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5.13: MM HEALTHCARE PROCEDURE ROOM INFECTION CONTROL TYPES AND REQUIREMENTS

Related Documents

Refer to SBA 5.16 "MM Requirements for Critical Pressure Sensitive Rooms" (5.16 - Google Docs) for information on detailing and other requirements where air pressure is critical.

Basis Guidelines:	230905 Mechanical Systems Controls (Hospital Projects) 260526-H Supplemental Grounding and Bonding for Electrical 260553-H Supplemental Electrical Equipment Identification 260800-H Supplemental Electrical Acceptance Test 262000-H Supplemental Low Voltage Electrical Distribution 265100-H Supplemental Interior Lighting 275223-H Nurse Call Systems 275313-H Supplemental Clock System Standard Detail E-IP-1 Isolated Power System Requirements Standard Detail E-IP-2 Isolated Power System Requirements FPD Policy Oct 18 Power Plug Strips in UMHHC
Standards:	Facility Guidelines Institute – FGI 2018 NFPA 99 Health Care Facilities Code 2012 Michigan Electrical Code Part 8, incl NEC 2023 – Section 517
Policies:	UMH Infection Prevention Surgical Attire (Attire in Restricted and Semi-Restricted Areas) Policy

Definitions:

Wet Procedure Location: Per NFPA 99, Operating Rooms shall be considered a wet procedure location, unless a risk assessment conducted by the health care governing body determines otherwise.

Clear Area (Clear Square Footage): All room areas are to be calculated based on the actual clear floor area, excluding any built-in cabinetry, boxed out low wall air returns, columns and the like.

Equipment List: A list of all equipment for a room or space, provided by MM Facilities Planning and Development (FPD) Capital Equipment Planner.

Equipment Plan: A scaled 2-D or 3-D architectural plan which shows all “equipment”, furniture, built-ins and other items graphically within a room or space. These may include floor plans, reflected ceiling plans, and interior elevations, and are prepared by the A/E. “Equipment” here includes all items located in the room as noted on the “Equipment List” including contractor installed equipment and infrastructure items, MM Health Information Technology & Services (HITS) supplied equipment, etc.

Operating Room: A room licensed by the state as an Operating Room. (Infection Prevention “IP” Room Type 1 room as noted below); designated as a restricted area

Patient Care Vicinity: The volume of space within 6.0 feet horizontal of the surgical sterile field and extending vertically 7 feet 6 inches above finished floor (AFF).

Restricted Corridors/Rooms: Operating Rooms and the sterile core accessed from a semi-restricted area where surgical attire is required.

Semi-Restricted Corridor/Rooms: The corridor area within the “Red Line” where surgical attire is required, including scrubs or protective coveralls (“Bunny Suit”) and hair coverings.

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Sterile Zone: The area around the patient table within a procedure room that which is covered by the laminar flow supply air system. This area shall include the patient table, the staff and the surgical equipment used during the procedure.

Treatment, Procedure Rooms: Names used to describe clinical rooms where various surgical and non-surgical "procedures" are performed that vary~~ing~~ in invasiveness. The goal of this document is to give specifications for each type using IP Room Types 1 through 7. Many factors determine whether these are restricted areas. It will be determined by the location and type of procedures performed as determined by AORN and 2018 FGI.

General

This Special Building Area (SBA) guideline applies to new procedure rooms within Michigan Medicine (MM) inpatient and outpatient facilities, owned or leased. This SBA applies to clinical areas where invasive to minimally invasive procedures are performed.

The definition for, and the use and understanding of, the various procedure rooms names used within a healthcare setting (i.e. "Operating Room", "Procedure Room", "Treatment Room", etc) varies greatly amongst healthcare codes, industry standards, design professionals, and MM healthcare staff. Therefore, the room types noted below and throughout the document were developed by MM to better clarify the needs and requirements of the various procedure rooms.

