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PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Surface preparation and field painting of exposed interior items and surfaces.

1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

B. Paint exposed surfaces, except where indicated that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.

1. Painting includes field painting of exposed bare and covered pipes and ducts, hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.

~~2. Paint all surfaces in ITS Tech Center (Room #105 and #105A) in exposed ceiling including the new gantry system.~~

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels, unless indicated otherwise.

1. Prefinished items include the following factory-finished components:

- a. Prefinished wood doors.
- b. Acoustical materials.
- c. Prefinished Architectural woodwork and cabinets.
- d. Finished mechanical and electrical equipment.
- e. Light fixtures.
- f. Distribution cabinets.
- g. Baked enamel coated items.
- h. Fluorocarbon coated items.

2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

- a. Foundation spaces.
- b. Furred areas.
- c. Ceiling plenums.
- d. Utility tunnels.
- e. Pipe spaces.
- f. Duct shafts.
- g. Elevator shafts.

3. Finished metal surfaces include the following:

- a. Anodized aluminum.

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- b. Stainless steel.
 - c. Chromium plate.
 - d. Copper and copper alloys.
 - e. Bronze and brass.
4. Operating parts include moving parts of operating equipment and the following:
- a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- a. Embossed UL labels may be used and painted where acceptable to authority having jurisdiction

D. Related Sections:

1. Division 09 - "Gypsum Board Assemblies" for surface preparation of gypsum board assemblies.

1.2 DEFINITIONS

A. MPI Gloss Levels: MPI Gloss and Sheen Standard values are measured per ASTM D523, Method D and are as follows:

1. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees.
2. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees.
3. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
4. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees.
5. Gloss Level 5: 35 to 70 units at 60 degrees.
6. Gloss Level 6: 70 to 85 units at 60 degrees.
7. Gloss Level 7: More than 85 units at 60 degrees.

B. Interior Painting: Generally includes surfaces located in conditioned spaces.

1.3 SUBMITTALS

A. Product Data: Manufacturer's technical literature for each product and system indicated.

1. Include manufacturer's specifications for materials, finishes, installation instructions, and recommendations for maintenance.

B. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

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- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat indicated.
 - 1. Submit Samples on rigid backing, 8 in (200 mm) square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Manufacturers Project Acceptance Document: Certification that products are approved, acceptable, suitable for use in specific locations, for specific details, and for applications indicated, specified, or required, and that warranty will be issued.
 - 1. Certifications by manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
- E. Qualification Data:
 - 1. For firms and persons specified in "Quality Assurance" to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architects and Owners, and other information specified.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Experience: Installer with not less than 5 years experience in performing specified Work similar to scope of this Project, with a record of successful in-service performance and completion of projects for a period of not less than 5 years, and with sufficient production capability, facilities and personnel, to produce required Work.
 - 2. Supervision: Installer shall maintain a competent supervisor who is at Project during times specified Work is in progress, and, who is experienced in installing systems similar to type and scope required for Project.
- B. MPI Standards:
 - 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
 - 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" and "MPI Maintenance Repainting Manual" for products and paint systems indicated.

1.5 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site to comply with requirements of applicable Division 01 Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

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1.7 PROJECT CONDITIONS

- A. Apply paints only when temperatures of surfaces to be painted and surrounding air are between minimum and maximum range recommended by manufacturer.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1.8 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Product Substitution Procedures".

- 1. Sherwin-Williams Company (The)
- 2. Benjamin Moore & Co.
- 3. Comex Group, including regional brands Color Wheel Paint, Frazee Paint, Kwal Paint, and Parker Paint
- 4. Dunn-Edwards Corporation
- 5. Kelly-Moore Paints
- 6. PPG Architectural Finishes, Inc.
- 7. Pratt & Lambert Paints
- 8. Sherwin-Williams Company (The)
- 9. AkzoNobel Paints, dba Glidden Professional (formerly ICI Paints)

- B. Color and Gloss: As indicated in Design Selections.

2.2 PAINT, GENERAL

- A. Source Limitations: Obtain block fillers and field applied primers for each coating system from the same manufacturer as the finish coats.

- B. Material Compatibility:

- 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
- 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

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2.3 INTERIOR PRIMERS/SEALERS

- A. Alkali-Resistant, Water-Based Primer: MPI #3; for use as a primer with interior high-performance architectural latex intermediate and topcoats.
 - 1. VOC Content: E Range of E2, 101 - 150 g/l, or E3 less than 101 g/l.
- B. Interior Latex Primer/Sealer: MPI #50; for interior concrete, plaster and gypsum board.
 - 1. VOC Content: E Range of E1, 101 - 150 g/l, or E2, 51 - 100 g/l, or E3 less than 51 g/l.
 - 2. Environmental Performance Rating: EPR1 or EPR2 or EPR3.
- C. Interior Latex-Based Wood Primer: MPI #39; for interior wood.
 - 1. VOC Content: E Range of E2, 51 - 100 g/l, or E3 less than 51 g/l.
 - 2. Environmental Performance Rating: EPR2 or EPR3.
- D. Rust-Inhibitive Primer (Water Based): MPI #107; for interior ferrous metal.
 - 1. VOC Content: E Range of E2, 101 - 150 g/l, or E3 less than 101 g/l.
 - 2. Environmental Performance Rating: EPR2 or EPR3.
- E. Waterborne Galvanized-Metal Primer: MPI #134; for exterior and interior galvanized metal.
 - 1. VOC Content: E Range of E2, 101 - 150 g/l, or E3 less than 101 g/l.
 - 2. Environmental Performance Rating: EPR2 or EPR3.

2.4 LATEX PAINTS, INTERIOR

- A. High-Performance Architectural Latex (Low Sheen): MPI #138 (Gloss Level 2); for interior surfaces unless otherwise indicated.
 - 1. VOC Content: E Range of E1, 101 - 150 g/l, or E2, 51 - 100 g/l, or E3 less than 51 g/l.
 - 2. Environmental Performance Rating: EPR4 or EPR5 or EPR6.
- B. High-Performance Architectural Latex (Eggshell): MPI #139 (Gloss Level 3); for interior surfaces unless otherwise indicated.
 - 1. VOC Content: E Range of E2, 51 - 150 g/l, or E3 less than 51 g/l.
 - 2. Environmental Performance Rating: EPR 5 EPR 6.
- C. High-Performance Architectural Latex (Satin): MPI #140 (Gloss Level 4); for interior surfaces unless otherwise indicated.
 - 1. VOC Content: E Range of E3 less than 151 g/l.
 - 2. Environmental Performance Rating: EPR6.5.
- D. High-Performance Architectural Latex (Semigloss): MPI #141 (Gloss Level 5); for interior surfaces unless otherwise indicated.
 - 1. VOC Content: E Range of E1, 101 - 150 g/l, or E2, 51 - 100 g/l, or E3 less than 51 g/l.
 - 2. Environmental Performance Rating: EPR5 or EPR6 or EPR7.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to shop applicators to ensure use of compatible primers.

