. Cable from couplers to ITV outlet shall be digital ready RG-6, Belden 1694A.

3.2 ADDITIONAL SPECIFICATIONS

- A Provide an 8' cable for each ITV outlet installed. The cable shall be RG-59 (Belden 8241 or equivalent) sweep tested from 5 MHZ to 1000 MHZ, with a Connector "F" (AIM 25-7030 or equal) on one end and a F-59PG push-on connector (AIM25-7080 or equal) on the other end.
- B Weatherproof all outside connectors, including down converter and antenna connectors.
- C No cross-modulation, co-channel, or adjacent channel or any type of interference shall be noticeable at any TV outlet, using a standard color TV set, and viewed by a trained observer.
- D The internal distribution system shall provide signals to each television receiver outlet on each channel at levels not less than +6 dBMV, nor greater than +18 dBMV.
- E The C/N (carrier to noise) ratio of the overall MATV system shall not be less than 50 db, measured at the most remote outlet from the main amplifier or the lowest output tap, whichever provides the lowest signal.
- F Conduit from tower top shall be 2" unobstructed PVC to 5" hand hole. Install a 16" x 12" x 6" WP junction box over the hand hole at the base of the tower. Conduit from junction box shall be 2" galvanized pipe, 10' minimum to the pull box.
- G Any substitutions for equipment listed in this specification (16781) must have the same degree of repair ability as well as the same technical characteristics or better. Substitutions must be approved by School District personnel in writing before installation.
- H Provide a drawing of the grounding system as installed (Part 2, Paragraph 2.6) to the Project Manager and a copy sent to Electrical QA, ITV Technician.
- I Install a 6" conduit with pull-wire from ITV head-end cabinet to the property for future cable television connection. Verify and coordinate exact location of the conduit termination point at property line with local cable television provider.

END OF SECTION