This SBA was therefore created to establish a universal understanding amongst our design professionals, construction coordinators and staff, clinicians, infection control, and maintenance on how these spaces should be designed and operated. The information expressed in this SBA is meant to standardize the design and performance of procedure room types and requirements across the MM campuses and is based on close coordination with the State of Michigan Department of Community Health and the MM Infection Prevention and Epidemiology Department (IPE), along with industry-wide best practices. Where the information in this SBA seems to exceed that of regulating healthcare codes, the AE shall nevertheless utilize the information expressed here in this SBA. Where the information in this SBA would serve to conflict or be in direct violation of regulating healthcare codes, the A/E shall bring this to the attention of the University Project Manager. At no time shall governing health care codes be violated.

The use and application of these procedure room types is governed by MM IPE in conjunction with the MI Health Facilities Engineering Section (HFES). All determinations on room types, and the procedures performed within, shall be made by MM IPE and MI HFES. MM Infection Prevention and Epidemiology shall be the authority on room type classifications for specific procedures.

Equipment Plan and Room Size:

Minimum room sizes shall comply with the current adopted version of the Facilities Guideline Institute (FGI). Refer to Table 2 in this document. In many cases, however, the Equipment Plan will dictate that the room needs to be larger than the code minimum based on the equipment to be used within the room and staff movement paths.

For example, a room required to be 400 square feet might have overall dimensions within the interior walls of 24' x 24' (576 SF) within the walls if 2' of built-ins, air returns and equipment around the perimeter are required. Additional equipment and staff movement paths may dictate the room be even larger.

Prior to finalizing room size, the A/E shall create Equipment Plans, including all fixed and movable equipment and furnishings to be used in the room for the specific cases expected in the room. If multiple procedures or equipment layouts are expected, each case should be laid out individually. Any equipment to be stored in the room when not in use for a particular case shall be accounted for. The Equipment Plan must include patient and staff locations and include adequate circulation space (min. 30") for staff to circulate fully around the perimeter of the room, and through the doors to the room, during the case. A Reflected Ceiling Plan should be created where ceiling mounted equipment is planned. Particular

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attention should be made to all boom and lighting layouts, and the "Sterile Zone" created with the supply air. If a sterile zone is to be created, it should be superimposed on the Equipment Plan. In all layouts, the location of the patient must be within the sterile zone. In addition, surgical staff and tools used for procedures shall be within this sterile zone.

In addition to Equipment Plans, the cases should be mocked up with the actual equipment. The Equipment Plans shall be reviewed and approved by the Clinical department, Infection Prevention and Epidemiology (IPE), and Facilities Planning and Development (FPD).

Prefabricated Ceiling Systems:

When considering these systems, discussions should be had as early as possible regarding how the system will be incorporated into the design. The various manufacturers have different approaches to providing a modular sterile zone design. Therefore, for the system to be planned for in design, a specific manufacturer will need to be selected, and it will need to go through the single-source process with input from the design team. The user group is required to complete a "Sole Source Justification" form for the requested manufacturer and submit it to the Procurement Department for approval. Otherwise, the system could be designed as a "white box" system which would be bid out to various manufacturers. This would require the design team to coordinate the needs of the ceiling system in a post-bid design process in which the specific ceiling requirements would be designed The design team would need to incorporate this extended design time into their schedule and budget.

The size of the ceiling system will be dictated by the size of the sterile zone based on the procedures performed as determined from the UMH staff. The system shall incorporate diffusers, lighting, booms, and any other components that may be required for the procedures performed. Since these ceiling systems are not standardized between manufacturers there must be flexibility when planning to competitively bid the project. The use of Nano or UV lighting has not been proven as an effective means to reduce infection rates in the rooms served. Projects should not incorporate this system into the design unless specifically requested by the user group.

The approved preferred manufacturers for the prefabricated ceiling systems are as follows:

- AJ Manufacturing – AJ Ceilings
- Bio-Grid – Clean Room Ceiling System
- Price – Ultrasuite
- SLD - Airframe
- Steris – Cleansuite

Classification of Infection Prevention Room Types

To clarify the various types of surgical and procedure rooms and the procedures performed in each, MM standardizes on (7) seven infection prevention room types for these spaces. These room types are defined in Table 1 below. MM IPE shall maintain a separate list of procedures for each room type.