3.2 INSTALLATION

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform work according to the following, unless otherwise specified in this Section:
 - 1. Respective manufacturer's written installation instructions.
 - 2. Approved submittals.
 - 3. Contract Documents.
 - 4. MPI Architectural Painting Specification Manual" or "MPI Maintenance Repainting Manual", as applicable.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations and specifications for cleaning and surface preparation. Surfaces shall have no defects or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" and "MPI Maintenance Repainting Manual" applicable to substrates and paint systems indicated.
- C. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates, unless expressly permitted by authorities having jurisdiction for labels intended to be painted.
- D. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required

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to produce paint systems indicated.

- E. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
 - 1. Use mechanical methods of surface preparation recommended by paint manufacturer.
 - 2. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's printed directions.
- F. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- G. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
 - 1. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
 - 1. Galvanized metal substrates shall not be chromate passivated. If galvanized metal is chromate passivated, provide surface preparation and primers recommended by manufacturer.
- I. Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- J. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.4 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items, equipment, and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items, equipment, or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Paint interior surfaces of non-ducted return air plenums with a flat, non-specular black

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- paint where visible through registers or grilles.
5. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
 6. The number of coats and film thickness required are the same regardless of application method.
 7. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 8. Omit primer over metal surfaces that have been shop primed and touchup painted.
 9. Allow sufficient time between successive coats to permit proper drying.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve total dry film thickness of the entire system as recommended by manufacturer.
- F. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces, exterior walls and on roofs including, but not limited to, the following:
1. Mechanical Work:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Tanks that do not have factory-applied final finishes.
 - e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets with a flat, non-specular black paint.
 - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 2. Electrical Work:
 - a. Switchgear.
 - b. Panelboards.
 - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.
- 3.5 CLEANING AND PROTECTION
- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 - B. After completing paint application, clean spattered surfaces. Remove spattered paints by

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washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
- E. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces to match approved samples.

3.6 PIPE IDENTIFICATION

- A. Mechanical Rooms: Provide complete painting of piping in mechanical rooms only.
- B. Parking Garages: Provide complete painting of exposed piping in parking garage.
- C. Re-label all pipe, duct, utilities in areas where painting of exposed ceiling occurs.
- D. Conform to requirements of ANSI/ASME A13.1 "Scheme for the Identification of Piping Systems".

3.7 FIRE AND SMOKE BARRIER IDENTIFICATION

- A. Corridor partitions, smokestop partitions, horizontal exit partitions, exit enclosures and fire walls shall be effectively and permanently identified with signs, labels or stencils in a manner acceptable to authority having jurisdiction.
 - 1. Identification shall be above decorative ceiling and in concealed spaces.

3.8 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
 - 1. High-Performance Architectural Latex System: MPI INT 3.1C.
 - a. Prime Coat: Interior alkali-resistant, water-based primer.
 - b. Intermediate Coat: High-performance architectural latex matching topcoat.
 - c. Topcoat: High-performance architectural latex.
 - d. Gloss and Sheen: Refer to Painting Finish Schedule.
- B. CMU Substrates:
 - 1. High-Performance Architectural Latex System: MPI INT 4.2D.
 - a. Prime Coat: Interior/exterior latex block filler.
 - b. Intermediate Coat: High-performance architectural latex matching topcoat.
 - c. Topcoat: High-performance architectural latex.
 - d. Gloss and Sheen: Refer to Painting Finish Schedule.

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- C. Steel Substrates:
1. High Performance Architectural Latex System:
 - a. Prime Coat: Rust-inhibitive primer (water based).
 - b. Intermediate Coat: High-performance architectural latex matching topcoat.
 - c. Topcoat: High-performance architectural latex.
 - d. Gloss and Sheen: Refer to Painting Finish Schedule.
- D. Galvanized-Metal Substrates:
1. High-Performance Architectural Latex System: MPI INT 5.3M.
 - a. Prime Coat: Waterborne galvanized-metal primer.
 - b. Intermediate Coat: High-performance architectural latex matching topcoat.
 - c. Topcoat: High-performance architectural latex.
 - d. Gloss and Sheen: Refer to Painting Finish Schedule.
- E. Dressed Lumber Substrates: Including architectural woodwork, doors.
1. High-Performance Architectural Latex System: MPI INT 6.3A.
 - a. Prime Coat: Interior latex-based wood primer.
 - b. Intermediate Coat: High-performance architectural latex matching topcoat.
 - c. Topcoat: High-performance architectural latex.
 - d. Gloss and Sheen: Refer to Painting Finish Schedule.
- F. Wood Panel Substrates: Including painted plywood, medium-density fiberboard, hardboard.
1. High-Performance Architectural Latex System: MPI INT 6.4S.
 - a. Prime Coat: Interior latex-based wood primer.
 - b. Intermediate Coat: High-performance architectural latex matching topcoat.
 - c. Topcoat: High-performance architectural latex (low sheen).
 - d. Gloss and Sheen: Refer to Painting Finish Schedule.
- G. Gypsum Board Substrates:
1. High-Performance Architectural Latex System: MPI INT 9.2B.
 - a. Prime Coat: Interior latex primer/sealer.
 - b. Intermediate Coat: High-performance architectural latex matching topcoat.
 - c. Topcoat: High-performance architectural latex.
 - d. Gloss and Sheen: Refer to Painting Finish Schedule.

