# DIVISION 11 – Equipment

## Preface

The Texas Tech University System's '*Design and Construction Standards*', as administrated by Facilities Planning and Construction, are intended to serve as guidelines to the Design Professional and Construction Management teams for design development and construction administration of Texas Tech University System (TTUS) Capital Projects. They communicate the minimum expectations and requirements relative to specific building systems, design provisions, general specification requirements, and administrative procedures for new facilities being constructed on Texas Tech University System (ASU, MSU, TTU, TTUHSC, and TTUHSC El Paso) campuses. Several, but not all requirements for each component Institution or Agency within the TTU System are covered. Design Professionals, Construction Managers at Risk and/or Design-Build Firms shall also refer to provisions covered in their service Agreements, as well as within the project's Basis of Design (BOD) document.

In addition, the 'Design and Construction Standards' shall also be utilized in conjunction with the approved project specific Program and Schematic Design development. In the event of conflict between this document and specific project requirements, Design Professionals, Construction Managers at Risk and/or Design-Build Firms shall contact Facilities Planning & Construction for clarification.

The guidelines within the '*Design and Construction Standards*' are not intended to prohibit the use of alternative design solutions, methods, systems, products or devices not covered in this document. Offered alternatives deviating from or not covered in these standards shall be documented by the Design Professional and/or Construction Management teams and submitted to Facilities Planning & Construction for approval prior to implementation.

Throughout the '*Design and Construction Standards*' there are references to manufacturer specific products. These are to be considered the 'Basis of Design' to establish the expected

minimum quality requirements. Design Professionals are encouraged to identify and include equivalent products and/or manufacturers offering comparable products to facilitate open bidding environments.

***General Requirements for Equipment***

## Audio Visual Equipment

All components required for a complete infrastructure to support Audio Visual (AV) systems shall be installed by the electrical contractor unless specifically excluded.

AV infrastructure elements included within this division shall include but not be limited to:

1. Wall and Floor boxes
2. Projection Screens
3. Room Scheduling Monitor Enclosure
4. Document Camera

Furnish and install all such infrastructure elements in a professional manner using standard industry practices and in accordance with performance requirements specified, and any modifications resulting from reviewed shop and field coordinated drawings.

Regardless of completeness of descriptive paragraphs herein, each device shall meet its manufacturer's published specifications and performance standard.

Systems are described in terms of major products. Even if not specifically mentioned, provide and install patch cables, connectors, hardware, labels, terminals, etc. necessary for complete and working system meeting design intent of specifications.

Coordinate AV electrical power with Electrical Contractor regarding proper placement of isolated-ground duplex outlets for any AV equipment. Electrical circuits should be connected (and outlets wired) by the Electrical Contractor to the AV system circuit breaker panel. Ensure that "Star" ground configuration is properly implemented by the Electrical Contractor. Ensure

that ground wires from each outlet are isolated from conduit, neutrals, and each other, and are each “home-run” back to the dedicated breaker panel for AV systems.

Follow all Texas Tech University AV Standards published at http://www.depts.ttu.edu/ithelpcentral/solutions/classroom/index.php.

Execute work in accordance with standard sound and AV system installation practices, National Electrical Code, and applicable state and local codes.

Comply with terms and conditions of Americans with Disabilities Act, especially regarding provisions for hearing impaired and wheelchair access in control areas.

Submit a letter providing warranty covering labor and materials supplied under this contract. Bind in Operation and Maintenance Manuals. Minimum terms as follows:

1. System Warranty Period - Systems to be free of manufacturing or installation defects for a minimum period of one year from the date of final acceptance. Clearly designate begin and end dates of system warranty period.

2. Parts and Labor - Provide parts and labor to repair defects in materials and workmanship during system warranty period.

3. Response Time - Within system warranty period, provide initial on-site service response within one business day of service call.

4. Replacement Products - If any item must be removed for repair during system warranty period, provide replacement item of similar quality at no charge.

5. Repair Limit - Do not repair any piece of equipment found defective during installation or system warranty period more than 2 times. After second repair, replace defective item with similar approved item at no additional cost to Owner.

6. Extended Manufacturer’s Warranties – Identify products with manufacturer’s warranties extending beyond one year. Provide terms and conditions of such warranties.

7. Service Personnel Information - Provide name(s) and telephone number(s) ofservice personnel to be contacted regarding repair and maintenance.

Provide owner training as described in General Conditions. As a minimum, provide 4 hours total instruction regarding AV Systems operation to Owner-designated personnel. Schedule instruction time(s) with Owner to occur after completion of Final Tests and Adjustments. Coordinate with Owner in advance to schedule instruction time. Document date, time, and attendees of the training session and include documentation in Operation and Maintenance Manuals to serve as record of trained personnel. Video the training session and submit to the Owner in the closeout documents.

AV Contractor shall be experienced in installations of similar size and scope within last five years. Submit list of 4 (minimum) installed jobs of similar magnitude, completed within last five years. For verification, submit complete information, including project name, project address, contact person, and daytime telephone number. At Owner's request, accompany Owner or Owner's representative on visit to any or all example completed projects submitted.

AV Contractor shall verify that they are an authorized dealer for all major lines of equipment provided. Contractor must have at least one permanent staff member who is factory trained in the installation and maintenance of each major product line offered.

Mount equipment and enclosures plumb and square. Ensure that permanently installed equipment is firmly and safely held in place. Design equipment supports to support loads imposed with project safety factor of 5 or greater. For devices hung overhead, obtain review by Structural Engineer licensed to practice in State of Texas.

Contractor to provide a label over each user-operated control that describes the function or purpose of control. Provide label of proper size to fit available space.

Contractor to provide labels on equipment. Mount labels plumb and square. Unless otherwise indicated, provide permanently mounted black labels engraved with 1/8-inch white block characters. Handwritten, self-laminating, or embossed plastic (Dymo) labels

are not acceptable.

Label cables and wiring logically, legibly and permanently for easy identification. Labels on cables to be adhesive strip type, covered with clear heat shrink tubing. Factory stamped heat shrink tubing may be used. Hand-written or self-laminating type labels are not acceptable.

Contractor shall label each cable with unique alpha-numeric code. Locate cable designation at start and end of each cable run, within 3 inches of termination point. For cable runs that have intermediate splice points, label cable with same designation throughout, with additional suffix to indicate each segment of run. Provide cable designation codes to schematic drawings included with Project Record Documents and Operation and Maintenance Manuals.

Contractor shall coordinate final connection of power and ground wiring to rack. Electrical contractor will provide power to audio visual systems. Before installation, verify load requirements for systems as accepted.

Submit Certificate of Final Acceptance form signed by Owner verifying complete installation and proper operation of systems upon fulfillment of all requirements and upon recommendation by Consultant.