TABLE 1

Infection Prevention Room Type	Surgical Procedure/ Invasiveness	Common Terminology (1)
1	Invasive, major surgical procedures, above or below fascia, may involve bone or implants, requiring active life support	Operating Room (OR)/Hybrid OR/Class 3 Imaging room/C-Section
2	Invasive, minor surgical procedures, minimally invasive- below fascia, may involve bone or implants.	Procedure Room – Review procedure types with IPE

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3	Cardiac Catheterization, Angiography and Interventional Radiology. Image-guided biopsy; may require active life support	Class 2 Imaging Room, Cardiac Cath/EP Lab, Trauma, Interventional Radiology; minimally invasive surgery
4	Endoscopic, non-invasive	General Endoscopy
5	Bronchoscopy, Triage	Bronchoscopy, Triage
6	Minimally Invasive procedures-above fascia, LDR and LDRP* and percutaneous procedures	Treatment Room
7	Minimally invasive- above fascia only.	Examination Room
(1) Terminology per Facilities Guideline Institute (FGI) and ASHRAE 170 Ventilation of Health Care Facilities.	*Inpatient building only	

The A/E shall clearly indicate the Room Name & Room Type on the preliminary and final construction contract documents, and in the Operational Narrative.

The A/E shall ensure that all rooms identified under this SBA shall conform to the criteria stated under Table 2 “Architectural”, Table 3 “Electrical” and Table 4 “Mechanical” at the end of this document.

IP Room Types 1 & 2:

Architectural
Due to the need to maintain space pressurization control, the A/E shall give special attention to providing a sealed space envelope, including extending all walls to the structure above and sealing all floor, wall and ceiling penetrations (i.e. light switch back boxes, conduit and pipe penetrations, etc) as well as the intersection of the wall and underside of the structure above.

In an effort to maintain a sealed, pressurized room envelope, the A/E shall limit the infrastructure (i.e. ductwork, piping, conduit, etc) passing over an IP Types 1, 2, 3 or 4 room to only that which serves the space. All items requiring regular maintenance (i.e. terminal air boxes, etc.) or accessibility (i.e. valves, etc.) shall be located outside of the room envelope so as to preclude the need to access such devices from within the space.

The stretcher access doors shall be automated with touch-less hand actuated sensors. The width will be determined by clinical needs and site conditions; a typical room might have a pair of doors totaling 6 feet wide. A wall mounted shut-off switch for these doors will be located on the room side to prevent accidental usage during a procedure. Push paddle hands-free type hardware should be used so that it is possible to enter the room without using hands or arms. All doors shall have closers. The door material should be carefully considered for durability, for example fiberglass rather than painted hollow metal, and door frame protection should also be installed.

Provide properly sized and placed access hatches to allow for maintenance and related activities associated with any equipment placed, or may be placed, above the ceiling. Properly sized meaning they are big enough for a normally sized person, to access and maintain the equipment easily and safely. Where shoulder clearance is required, access hatches shall be a minimum of 24” x 24”.

The basis of design for the sterile zone ceiling system in IP room types 1 and 2 shall be a “stick-built” system in which all components are independently installed. A prefabricated ceiling system is acceptable but must be discussed with the UMH project manager and FPD project team. See more on the Prefabricated Ceiling Systems section herein. The Architect shall provide carefully and completely laid out

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reflected ceiling plan showing all diffusers, lights, surgical column supports, fire suppression sprinklers, smoke detectors, occupancy sensors, access hatches, A/V equipment, and any other equipment to insure coordination and utility of the design. In addition, provide a cross-section of above ceiling space, sufficiently detailed to ensure proper space and accessibility for all installed systems is available above the ceiling. The ceilings will consist of a gasketed accessible ceiling system. The ceiling tiles shall have a washable surface and must stay in place during the washing process. Tile clips will only be allowed where tiles are less than 2 square feet in size or as directed otherwise by the Design Manager.