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FIRE DETECTION AND ALERT NOTIFICATION SYSTEM

PART 1 – GENERAL

1.1 SUMMARY

- A. The Contractor shall secure, and pay for, as part of this contact agreement, the services of a qualified Fire Detection and Alert Notification Contractor to install monitor modules, control modules, manual pull stations, notification appliances, auxiliary power supply(s) (APS), and control panels that will connect to the Fire Alarm Control Panel (FACP) via data loop.
- B. The extent of the fire detection and alert notification work is shown on the Contract Drawings and contained in the Specifications. This Fire Detection and Alert Notification Contractor shall review all other discipline/subcontractor drawings, specifications, and other documents to become cognizant of the entire extent of his/her work, which are not detailed on the drawings. Submission of a proposal shall be evidence that this Contractor has reviewed all of the Contract Documents and performed all necessary walk downs to determine the complete scope of work.
- C. The Fire Detection and Alert Notification Contractor is directed to examine all Contract Drawings in detail. Failure of the Fire Detection and Alert Notification Contractor to examine all areas, which may require special considerations and misinterpretation of the Contract Documents resulting there from, shall be entirely his/her responsibility.
- D. Fire detection and alert notification system components shall be installed as shown on the Contract Drawings with design criteria as specified in this Section. However, the Fire Detection and Alert Notification Contractor shall note that this specification requires that the Fire Detection and Alert Notification Contractor must prepare and submit drawings, system schematics and any other documents needed for the procurement of approvals and the provision of complete, functional and approved fire detection and alert notification system. As a result, the Contract Drawings and this Section serve the purpose of indicating design criteria for the Fire Detection and Alert Notification Contractor's use and guidance in preparing documents required to be submitted for review.
- E. The Contract Drawings and specifications form complimentary requirements. Provide work specified and not shown, and work shown and not specified as though explicitly required by both. Although work is not specifically shown or specified, provide supplementary or miscellaneous items, appurtenances, devices and materials necessary for a sound, secure, complete and approved installation. Completely coordinate work of this specification with work of other trades.
- F. The Fire Detection and Alert Notification Contractor is directed to bring to the attention of the General Contractor and/or Fire Protection Engineer, in writing, any discrepancies, and/or matters as they may relate to codes, standards, and recommendation and/or job conditions. Failure of the Fire Detection and Alert Notification Contractor to do so prior to bidding shall indicate acceptance of all documents herein and all job conditions.
- G. The Fire Detection and Alert Notification Contractor shall bring to the attention of the Fire Protection Engineer any conflicts between these drawings and codes or standards for resolution. The Fire Detection and Alert Notification Contractor shall not discuss these matters with the Building or Fire Official without the approval of the Fire Protection Engineer.
- H. Should the Fire Detection and Alert Notification Contractor perform any work that does not comply with the requirements of the specifications and applicable Codes, Standards and References, they shall bear all costs arising in correcting the work to the satisfaction of the Fire

Protection Engineer.

- I. The Fire Detection and Alert Notification Contractor shall include costs in their estimate(s) to fully complete all renovation including all interconnecting, coordination and installation details and components and extending the system into and throughout all spaces. The Contractor shall also include costs for startup, pre-testing and acceptance testing, and for making all the systems fully operational, and for scope and design contingencies.
- J. Provide contract cost breakdown in accordance with other sections of this specification and submit a breakdown of material and labor costs to aid the General Contractor and Fire Protection Engineer in determining the value of the work installed as the job progresses. The cost breakdown shall itemize categories of material and portions of systems to place a value on the work as it is installed. Unit cost on additional devices will be required as part of the contractors bid.
- K. The Fire Detection and Alert Notification Contractor will be required to prepare detailed shop drawings as herein before specified. This information, in the form of a single "Package", shall be submitted to the General Contractor and Fire Protection Engineer for review and approval. Equipment within the "Package" shall bear approval or listing of a testing laboratory approved by the Texas State Board of Insurance, Fire Department and the Owner's Insurer prior to submission to Fire Protection Engineer for their review.
- L. Give all notices, file all plans and other documents, obtain all permits and all licenses, pay all fees and obtain all approvals from all Authorities Having Jurisdiction as required to perform work in accordance with all requirements and with the Specifications and Contract Drawings, all of which are considered a part of these Contract Documents.

1.2 DESCRIPTION OF WORK

- A. Provide all required labor, warranty labor, materials, equipment, system programming, testing, submittals and services necessary to modify the existing fire alarm system as hereinafter described, and as shown on the engineering drawings. The end result will be for a complete and operational fire detection and alert notification system.
 - 1. Volume 1: The Contractor shall replace all existing horn/strobe and strobe only appliances with new strobe only appliances that conform to current DFW Design Criteria Manual requirements. Existing 24VDC Auxiliary Power Supplies (APS) will be replaced with new units to enable the continued synchronization of fire alarm strobes throughout the building.
 - 2. Volume 2: The Contractor shall install a new air sampling smoke detector in the Main Electrical Room #123, which shall be supervised by the existing fire alarm system.
- ~~A. This Section covers installation, programming and testing for fire detection and alert notification system improvements in the Technology Center, Communications Room, and adjacent Storage Space as hereinafter described, and as shown on the engineering drawings.~~
- ~~B. Provide all required labor, warranty labor, materials, equipment, system programming, testing, submittals and services necessary for a complete and operational fire detection and alert notification system as hereinafter described, and as shown on the engineering drawings.~~
- ~~C.B. It is intended that the engineering drawings and specification shall describe and provide for a working installation complete in every detail and all items necessary for such complete installation shall be provided whether or not specifically mentioned herein or shown on the engineering drawings.~~

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FIRE DETECTION AND ALERT NOTIFICATION SYSTEM

1.3 REFERENCES

- A. All work shall be installed in accordance with all applicable codes and referenced design standards:

1. 2015 International Building Code with local amendments
2. 2015 International Fire Code with local amendments
3. 2015 International Mechanical Code with local amendments
4. 2016 NFPA 72, National Fire Alarm and Signaling Code
5. 2014 NFPA 70, National Electrical Code
6. 2013 NFPA 13, Sprinkler Systems
- ~~1. 2009 International Building Code with local amendments~~
- ~~2. 2009 International Fire Code with local amendments~~
- ~~3. 2009 International Mechanical Code with local amendments~~
- ~~4. 2010 NFPA 72, National Fire Alarm and Signaling Code~~
- ~~5. 2008 NFPA 70, National Electrical Code~~
- ~~6. 2010 NFPA 13, Sprinkler Systems~~

ADA - Americans with Disabilities Act

2005 DFW Airport Design Criteria Manual and the Basis of Design Documents

UL standard 464, Audible Signal Appliances (horn appliances only), latest edition.

UL Standard 1481, Power Supplies for Fire Protective Signaling Systems, latest edition.

UL Standard 1971, signaling Devices for the Hearing Impaired, latest edition.

Americans with Disabilities Act Accessibility Guidelines (ADAAG). 1990 edition.

Texas Accessibility Code, latest edition

American National Standards (ANSI) A117.7, Accessibility Code, latest edition.

UFAS-Uniform federal Accessibility Standards, latest edition.

Administrative Rules of the Texas Department of Licensing and Regulation 16
Texas Administrative Code, Chapter 74, latest edition-Elevators, Escalators and Related
Equipment.

- B. If there is a conflict between the applicable codes, referenced design standards, or local amendments and this specification, it is the Contractor's responsibility to immediately bring the conflict to the Fire Protection Engineer for resolution.

