

# MIT

# Design Standards

---

**Mechanical and Electrical Rooms**

**T13 Thematic Folder**

Issued 2022



Department  
of Facilities

## Table of Contents

---

<b>1. MECHANICAL AND ELECTRICAL ROOMS - OVERVIEW .....</b>	<b>2</b>
1.1 TYPES OF MECHANICAL AND ELECTRICAL ROOMS.....	2
1.2 CODES AND STANDARDS .....	2
<b>2. ARRANGEMENT AND GENERAL STANDARDS.....</b>	<b>2</b>
2.1 CLEARANCES.....	2
2.2 WALLS, FLOORS AND DRAINS .....	3
2.3 ROOM SIGNAGE .....	4
2.4 DOORS .....	4
2.5 DOOR LOCKING AND CARD ACCESS .....	5
2.6 GENERAL HOUSEKEEPING AND ROOM CONDITION .....	5
2.7 EYEWASH AND SHOWERS .....	5
<b>3. ELECTRICAL .....</b>	<b>5</b>
3.1 BASIC ELECTRICAL REQUIREMENTS.....	5
3.2 RECEPTACLES.....	6
3.3 WI-FI.....	6
<b>4. FIRE SAFETY AND EGRESS.....</b>	<b>6</b>
4.1 BASIC FIRE SAFETY AND EGRESS REQUIREMENTS .....	6

# **1. MECHANICAL AND ELECTRICAL ROOMS - OVERVIEW**

---

## **1.1 Types of Mechanical and Electrical Rooms**

This MIT thematic folder is for all new construction and major renovation of mechanical and electrical rooms spaces including, but not limited to, the following:

1. Utility / Mechanical (U/M).
2. Electrical rooms including vaults, emergency, and fire alarm rooms.
3. Elevator machine rooms.

The requirements shall be incorporated into the design, planning and construction stages of all projects by designers, architects, engineers, and contractors as applicable.

## **1.2 Codes and Standards**

Comply with local, state, and federal codes including but not limited to the items listed following. If the MIT standards are more stringent than code, follow the MIT standards.

American Society for Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE):

1. Mechanical equipment rooms must be designed in accordance with ASHRAE Standard 15: Safety Code for Mechanical Refrigeration.

Occupational Safety and Health Administration (OSHA):

1. Includes OSHA 1910 and 1926. Note that since MIT must comply with OSHA 1910, it is important that those requirements be designed into the project. In our experience, this has been lacking.

# **2. ARRANGEMENT AND GENERAL STANDARDS**

---

## **2.1 Clearances**

Vertical Clearances:

1. Main mechanical and electrical rooms shall have clear ceiling heights of not less than 12 feet (3.6 m).
2. Catwalks shall be provided for equipment that cannot be maintained from floor levels.
3. Where maintenance requires lifting heavy parts of 100 pounds (45 kg) or more, provide

hoists and hatchways.

#### Horizontal Clearances:

1. Mechanical and electrical rooms shall be configured with clear circulation aisles and adequate access to equipment.
2. The arrangement shall consider future removal and replacement of equipment.
3. The mechanical and electrical rooms shall have adequate doorways, areaways, and staging areas to permit replacement and removal of equipment without the need to demolish walls or relocate other equipment.
4. Establish sufficient clearance areas, in accordance with the equipment manufacturer's recommendations, for maintenance and removal of coils, filters, motors, and similar devices.
5. Required clearance shall be the length of the longest coil plus two feet (at location of coil).
6. Required clearance at filters shall be the length required to replace the largest filter.

#### Equipment Access:

1. Comply with OSHA requirements and MIT standards.
2. Access to equipment must be permanent where periodic maintenance needs to be performed. Equipment including sewage ejectors, sump pumps, and similar equipment must be readily accessible for service without having to enter a confined space such as a vault or pit, and with davits or other lifting means for removing and servicing heavy equipment.
3. Design catwalks, platforms, and permanent ladders in accordance with OSHA requirements for building operation.

## **2.2 Walls, Floors and Drains**

Mechanical and electrical room floors shall be uniformly sloped to drain with appropriate drains in logical locations relative to equipment and piping.

1. Blow-offs and equipment drains shall be piped to a floor drain with pipes properly supported and protected.
2. Tubing and hose are not considered permanent and should only be used for temporary drains.

Equipment and Housekeeping Pads: 4-6 inches wider than equipment at sides and rear, but no more than 1 inch wider in front. This is to allow all breaker lift carts to operate smoothly. Pads shall be a minimum thickness of 4 inches and a maximum thickness of 5 inches.

Wall and Floor Coatings: The wall coating color shall be MIT Off-White. The floor coating color shall be MIT Grey and extend entirely across the floor and equipment platforms; apply

coating prior to installation of equipment. The safety marking color shall be MIT Safety Yellow and extended at least 2 inches at curbs, corners, edges, and vertical legs. The safety striping color shall be MIT Safety Yellow and be located at equipment safety clearances. Refer to the MIT Design Standards Division 09 - Finishes for paint materials and colors.