All room finishes will be selected by MM FPD Interior Design, in consultation with IPE and other MM staff. Monolithic, non-porous wall surfaces, such as PVC or FRP are preferred. Modular wall systems are acceptable, but not required. Discuss whether the project would benefit by using a modular wall system with the UMH project manager and the FPD project team. Flooring material and base material shall be monolithic, such as terrazzo or an epoxy flooring product, or a resilient sheet flooring.

Colors of ceilings, walls and floors shall be selected with consideration of their effects on the lighting levels in the room in all room types. Reflectance levels of less than 80% for ceilings, 50% for walls and 20% for floors shall be allowed for in the lighting design.

Flooring patterns may be desired to indicate the sterile field. If provided, construction documents must indicate that floor patterns match the extent exactly. Floor patterns may be desired to indicate other operational or equipment limits, such as gauss lines.

Mechanical

Rooms shall be served by a dedicated HVAC control zone to actively maintain the room's thermal comfort and pressurization (typically either a dedicated AHU or tracking supply and return terminal airflow control boxes in conjunction with a reheat coil). System shall be controlled to maintain room temperature and balanced to maintain room pressurization, as measured via a differential pressure monitor across the main doorway from the clean corridor. Dynamic pressure control is neither required nor desired. Return airflow shall be controlled to maintain the active measured supply airflow minus a fixed airflow offset setpoint (initially assume an offset of 300-500 CFM, depending on number & size of doorways into space). Airflow offset shall be determined by a test & balance contractor, as required to maintain a room pressurization of 0.03"-0.05"wc- see SBA 5.16 "MM Requirements for Critical Pressure Sensitive Rooms". See Table 4 for mechanical requirements for these spaces.

Pressurize relationship for the procedure room suite should be prioritized as follows:

1. Operating and Procedure rooms should have a positive pressurization to all adjacent areas.
2. Sterile storage areas should be positive to all adjacent areas except operating and procedure rooms.
3. Semi-Restricted areas within the suite should be positive to all other adjacent areas except operating rooms and sterile storage areas.

Space temperature and humidity sensors shall be mounted in the common return air main from the room. DDC shall monitor the door status (ie open/ closed) of all doors into the space. Provide a wall mounted human machine interface (HMI) panel within the room that displays room temperature, temperature set-point, humidity, occupied/ unoccupied mode, space pressurization, door status and air change rate. All points shall also be integrated into the BMS frontend. Panel shall allow the users to adjust temperature within the room. Panel shall provide local indication if room temperature, humidity, air change rate, or pressurization are outside of acceptable limits. Protect wall-mounted panel with a stainless steel "crash-guard" where applicable. Locate one HMI within the OR to give staff a visual on the room environmental status, as well as allow them to change temperature setpoint. Another shall be located adjacent to the scrub sink so that staff preparing for surgery can see that all room environmental conditions are being met and there are no problems prior to going into surgery.

A/E shall clearly state the room pressurization requirement (i.e. goal is 0.03"-0.05"wc) on the design drawings and indicate a means of achieving pressurization (i.e. throttle return/ exhaust airflow).

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Rooms shall include controls to automatically reduce ventilation during unoccupied periods for energy conservation. This control system shall include at least two ceiling or wall mounted dual technology (passive infrared plus microphonic sensing) occupancy sensors per room, selected for full room sensing coverage, to automatically determine room occupancy. All room sensors must simultaneously detect unoccupied conditions for a period of not less than 30 minutes in order to enable unoccupied mode operation. The system must be designed such that a failure at any level (i.e. loss of power to sensor, cut or disconnected communication wire, etc.) will cause the system to assume occupancy and operate in an occupied mode. During unoccupied mode operation, airflow shall be controlled down to the minimum level necessary to maintain required room pressurization, and to maintain the room temperature setpoint.

Procedure rooms requiring typical humidity ranges as defined by FGI (30-60% RH) do not require a dedicated “booster” humidifier in addition to the main air handling unit’s system humidifier. However, if the room has a need for a higher low-limit percentage as determined by the equipment or type of procedure performed, a booster humidifier may be required to meet these needs. Confirmation of this need should take place during the design process.