1.4 SYSTEM OPERATION

- E. A. The fire detection and alert notification system substructure shall operate as follows: Initiation circuits shall meet the minimum requirements of Class B. Supervisory circuits shall meet the minimum requirements of Class B. Notification circuits shall meet the minimum requirements of Class B, Style 1. Signaling line circuits shall meet the minimum requirements of Class B. Auxiliary circuits, where not installed as signaling line circuits, shall meet the minimum requirements of a Class B notification circuit. Circuits for relay coil operation shall be 24 volt maximum with a separate or integral field collapsing diode.
- F. C. The control panels and auxiliary power supplies shall receive their power from 120 volt AC dedicated branch circuits. The circuit disconnecting means shall have a red marking, shall be accessible only to authorized personnel, and shall be identified as "FIRE ALARM NOTIFICATION CIRCUIT". The 24 volt DC power for all system initiation, supervisory, notification and control circuits shall be provided by the Fire Detection and Alert Notification control panel power supplies or listed auxiliary power supplies.
- G. D. Upon loss of building power, the entire system shall transfer to secondary within ten (10) seconds, and without loss of signals. The system shall operate under secondary power in normal or trouble conditions for twenty-four (24) hours and have sufficient power to support

complete alarm condition operation for a subsequent fifteen (15) minutes of evacuation alarm operation at maximum connected load.

1.5 QUALITY ASSURANCE

- A. All work shall meet the requirements of the Owner, Architect, Engineer and Authority Having Jurisdiction (AHJ).
- B. All equipment and components shall be UL listed for the actual intended use, unless hereinafter specifically excluded from such a listing.
- C. Installation and supervision of installation shall be in strict compliance with the requirements of the regulations, licenses, and permits for fire detection and alert notification system installers in this jurisdiction.
- D. Installer must have been actively engaged in the business of selling, installing, and servicing fire detection and alert notification systems for at least five (5) years.
- E. Installer must be registered with and licensed by the State of Texas as a Fire Alarm Contractor.
- F. Installer must be an authorized representative of the Equipment Manufacturer (EM) and have technical factory training specifically for the system proposed.
- G. The EM shall have a representative supervise the final connection of devices, wiring, and programming of the control panels. The EM representative shall be National Institute for Certification in Engineering Technologies (NICET) certified as Level II or higher Fire Alarm Protection / Fire Alarm Systems Engineering Technician.

1.6 REGULATORY REQUIREMENTS

- A. All work shall meet the requirements of all applicable codes and referenced design standards.
- B. No approvals or interpretations of the design documents shall be pursued except through the Engineer.
- C. Any work performed prior to the satisfactory review of the shop drawings by the Engineer, approval by the AHJ, and determined to be noncompliant with the contract documents or applicable codes by the Owner or AHJ will be replaced at the Contractors' expense.
- D. The system will not be acceptable until final testing and receipt of the Inspection and Testing Form has been obtained.

1.7 SUBMITTALS

- A. The engineering drawings have been prepared using AutoCAD. These documents will be made available either in electronic or hard copy form. Utilization of these documents for the development of shop drawings and submittals does not relieve any responsibilities required herein.
- B. In the submittals, the Contractor must clearly identify all areas and sections of this specification to which they take exception or are not capable of providing.
- C. Submittals will be disapproved unless required equipment literature, calculations, and complete

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shop drawings are submitted together as one package for review.

- D. The Fire Protection Engineer and Airport Fire Prevention Bureau shall review and recommend approval, disapproval, or other appropriate recommendations on the Contractor's submittals. This review is to verify conformance to the project specifications and design concepts expressed in the contract documents. The Contractor shall allow sufficient time to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of details and dimensions, or substantiating installation or performance of equipment and systems designed by the Contractor, all of which remain the Contractor's responsibility to the extent required by the contract documents. The Engineer's review shall not constitute approval of safety precautions of construction, means, methods, techniques, sequences of procedures, or approval of a specific assembly.
- E. Prior to release of equipment for shipment or installation, submit to the Fire Protection Engineer, DFW ITS Life Safety Department and Airport Fire Prevention Bureau the following:
1. Five (5) sets of shop drawings in addition to the specific quantity required for this project. Three (3) sets of shop drawings to the Fire Protection Engineer and Airport Fire Prevention Bureau, one (1) set to DFW ITS Life Safety Department, and one (1) electronic set (AutoCAD) copy/file to the Fire Protection Engineer. The three (3) sets of shop drawings for the Airport Fire Prevention Bureau shall be hard, bond type paper. Submittal must be comprehensive of the entire project, complete in all detail, and include, but not be limited to, the following:
 - a. Floor plans showing equipment placement, point to point wiring, wiring types and sizes, conduit types and sizes, wiring and raceway routes, and proposed mounting methods for conduit and backboxes. Floor plans shall be AutoCAD generated.
 - b. Sequence of Operations (Event Matrix) to include a detailed description of the operation of each system function for all possible alarm conditions.
 - c. Riser diagram showing typical wiring connections for each type of device and module.
 - d. Supervisory and alarm current calculations for primary power and emergency battery sizing of all control panels and auxiliary power supplies.
 - 1) Battery calculations shall list the type of devices and modules, quantities, amperage draw for standby and alarm conditions for each device, the total amperage draw for each panel, and each panel's battery amp/hour rating.
 - 2) The calculated load shall be the design load (summation of current at end of circuit), including all required spare capacity.
 - 3) The battery capacity used to meet the calculated load shall be a maximum of eighty (80) percent of the amp/hour listed by the manufacturer.
 - e. A complete list of all proposed alphanumeric descriptions and their associated point address and circuit number.
 - f. Voltage drop calculations for all notification appliance circuits.
 - 1) Calculations shall follow the voltage drop calculation criteria as outlined in NFPA 72 and UL 864.
 - 2) Calculations shall use the worst case operating voltage of each control panel or power supply as a starting voltage. The starting voltage shall be 20.4 VDC, unless written documentation is provided confirming that the specific control panel or power supply is capable of maintaining a voltage higher than 20.4 VDC.
 - 3) Calculations shall use the lowest operating voltage of the notification

appliances and the associated increased current draw. The lowest operating voltage shall be the UL standard operating voltage of 16 VDC, unless approved otherwise by the Fire Protection Engineer.