Mechanical and electrical rooms that may leak shall be waterproof including a minimum 4 inch seamless upturn at walls and equipment pads.

Wastewater discharges may require special permitting or pre-treatment that should be reviewed with EHS.

### **2.3 Room Signage**

Mechanical and electrical room doors must have a label in accordance with OSHA requirements and MIT standards. If more than one door is used, all doors shall be labeled. Labels are to be fastened to the door or next to the door in accordance with MIT signage guidelines using tamperproof screws. Double-sided tape is not acceptable for a permanent means of attachment.

Doors shall have appropriate warning signage where required by OSHA and in accordance with MIT standards, which may include:

1. Hard hats if projections or clearances are less than 6'-8".
2. Hearing protection if noise is over 85 db (see sound hazards below). Note that MIT has adopted a requirement more strict than OSHA.
3. Authorized personnel only.
4. Designate electrical room types, for example Electrical Vault, Main Electrical Room, Electrical Room, Emergency Electrical Room, Electrical Closet, and Fire Panel Room.
5. No storage allowed.
6. Roof access signage as applicable.

### **2.4 Doors**

Mechanical and electrical room doors shall swing out of the room. Doors shall have crash bars, closers with hold opens, and a stainless steel kick plate on the room side.

Doors leading into main mechanical and electrical rooms shall have at least one set of double doors, preferably located near the elevator.

Doors that lead directly outside shall have weather stripping and a dust strip to keep out dust and dirt from the outside.

## **2.5 Door Locking and Card Access**

Card access shall be in accordance with Thematic Folder T20 - Campus Safety and Security Services.

Mechanical and electrical room doors must be locked from the exterior at all times. Doors shall require key for entry, but shall not be lockable from inside the mechanical or electrical room.

Exception: Doors opening directly onto roofs shall require key access from the inside of the building and no key access or locking to egress from the roof.

## **2.6 General Housekeeping and Room Condition**

For remodeling projects, floors, ceilings, and walls must be free of abandoned threaded rods, strap hangers, conduit, clips and similar fasteners, supports or accessories that are no longer required.

Abandoned equipment must be removed, including but not limited to, pipes, conduit, ductwork, electrical feeds, and low voltage wires.

## **2.7 Eyewash and Showers**

If chemicals are used in the space that are corrosive or present significant skin or eye contact or absorption hazard, then eye wash and showers shall be provided as required in OSHA 1910.151. Examples of use include but are not limited to chemicals to be used to treat water discharge, clean equipment or HVAC components. Refer also to the EHS Thematic Folder.

# **3. ELECTRICAL**

---

## **3.1 Basic Electrical Requirements**

Comply with applicable NEC and OSHA requirements.

Disconnecting Means:

1. Electrical panels shall be identified with phenolic labels, not markers.
2. Electrical panel schedules shall be computer printouts and clearly legible.

Provide Arc Flash warning labels and verified arc flash studies where required.

Electrical equipment must maintain required clearance.

MI (mineral insulated) cables shall be clearly labeled in accordance with local electrical codes and NEC, with label every 4 feet.

Low voltage wires shall be installed and protected from damage in accordance with the applicable MIT Design Standards Thematic Folders and Technical Divisions.

Lighting levels must meet OSHA requirements or better for electrical spaces.

### **3.2 Receptacles**

All mechanical and electrical rooms must have Ground Fault Circuit Interrupter (GFCI) installed, or receptacles are to be installed on the load side of a GFCI.

Each mechanical and electrical room wall shall have at least one outlet every 20 feet. If a wall is less than 20 feet long, install one outlet per wall.

### **3.3 Wi-Fi**

Provide wireless network access at all mechanical and electrical rooms.

## **4. FIRE SAFETY AND EGRESS**

---

### **4.1 Basic Fire Safety and Egress Requirements**

For mechanical rooms which contain a steam pressure reducing station, serious consideration shall be provided for two means of egress located at opposite ends of the room, unless there exists an unobstructed direct path to egress with a minimum exit width of six feet, and no possible way for a person to occupy the space on the opposite side of the steam pressure reducing station from the exit door. The goal is to be able to exit the room in the event of a steam pipe break without having to pass by, or go around, the steam discharge point.

Comply with applicable NFPA, NEC and OSHA requirements and MIT standards. Provide firesafing and firestopping at penetrations to meet local code requirements.

Fire Extinguishers:

1. Department of Facilities (DOF) rooms shall have fire extinguishers located inside the room near the exit, or exits if multiple doors are used. Comply with MIT policy on fire extinguishers in Division 10 - Specialties.

END OF DOCUMENT