

## **SECTION 8**

### **FIRE PROTECTION DESIGN STANDARDS**

#### **8.1 GENERAL**

##### **8.1.1 Correlation and Coordination**

- A. This section provides standards for the Fire Protection design work. These design standards shall correlate with the current edition of Lockheed Martin Missiles & Space (LMMS) Facility Engineering Standards (FES), Construction Specifications Volumes I through IV, and other relevant sections of this Facility Design Standards. Where applicable, the Engineering Construction Details delineated in the FES Construction Specifications, shall be used for compatibility to LMMS existing facilities design.
- B. The Fire Protection design work shall be designated under the current Construction Specifications Institute (CSI) format.
- C. The design shall be fully coordinated with other related architectural and engineering disciplines to eliminate conflicts and omissions, and to ensure that the total project requirements are met. Prudent judgment must be exercised in collaborating design solutions with LMMS organizations and personnel.
- D. All design/construction drawings shall follow LMMS drawing procedures and standards, unless specifically described otherwise in specific Sections of this Facility Design Standards. Refer to Section 11, Drawing Procedures for general drawing requirements and to Paragraph 8.3 for specific requirements.

##### **8.1.2 Design Philosophy**

The design shall be done in a manner to assure that the maximum benefit is obtained for the costs expended. Safety and reliability shall not be compromised as a cost saving measure. The methods of analysis and design shall follow the established principles of professional engineering practices. Value Engineering is encouraged during the development of the design work.

##### **8.1.3 Codes and Standards**

The design work shall comply with the current adopted edition of all applicable city, county, state and federal codes and standards. In addition, the current adopted edition of the following codes, standards and publications, have been considered as the governing references to this section. Applicable recommendations of related trade and professional associations not listed here shall also be considered.

California Code of Regulations (CCR)  
California State Fire Marshal Office, Approval Listing Guide

Factory Mutual Engineering Corporation (FM), Approval Guide and Loss Prevention Data Sheets  
International Conference of Building Officials (ICBO), Uniform Codes  
LMMS Construction Specifications, Volumes I through IV  
National Fire Protection Association(NFPA) Standards , National Fire Code (NFC)  
Underwriters Laboratories (UL), Directories

## **8.2 DESIGN CONSIDERATIONS**

### **8.2.1 General**

- A. All portions of the building shall be fully sprinklered.
- B. Raised access flooring shall be of non-combustible construction. All communication and cabling not in conduit shall be plenum rated and indicated as such. If UL listed, computer connecting cable is exempt.
- C. Fire wall design shall be in accordance with the Uniform Building Code (UBC), and clearly indicated on all drawings. Walls meeting security requirements shall not be construed as fire rated construction.
- D. Special fire alarm, detector and/or extinguishing systems shall not be used, without special approval requiring written justification.
- E. Emergency power shall be provided for fire systems.
- F. Coordinate the location of 4 inch and greater diameter piping with all disciplines within the truss and furred spaces.
- G. The following shall be submitted with the associated drawings to LMMS Fire Protection Engineering group for review:
  - 1. Automatic sprinkler calculations
  - 2. Special fire extinguishing systems calculations
  - 3. Explosion venting calculations
  - 4. Ventilation calculations for ovens and dryers utilizing flammable mixtures
  - 5. Fire alarm systems
  - 6. Smoke detector systems
- H. The smoke detection/fire protection system(s) shall be coordinated with the system(s) supplier and the Fire Protection Engineering group of LMMS Facility Engineering organization. The American District Telegraph Company (ADT) is designated as a single

source for fire alarm equipment. Equipment provided shall include an ADT UNIMODE FACP into which all fire and supervisory alarm circuits shall be incorporated for retransmission to the LMMS Fire Department in LMMS Building 141.

- I. New HVAC system shall be provided with smoke purge capabilities in all LMMS owned buildings and in all areas of "A" Occupancy (as defined by the UBC) in leased buildings. Purge capability shall be interfaced with the BAS. Refer to Section 16, Building Controls Design Standards.
- J. Provide appropriate signage for all fire protection equipment.
- K. Chemical work stations, fume hoods, and associated duct work utilizing flammable liquids shall be steel construction. A list of chemicals utilized in each station/fume hood must be shown on the equipment lay out plan. Automatic sprinkler protection, under separate control valve(s), shall be installed as required by the Uniform Mechanical Code (UMC).
- L. Computer rooms shall be protected as follows:
  - 1. All computer rooms and tape storage rooms, when provided with a raised floor, where the area below the raised floor is used as an air plenum, shall be protected by a partial flooding carbon dioxide system covering the space between the true floor and the raised floor.
  - 2. This extinguishing system shall be actuated by a cross-zoned smoke detection system. This system shall include a FACP, a Timer Activation Panel (TAP) and a two stage High Temperature Alarm Panel (HTAP).
  - 3. The smoke detection system shall be cross-zoned to shut down power and air conditioning, shut combination smoke/fire dampers and release extinguish agents via the TAP. The two stage HTAP shall transmit the first alarm at 75 degrees F to LMMS Building 041 and the second alarm at 85 degrees F to LMMS Fire Department, Building 141. The second alarm shall shut down computer power only upon written request from the using organization.
  - 4. Smoke detectors shall be installed in all computer rooms and media storage libraries (tape storage vaults).
  - 5. Smoke detectors shall be both under floor and under ceiling. Each level shall be a separate circuit with separate conduit.
  - 6. Combination smoke/fire dampers shall be installed on all HVAC penetrations in computer rooms and tape storage vaults, walls, and ceilings.
- M. Any HVAC unit(s) exceeding 2,000 cfm shall be designed to meet UMC 1009 requirements. One smoke detector in the return air ductwork upstream of make up air intake and air filters. One smoke detector in the supply air duct work. Actuation of either detector will provide an alarm to B/141 and shutdown the HVAC unit.