2. Three (3) sets of manufacturer's literature on all system equipment and system conductors in addition to the specific quantity required for this project.
 - a. Literature shall include specification and description of recommended supporting methods, enclosures or boxes, and wiring connections.
 - b. The exact components to be utilized on this specific project shall be indicated, by highlighting or arrows, on each data sheet of the equipment literature.
3. One (1) copy each of the qualifications and authorization of the representative of the EM.
4. The Owner, Owner's Representative, or design firms retained by the Owner shall not be responsible for any additional costs resulting from replacement of equipment or materials not reviewed prior to installation.

F. After complete review and approval of the shop drawings by the Fire Protection Engineer and Airport Fire Prevention Bureau, the Contractor shall submit all required drawings, manufacturers' literature, calculations and any other materials required by the AHJ to obtain a permit to the appropriate party for review.

G. Forward to the Fire Protection Engineer, in writing, any comments from the AHJ or the Insurance Underwriter within five (5) working days after the receipt of their comments.

1.8 PROJECT RECORD DOCUMENTS

A. The Contractor shall provide and maintain on site an up-to-date record set of approved shop drawing prints which shall be marked to show each and every change made to the fire detection and alert notification system from the original approved shop drawings. This shall not be construed as authorization to deviate from or make changes to the shop drawings approved by the Fire Protection Engineer without written instructions from the Fire Protection Engineer in each case. This set of drawings shall be issued only as a record set. These drawings shall be made available to the Owner, or the Owner's Representative, upon request.

B. The Contractor shall continually document software and programming changes. This documentation shall include:

1. A complete printout of the system prior to the change.
2. A complete printout of the system program subsequent to the change, with all modifications highlighted.
3. A letter prepared and signed by the individual who made the changes, describing each change made and the reason for the change. This letter shall certify that the programmer has personally reviewed and compared the before and after program printout and verified the correctness of the modification(s).
4. An equivalent means performed automatically in computer software, which verified the results of changes made is acceptable.

C. Once the fire detection and alert notification system is put into service, in whole or in part, and the associated building(s) are partially or wholly occupied, no software changes shall be performed without prior written permission of the Owner, or Owner's Representative.

D. Only a certified manufacturer's representative trained in the specific programming software shall make changes to the fire detection and alert notification system software once the system

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is in service.

- E. Each revision to the software shall be identified by a unique version number and date.
 - F. Prior to final payment for the fire detection and alert notification system and the beginning of the warranty period, submit the following completed project record documents to the Owner's Representative:
 - 1. Copies of all test and inspection reports as required by the AHJ and NFPA 72:
 - a. The Record of Completion form shall be in the format as outlined in NFPA 72.
 - b. The Inspection and Testing form shall be in the format as outlined in NFPA 72.
 - 2. DFW Airport Fire Marshall shall accept the system and is provided with all permits, licenses, acceptance tests and final acceptance requirements as per NFPA applicable codes and standards. All permits and licenses required to be in the possession of the Owner by the AHJ.
 - 3. Accurate record (as-built) drawings of the complete installation to include, but not be limited to, the information required for the shop drawings. Record drawings of the floor plans shall be AutoCAD generated.
 - 4. Original warranty documents including, but not limited to, those of the EM. Warranty documents shall reference and be binding to the warranty provisions specified in the warranty portion of this specification.
 - 5. Submit to the Engineer a copy of the transmittal to the Owner's Representative for all final complete project record documents.
 - G. Upon completion of construction, submit the following:
 - 1. Provide one (1) sepia bond reproducible print, two (2) prints, and a set of disks in Electronic Format of the drawings, floor plans with device locations, device addresses, wire routing and wiring diagrams reflecting "as-built" conditions to the Owner.
 - 2. Provide two (2) complete sets of "as-built" data sheets for all system-connected equipment to the Owner.
 - 3. Provide two (2) sets of complete "as-built" software listing of all data files, even programs, print statements, points' lists, etc. to the Owner.
 - 4. Provide one (1) copy of all data files on diskette to the Owner.
 - 5. Provide two (2) sets of customized "as-built" operating manuals to the Owner.
 - 6. Provide one (1) complete set of electronic files of "as-built" drawings and wiring diagrams to the Engineer. Electronic files shall be in AutoCAD.
 - 7. Provide a completed test form which complies with NFPA 72, signed and dated by the fire detection and alert notification system manufacturer or his agent.
 - 8. Provide NFPA 72 completion certificate, signed by the Fire Department.
 - 9. All items of this section shall be provided prior to final payment request.
 - H. A copy of all software documentation required by this section shall be maintained on-site by the Contractor, in a binder, arranged in chronological order. This binder shall be provided to the Owner's Representative at the completion of the project.
 - I. Submit to the owner in electronic format, all fire detection and alert notification as-builds.
- 1.9 RELATED REQUIREMENTS:
- A. Materials and methods specified in other sections:

1. Electrical – Division 26

- a. Section 260526 – Grounding For Electrical Systems
- b. Section 260529 – Hangers and Supports for Electrical Systems
- c. Section 260533 – Raceways, Conduits and Boxes
- d. Section 260534 – Wireways
- e. Section 260549 – Through-Penetration Firestopping for Electrical

1.10 WARRANTY

- A. Repair all defective workmanship or replace all defective materials for a period of one (1) year from the date of acceptance by the Owner's Representative. Workmanship or equipment found to be defective during that period shall be replaced at no additional cost to the Owner.
- B. The warranty or any part of the warranty shall not be made void by any required operation or inspection of the system after final completion during the warranty period. The Owner may select qualified firms other than Warrantor to provide required tests and inspections. System testing and inspections will be conducted only by a duly licensed company under contract with the Owner to perform scheduled testing and inspections as required by the AHJ. The Owner may elect to have a representative present at the scheduled testing during the warranty period.
- C. As an option alternate bid, the Contractor shall supply pricing for extended Warranty of the system. This option shall be renewable on a yearly basis and pricing shall be supplied for a minimum of five (5) years from the expiration of the initial Warranty.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Provide modifications to the addressable fire alarm control system in the Consolidated Rental Car (RAC) Facility for the addition of a new Communications Room.
- B. Products for this project shall be of the latest design. Obsolete or discontinued models are not acceptable.
- C. All equipment supplied shall be UL listed for the required function and shall be compatible with the existing fire alarm and alert notification control system.

2.2 CONTROL PANELS

- A. The existing Honeywell XLS control panel will remain. Provide the additional modular components as necessary to satisfy system capacity requirements and to accomplish all system functions.
- B. Auxiliary Power Supplies
 - 1. Provide each auxiliary power supply (APS) unit in an individual, single, self-contained, lockable cabinet. Input shall be 120 volt AC nominal with an output of regulated 24 volt DC. Each APS shall be capable of actuation from either a host panel notification circuit, or programmed dry contacts. Each APS shall provide a trouble indication to host panel upon loss of AC power or abnormal conditions on individual output circuits. Each APS shall have a minimum of four (4) supervised output notification circuits rated individually

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at a minimum of 2.5 amperes available per circuit, with a total output of 10 amperes. The Contractor shall be responsible for all redesign, circuiting, and additional equipment costs to provide the necessary output amperage. Each APS shall have a minimum of twenty (20) percent spare capacity on each circuit.