The sterile zone shall be coordinated with the architect and MM clinical staff. MM requirements for the sterile zone dictate a large area of laminar flow air which will likely increase the room total air change rate above the required minimums. There may be a requirement to provide two terminal units per room due to the capacity of air required.

Where ceiling booms are used for medical gas service, in addition to those gases provided on the boom, provide the following properly labeled medical gas outlets on the wall at the head end of the table: (2) MVAC with slides, (1) OX, (1) WAGD, and (1) MA. Medical gas quantities and locations shall be verified with MM clinical staff during design. Under no circumstances shall the quantities be less than required by code.

Electrical

These rooms shall be served by critical power derived from two separate transfer switches, distributed on separate power risers and served from separate panels. Since these rooms are to be considered NFPA 99 Wet Procedure Location, isolated power systems (IPS), with line isolation monitors, shall be installed in each room. There shall be a minimum of two IPS per room. The need for additional IPS will depend on the IPS conductor length limitations and the required power distribution requirements of the program. This and other design and construction best practices are identified in FPD standard details that shall be utilized to prevent issues in the isolated power system certification testing. Half of the IPS shall be connected to each of the two critical power sources noted above. The NEC and MIOSHA requirements to leave the floor space 36 inches deep and the width of the IPS panel shall be clearly marked with a yellow warning placard posted on the panelboard or the floor space itself which states “AREA IN FRONT OF ELECTRICAL PANEL MUST BE KEPT CLEAR FOR 36 INCHES”.

A minimum of 48-outlets (24-duplexes) shall be installed in each room, with 50% fed from one IPS and the balance from the other IPS. In order to facilitate easy staff recognition of which IPS feeds which receptacle and improve resiliency in the case of an IPS alarm, the receptacle covers shall be labeled with a “Circle A” and “Square B” sticker. Request details on the IPE and EHS approved label specifications from the project FPD Lead. Please note that 48 is the minimum, provide more when the program dictates the need for more. [This number of outlets is in addition to any normal power supplied outlets that may be required by code.] The outlets shall be conveniently, and evenly, spaced around the room- including those installed in the surgical booms. As noted above, the outlets on surgical booms shall be fed from a diversity of IPS and labeled accordingly. All outlets shall be hospital grade, and color coded as per hospital design guideline Supplemental Electrical Equipment Identification.

Outlets shall be served by 20-ampere circuits, using XHHW-2 low dielectric constant wire. Typically, no more than 6 -outlets (3-duplexes) shall be connected to each circuit, unless additional outlets are allowed by the FPD Lead. The IPS circuits must approved for the intended purpose by the FPD Lead. [A good policy is to limit power to 1000-watts per circuit.]

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Lighting shall be 5000-K 85 CRI LED, with a maintained room lighting level minimum of 150 footcandles everywhere within the sterile field, and 75 footcandles elsewhere within the patient vicinity. Allowances may be made by the FPD Lead for lower Kelvin temperature at a higher CRI which achieves comparable IES color recognition. Provide switching and controls to permit reduced lighting during portions of the procedures that may mandate this, as noted in the program. All of the lighting will be on critical power, served from two circuits that are fed from different transfer switches. Approximately 33% of the lighting fixtures shall include battery back-up or UL 921 lighting inverter supplied power, to provide illumination during the period before emergency power is restored. [All of the above are in addition to the lighting provided by the surgical boom lights themselves.]

Provide power receptacles, and data outlets, for at least three large, wall-mounted, video display units (large computer screens) at locations defined by OR staff. Carefully coordinate the mounting elevation, and locations, of these with the staff.

Provide a raceway, junction and pull box system, power and data outlets, for installation of A/V equipment that may be provided either in the base project, or at a future date. A detailed drawing will be made available to assist in this.

At least 50% of the power outlets, and lighting, in scrub area, shared imaging rooms, and/or adjacent equipment rooms shall be on critical power, but not on IPS power unless required by the program. The outlets not on IPS shall have GFCI. Coordinate exact needs for power and data with equipment planners and OR staff. In addition, imaging systems, critical for completion of the surgeries, shall be served by critical power with UPS backup when required by the program.