Class 100,000 or cleaner clean rooms shall be equipped with the following:

1. Two cross-zoned duct smoke detectors shall be provided in the return air ductwork upstream of any make up air intake (s) and/or return air filter(s).
  2. Two cross-zoned duct smoke detectors shall be provided in the supply air ductwork downstream of any filters.
  3. The detectors, in 1 and 2 above, shall provide an alarm on the first signal and shall shut down the HVAC system as well as send a signal on the second alarm.
  4. All smoke detectors shall be connected to an ADT FACP.
- N. Horizontal carousel racks shall have: (also refer to Section 14, Equipment Design Standards)
1. Reinforced overhead sprinkler protection based on the commodity classification and the rack height.
  2. A complete smoke detection system installed directly over the flue spaces (aisles). This smoke detection system shall be connected to the Fire Alarm Control Panel (FACP) and shall, upon activation, shut down the carousel.
  3. A minimum of 2 foot aisles.
  4. A noncombustible curtain at the ceiling/floor shall completely surround the carousel rack where the top of the racks are not within 4 feet of the sprinkler system.
- O. Open grid ceilings (i.e., egg crate) and drop-out ceilings shall be:
1. UL listed and installed in accordance with their listing and NFC #13.
  2. Installations shall be reserved for corridors.
  3. Placement of lights and ducted HVAC grilles is prohibited within the plane of the open grid ceiling.
- P. The use of Sargent & Greenleaf 8470 LSR hardware is regulated and shall comply with CCR Title 19, State Fire Marshal Regulations and Local Municipal Codes.
- Q. The use of Sargent & Greenleaf 8475 and 8476 high security hardware is not regulated but is normally required in areas requiring two exit doors and combination locks.

### **8.2.2 Fire Alarm and/or Smoke Detection Systems**

- A. All fire alarm and/or smoke detection systems shall be designed and built in accordance with the appropriate NFC standards.

- B. Emergency Notification Systems (ENS) shall conform with LMMS Design Standards for buildings in Plants 1, 2, and 5. Refer to Section 5, Electrical Design Standards.
- C. The system shall be provided and installed by ADT. The building design shall provide all required conduits and power sources for this system. Refer to Section 5, Electrical Design Standards.
- D. The fire alarm system shall include monitoring of the sprinkler water flow(s), duct smoke detectors and heat sensor(s) in the HVAC systems, manual fire alarm system(s), ENS, and computer room fire protection system(s). Sprinkler control valve tamper switches shall not be provided for existing LMMS Plant 1 buildings. Existing tamper switches on LMMS Plant 5 buildings shall be monitored, and new tamper switches shall not be provided. Tamper switches for LMMS Plant 2 buildings shall be provided and monitored. Fire alarm devices in sprinkler risers (water flow), computer room (smoke detectors), circulation air ducts (heat sensors and smoke detectors) shall be included in the design package as LMMS owned equipment.
- E. All fire alarm systems for LMMS Plants 1, 2 and 5 shall be monitored by LMMS Fire Department in LMMS Building 141.
- F. The distribution of smoke detectors under the ceiling shall be one per 250 square feet and under floor shall be one per 400 square feet.
- G. Remote test capabilities shall be provided on all smoke detectors.
- H. Inspection doors shall be provided in HVAC duct work at duct smoke detectors/heat sensor and fire damper locations. Where a secure wall is penetrated, the access doors shall be on the secure side of the wall.
- I. Fan shutdown provided by ADT shall interface with the Building Automation System (BAS). Refer to Section 16, Building Controls Design Standards.

### **8.2.3 Fire Extinguishing Systems**

- A. All fire protection extinguishing systems shall be designed and built in accordance with the appropriate NFC Standards.
- B. Automatic sprinkler riser(s) shall be located as to be accessible to conduct testing and maintenance.
- C. Hanger details and seismic bracing shall be designed for adherence to NFC #13.
- D. Sprinkler systems are exempt from the security requirement of placing mesh screen wave guides inside pipe at point of penetration through security walls, floor or ceiling. Provisions in LMMS Engineering Construction Detail titled "Sprinkler RF Test Separation" in FES Construction Specifications, Volume III, Mechanical and Equipment, shall be followed.

- E. Halon 1301 systems shall be installed in anechoic chambers only, on a case by case basis. Where appropriate need and justification is provided, Halon 1301 may be used in other areas; however, this is on a demonstrated need basis and specific conditions of use will be developed.
- F. Bumper posts shall be provided for all locations, both interior and exterior, where sprinkler piping and valving is subject to potential vehicular damage.

**8.3 DRAWING REQUIREMENTS**

- A. Refer to Section 11, Drawing Procedures.
- B. Underground fire protection piping (valving, hydrants, etc.) shall be shown on the permit drawings for the site package.
- C. A completed door hardware schedule shall be submitted with the 100% design package.

END OF SECTION