2. The APS shall operate from a dedicated 120 volt AC or 24 volt DC source with a listed secondary power source conforming to the same alarm and standby time requirements as the FACP.
 - a. Acceptable Equipment Suppliers (provided compatibility requirements are met, i.e. synchronization): Honeywell, Inc. (XLS-BPS10 series)HPFF8 or Notifier FCPS-24S8 only.
3. Provide a smoke detector above any new remote power supplies, where required.

2.3 FIELD DEVICES

A. Monitor Modules

1. Provide addressable monitor modules where required to interface with contact alarm devices, or to connect a supervised zone of conventional initiating devices (any normally open dry contact device) to an intelligent SLC loop.
2. The module shall include a unique internal identification code that is factory installed and programmed into the control panel through a mapping process which the control panel shall use to identify the type of device. Flash status/power LED under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel. The LED may be placed into steady illumination by the control panel, indicating that an alarm condition has been detected.
3. Provide an automatic test feature to permit functional testing of the device from the main control panel. Indicate results of the test on the LCD display at the control panel.
4. Monitor modules with multiple input contact connections are acceptable if each input is capable of independent programming and functional operation.

C. Control/Relay Modules

1. Provide addressable control/relay modules where required to interface with a dry contact (Form C) relay. Provide power for the relay actuation from the intelligent SLC loop.
2. Minimum rating of Form C contacts shall be 2 amperes at 24 volts and 0.5 amperes at 120 volts AC.
3. The module shall include a unique internal identification code that is factory installed and programmed into the control panel through a mapping process which the control panel shall use to identify the type of device. Flash status LED under normal conditions, indicating that the control module is operational and in regular communication with the control panel. The LED may be placed into steady illumination by the control panel, indicating that an alarm condition has been detected.
4. Control/relay modules with multiple output contact connections are acceptable if each output is capable of independent programming and functional operation.

D. Signal Modules

1. Provide addressable signal modules where required to interface with audible or visual notification appliances, or to connect a supervised zone of conventional indicating appliances (any 24 volt DC polarized notification appliance) to an intelligent SLC loop. Provide notification appliance power through a separate loop from the main control panel or from supervised remote power supplies.

2. The Minimum rating of the output current shall be 1.5 amperes at 24 volts and 0.5 amperes at 120 volts AC.
3. The module shall include a unique internal identification code that is factory installed and programmed into the control panel through a mapping process LED under normal conditions, indicating that the control module is operational and in regular communication with the control panel. The LED may be placed into steady illumination by the control panel, indicating that an alarm condition has been detected.

E. Intelligent Photoelectric Smoke Detectors

1. Provide analog photoelectric type smoke detectors with the capability to send data, on command, to the control panel representing the analog level of smoke density.
2. Provide a "maintenance alert" feature whereby the detector initiates a trouble condition should the units' sensitivity approach the outside limits of the normal sensitivity window.
3. The detector shall include a unique internal identification code for each detector that is factory installed and programmed into the control panel through a mapping process which the control panel can use to identify the type and precise location of the detector.
4. Provide dual alarm and power/status LED's. Flash status LED's under normal conditions, indicating that the detector is operational and in regular communication with the control panel. Both LED's may be placed into steady illumination by the control panel, indicating that an alarm condition has been detected and verified.
5. Provide a low profile design modular detector head with twist-lock base.

F. Intelligent Detector Base

1. Provide a UL listed low profile twist-lock detector base with screw terminals. Provide an output connection in the base to connect an external remote alarm LED.
2. Detector base shall be capable of connecting to the control panel.
3. Provide supervision as required by NFPA 72 and the manufacturer's equipment literature.

~~G. Intelligent Photoelectric Smoke Detectors for Duct Applications~~

- ~~1. Provide duct mounted analog photoelectric type smoke detectors with the capability to send data, on command, to the control panel representing the analog level of smoke density.~~
- ~~2. Provide detectors operating in air velocities of 0 fpm to 4000 fpm without adverse effects on detector sensitivity.~~
- ~~3. Provide a "maintenance alert" feature whereby the detector initiates a trouble condition should the unit's sensitivity approach the outside limits of the normal sensitivity window.~~
- ~~4. Provide a molded plastic enclosure with integral conduit knockouts. Provide housing with gasket seals to insure proper seating of the housing to the associated ductwork. Provide sampling tubes that extend across the width of the duct and in compliance with the manufacturer's installation recommendations.~~
- ~~5. The detector shall include a unique internal identification code for each detector that is factory installed and programmed into the control panel through a mapping process which the control panel can use to identify the type and precise location of the detector.~~
- ~~6. Provide dual alarm and power/status LED's. Flash status LED's under normal conditions, indicating that the detector is operational and in regular communication with the control panel. Both LED's may be placed into steady illumination by the control panel, indicating that an alarm condition has been detected and verified.~~
- ~~7. Provide a low profile design modular detector head with twist-lock base.~~
- ~~8. Remote test stations, where required, shall consist of a key operated switch and indicating LED. The remote test station shall be listed for use with the duct smoke detector.~~

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~~9. Provide a separate addressable control/relay module for any associated control functions.~~

H. Addressable Manual Pull Stations

1. Provide dual action type manual pull stations. Manual pull stations shall be designed that upon activation, shall initiate a change of status at the control panel. The manual pull stations shall not be automatically resettable and shall include a visible indication of the manual pull station being activated.
2. The unit shall include a unique internal identification code that is factory installed and programmed into the control panel through a mapping process which the control panel can use to identify the type of device. Monitoring devices when used shall be located in the manual station's back box.
3. Construct of hi-impact red molded Lexan or die-cast metal with instructions for station operation in raised white letters.
4. Where possible, provide flush mounting of pull stations. Surface mounting of pull stations will be allowed if flush mounting is not possible. Semi-flush mounted stations shall mount on a standard electrical box.

I. Visual Notification Appliances - Wall Mounted

1. Provide visual notification appliances operable at 24 volt DC and polarized supervision. The appliances shall utilize a high intensity solid state xenon strobe tube with associated lens/reflector system. The appliances shall be constructed of high-impact white thermoplastic, shall indicate "ALERT", shall not include the "Running Man" symbol, and shall be UL listed for wall mounted applications.
2. Where possible, provide flush mounting of appliances. Where surface mounting is necessary, provide a decorative backbox skirt covering the appliance backbox.
3. Provide synchronization of all visual notification appliances. The synchronization modules shall be capable of synchronizing appliances with candela ratings ranging from 15 cd to 185 cd.

J. Audible/Visual Notification Appliances - Wall Mounted

~~J. Audible/Visual Notification Appliances - Wall Mounted~~

1. Provide solid state electronic audible notification appliances with integral visual notification appliance operable at 24 volt DC and polarized supervision. The appliances shall utilize a high intensity solid state xenon strobe tube with associated lens/reflector system. The appliances shall be constructed of high-impact white thermoplastic, shall be labeled "ALERT", shall not include the "Running Man" symbol, and shall be UL listed for wall mounted applications.
2. Where possible, provide flush mounting of appliances. Where surface mounting is necessary, provide a decorative backbox skirt covering the appliance backbox.
3. Provide synchronization of all audible and visual notification appliances. Provide a synchronized temporal pattern audible tone producing a minimum sound pressure level of 75 dB reverberant per UL 464 using the A-weighted scale (dBA). The synchronization modules shall be capable of synchronizing appliances with candela ratings ranging from 15 cd to 185 cd.

K. Visual Notification Appliances - Ceiling Mounted

~~K. Visual Notification Appliances - Ceiling Mounted~~

1. Provide visual notification appliances operable at 24 volt DC and polarized supervision. The appliances shall utilize a high intensity solid state xenon strobe tube with associated lens/reflector system. The appliances shall be constructed of high-impact white thermoplastic, shall indicate "ALERT", shall not include the "Running Man" symbol, and shall be UL listed for ceiling mounted applications.
2. Where possible, provide flush mounting of appliances. Where surface mounting is necessary, provide a decorative backbox skirt covering the appliance backbox.
3. Provide synchronization of all visual notification appliances. The synchronization modules shall be capable of synchronizing appliances with candela ratings ranging from 15 cd to 185 cd.

L.G. Audible/Visual Notification Appliances - Ceiling Mounted

1. Provide solid state electronic audible notification appliances with integral visual notification appliance operable at 24 volt DC and polarized supervision. The appliances shall utilize a high intensity solid state xenon strobe tube with associated lens/reflector system. The appliances shall be constructed of high-impact white thermoplastic, shall indicate "ALERT," shall not include the "Running Man" symbol, and shall be UL listed for ceiling mounted applications.
2. Where possible, provide flush mounting of appliances. Where surface mounting is necessary, provide a decorative backbox skirt covering the appliance backbox.
3. Provide synchronization of all audible and visual notification appliances. Provide a synchronized temporal pattern audible tone producing a minimum sound pressure level of 75 dB reverberant per UL 464 using the A-weighted scale (dBA). The synchronization modules shall be capable of synchronizing appliances with candela ratings ranging from 15 cd to 185 cd.

M.H. Auxiliary Relays Audible/Visual Notification Appliances - Ceiling Mounted

1. Provide relays for all auxiliary control interface. Provide heavy duty type rated up to 10 amperes at 24 volt DC. Provide with NEMA I dust cover assembly and DPDT contacts.
2. Relays shall be mounted within 3 feet of the controlled circuit or device.

2.4 CONDUCTORS

- A. Wiring will be in accordance with local, state, National Electrical Code and the ICC Electrical Code.
- B. SLC conductor(s) shall be Honeywell AK-3747.
- C. Notification Alarm Circuit conductor(s) shall be #12 AWG, THHN stranded.
- D. All electrical characteristics (conductor-to-conductor capacitance, DC resistance, etc.) of the fire detection and alert notification conductors shall meet the requirements of the selected EM for the intended application.
- E. Wire used for 120 VAC power circuits shall be minimum size of 12 AWG stranded copper conductors with THHN insulation.
- F. Wire used for point addressable, signaling line circuits, shall be a minimum size of 14 AWG solid copper conductor, UL listed for fire alarm system use and labeled FPL.

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2.5 CONDUIT/RACEWAY

- A. The following raceway types shall be permitted:
 - 1. EMT conduit (3/4 inch minimum).
 - 2. RIGID conduit (3/4 inch minimum).
 - 3. Non-Metallic conduit for wet locations (3/4 inch minimum).
 - 4. Metal clad cable is permitted in concealed spaces for horizontal fire detection and alert notification branch circuits and connections to devices and fixtures.
- B. All raceway types shall be new. Installing used raceway is unacceptable.
- C. Using existing raceway is unacceptable without prior written permission of the Engineer or Owner's Representative.
- D. Boxes, supports, and other accessories for the raceway installation shall be listed for the intended application.
- E. All wiring shall be installed in conduit.
- F. Install fire detection and alert notification system wire in conduit or approved raceway, parallel to existing building structure when possible.
- G. All riser wiring and wiring between floors shall be installed in conduit.
- H. Strap or bundle all cables and wires inside equipment enclosures and terminal cabinets, parallel to the enclosure sides.
- I. All EMT conduit fittings shall be compression type. All rigid conduit fitting shall be threaded with plastic inserts.
- J. Flexible conduit and associated junction boxes connecting sprinkler water flow and supervisory switches shall be water resistant.
- K. All fire alarm conduit and junction boxes shall be RED in color. Flexible conduit between fire alarm junction boxes and device mounting boxes that are less than 6 feet in length are not required to be RED. Device mounting boxes are not required to be RED.

PART 3 – EXECUTION

3.1 COORDINATION WITH OTHER TRADES

- A. Coordinate closely with all other trades to expedite construction, accurately interface with related systems and avoid interferences.

3.2 INSTALLATION / APPLICATION

- A. Furnish and install all control wiring, raceway and outlet boxes for the fire detection and alert notification system.
- B. Furnish and install all backboxes, equipment and devices for the fire detection and alert notification system.

1. Backboxes shall be of the exact type recommended by the EM as shown on the equipment and device submittals.
 2. Backboxes shall be installed per the manufacturer's installation recommendations.
 3. Devices and equipment must be installed by personnel legally permitted and currently licensed to install the devices and equipment. The cost of installation, warranty of installation and equipment, coordination of the installation, and supervision of the installation are responsibilities of the Contractor.
- C. All fire detection and alert notification junction boxes, pull boxes, cable splices and terminal cabinets shall be accessible, painted red and clearly marked "Fire Alarm." The Contractor shall comply with any local codes or AHJ requirements for circuit identification. Any access panels required for the accessibility to the junction boxes, pull boxes, cable splices and terminal cabinets shall be the responsibility of the Fire Detection and Alert Notification Contractor.
- D. All wiring conductors and conduits shall be installed in a neat and workmanlike manner at right angles to the building walls, floors and ceilings, and supported from the building structure at intervals compliant with NEC requirements.
- E. All wiring conductors for the fire detection and alert notification system shall be installed in conduit.
- F. All wiring conductors shall be tagged at all junction points and shall test free from grounds or crosses between conductors.
- G. Power-limited wiring conductors shall not be installed in conduits with electric light, power Class 1, non-power-limited fire alarm and medium power network-powered broadband communications circuits.
- H. Fire detection and alert notification cabling shall not be painted.
- I. Conduits shall enter the control panel enclosures only in the approved locations, as identified in the EM installation instructions.
- J. Flexible Metal Conduit (FMC) is allowed to be installed between the junction boxes, conduit body, or other conduit termination and the device back box only in accessible ceilings. FMC shall not exceed 6 feet in length without prior approval from the Engineer of Record and DFW IT for the specific location. FMC shall be securely fastened in place and supported in one of the following methods:
1. By an approved means from building structure within 12 inches of each box, conduit body, or other conduit termination and shall be supported and secured at intervals not to exceed 4 1/2 feet. Hanger assemblies used to support the FMC shall be installed in accordance with the manufacturers published instructions.
 2. By an approved means from building structure at the mid-point of the FMC at a minimum to ensure the FMC and connectors do not separate under normal operation of the building. Hanger assemblies used to support the FMC shall be installed in accordance with the manufacturers published instructions.
- K. Existing fire alarm devices being replaced, or their operations abandoned shall be removed immediately after the new fire detection and alert notification system is accepted by the Owner. All fire detection and alert notification equipment, equipment backboxes, accessible conduit and wiring shall be removed. Conduit and wiring that cannot be removed shall be marked "Abandoned". All fire detection and alert notification equipment (excluding backboxes, conduit, scrap wiring, and other equipment not strictly related to the demolished fire detection and alert

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notification system) shall be turned over to the Owner's Representative.

- L. Install all hangers, clamps, conduit, and backboxes for the fire detection and alert notification system prior to the application of fireproofing on structural members. The hangers, clamps, conduit, and backboxes for the fire detection and alert notification system shall be installed on the edge of any beam requiring fireproofing. Backboxes shall be fastened to the flange of the beam utilizing beam clamps, and shall not be attached directly to the beam. Verify the locations of all fireproofing, prior to the installation of any fire detection and alert notification conduit or backboxes.
- M. Any damage to fireproofing on the building structure as a result of the fire detection and alert notification system installation shall be repaired by a qualified Fireproofing Contractor. All damage and repair of fireproofing shall be reported to and coordinated through the General Contractor. The Fire Detection and Alert Notification Contractor shall be responsible for all fireproofing repairs at no additional cost to the Owner.
- N. Intelligent loop circuits shall be provided with adequate junction boxes, be expandable, and provide a means for connection to the loop in the junction box.
- O. Conduits shall enter panels from the sides or bottom. Where flexible conduits are used to connect device loop wiring to alarm devices, the Contractor shall use a 1/2 inch flexible conduit.

3.3 EQUIPMENT MOUNTING

- A. The control panels and auxiliary power supplies shall be surface mounted with no operational parts which may require maintenance mounted greater than 72 inches above the finished floor. The control panel annunciator shall be mounted so that no switch, manually operated device, display or LED is greater 60 inches above the finished floor.
- B. Smoke detectors shall be mounted on the underside of the ceiling or deck, and shall be located more than 3 feet from air supply diffusers.
- C. Smoke, heat, and duct detectors shall not be installed until after the construction clean-up of all trades is complete and final. Detectors that have been installed prior to final clean-up by all trades shall be cleaned or replaced in accordance with NFPA 72.
- D. Manual pull stations shall be securely mounted with the operable part of the manual pull station no greater than 48 inches above the finished floor (AFF) for frontal wheelchair access and 54 inches AFF for side access as measured to the pull lever.
- E. Wall mounted audible/visual, speaker/visual and visual appliances shall be flush mounted with their bottoms at 80 inches above the finished floor or 6 inches below the ceiling, whichever is lower. Wall mounted horns or speakers shall be mounted a minimum of 90 inches AFF.
- F. Devices and appliances shall not be supported by ceiling tiles. Devices and appliances must be attached to backbox supported by the ceiling grid.
- G. All initiating devices and addressable modules shall be mounted in a location accessible for testing and maintenance.
- H. Provide a label for each initiating device indicating the specific address for that device. The label shall include the node number, loop number and device number where applicable. The label shall be located on the base of all detectors and the cover plates of addressable modules

3.4 PAINTING AND PATCHING

- A. All fire detection and alert notification junction boxes, pull boxes, conduit, cable splices and terminal cabinets shall be thoroughly cleaned, removing all dirt, oil, etc. and made ready to receive paint.
- B. All penetrations of fire rated assemblies (wall or floor construction) shall be firestopped to preserve the original fire resistance and smoketight integrity of the assembly. All firestopping methods shall be UL listed Through Penetration Firestop Systems or otherwise approved by the Owner, Architect, Engineer, and AHJ. Specific firestop assembly shall be identified at the penetration location with a sticker or other approved identification means.

3.5 SYSTEM TESTS

- A. All test and inspections specified in this section shall be reported in writing and submitted in accordance with this specification section.
- B. The system shall meet all the requirements of the listed applicable codes and the requirements of the AHJ. The system tests and test documents, including those required for and by the approved remote monitoring station, shall meet the requirements of the AHJ.
- C. Provide one hundred (100) percent initial acceptance testing of the entire fire detection and alert notification system prior to the required AHJ acceptance testing. Before requesting the AHJ acceptance testing, furnish a written statement to the Owner's Representative indicating that the system has been installed in accordance with the approved documents and tested in accordance with the manufacturer's specifications and the applicable NFPA requirements. The Record of Completion shall be completed and submitted as part of the written statement.
- D. All testing, inspection and retesting required for certification and required for all warranty work or replacements shall meet the requirements of the AHJ. This certification, inspection, or testing shall be completed at no additional cost to the Owner.
- E. Provide the testing date in writing to the Owner a minimum of two (2) weeks before the date. The Owner may elect to have a representative present for testing.
- F. The fire detection and alert notification system will not be acceptable until final testing and receipt of the testing certificates have been obtained.

- END OF SECTION -

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FIRE DETECTION AND ALERT NOTIFICATION SYSTEM

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