When program notes are needed for 277-volt laser power outlets, these outlets may be supplied by a shared IPS serving several rooms or a dual-voltage IPS serving a single room. Carefully coordinate with Capital Equipment Planner, Clinical Engineering and OR staff in the placement and sizing of these outlets.

Provide an open channel communications system (in essence hands free) to allow communication for persons anywhere in the room to other defined remote locations. Locations needing this system will be defined during DD. Wall mounted intercoms must be chemical resistant with an antibacterial front surface for easy cleaning.

No fire alarm strobes or speakers shall be installed in these rooms. Nor shall they be in adjacent corridors, if intervening walls have extensive glass. These instead will be placed in control rooms, or scrub areas not in line of sight of staff working on the patient.

IP Room Type 3:

Architectural
Due to the need to maintain space pressurization control, the A/E shall give special attention to providing a sealed space envelope, including extending all walls to the structure above and sealing all floor, wall & ceiling penetrations (i.e. light switch back boxes, conduit & pipe penetrations, etc.) as well as the intersection of the wall and underside of the structure above.

To maintain a sealed, pressurized room envelope, the A/E shall limit the infrastructure (i.e. ductwork, piping, conduit, etc.) passing over a Type 3 room to only that which serves the space. All items requiring regular maintenance (i.e. terminal air boxes, etc.) or accessibility (i.e. valves, etc.) shall be located outside of the room envelope so as to preclude the need to access such devices from within the space. The stretcher access doors shall be automated with touchless hand actuated sensors. A wall mounted shut-off switch for these doors will be located on the room side to prevent accidental usage during a procedure. Push paddle hands-free type hardware should be used. All doors shall have closers.

Provide properly sized and placed access hatches to allow for maintenance and related activities associated with any equipment placed, or may be placed, above the ceiling. Properly sized meaning they are big enough for a normally sized person, to access and maintain the equipment easily, and safely. The

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number of hatches shall be based upon equipment installed above ceiling; however, at least two shall be installed regardless. Where shoulder clearance is required, access hatches shall be a minimum of 24" x 24".

The basis of design for the sterile zone ceiling system in IP room type 3 shall be a "stick-built" system in which all components are independently installed. A prefabricated ceiling system is acceptable but must be discussed with the UMH project manager and FPD project team. See more on the Prefabricated Ceiling Systems section below. The Architect shall provide carefully and completely laid out reflected ceiling plan showing all diffusers, lights, surgical column supports, fire suppression sprinklers, smoke detectors, access hatches, A/V equipment, and any other equipment to insure coordination and utility of the design. In addition, provide a cross-section of above ceiling space, sufficiently detailed to ensure proper space and accessibility for all installed systems is available above the ceiling. The ceilings will consist of a gasketed accessible ceiling system. The ceiling tiles shall have a washable surface and must stay in place during the washing process. Tile clips will only be allowed where tiles are less than 2 square feet in size or as directed otherwise by the Design Manager.

All room finishes will be selected by MM FPD, Interior Design, in consultation with IPE and other MM staff. Walls shall be smooth FRP panels with tooled sealant joints. Modular wall systems are also acceptable but should be discussed with the project team as the initial cost of these systems are higher than standard construction. Renovation projects may benefit from the use of modular wall systems by potentially reducing construction time. Terrazzo flooring with integral base shall be provided where there is heavy equipment traffic. Flooring patterns may be desired to indicate operational limits. If provided, construction documents must indicate that the floor patterns match the limits exactly.

Mechanical
See requirements for IP Room Type 1 & 2 above.

Electrical
See requirements for IP Room Type 1 & 2 above.

IP Room Type 4-7:

See Tables 2, 3, 4

Architectural
Refer to typical Infection Control Room Type layout drawings on the Standard Details page. Doors should be 3'-2" minimum. Privacy should be provided at the doorway by way of curtains and/or hinge gasketing. Walls should be full height to structure above, and acoustically insulated. If plenum returns are used, walls should extend as far as practical above ceiling plane and return-air acoustical boots should be installed. Wall finishes should be durable and cleanable. Wall protection should be installed. Sink should be located as close to the doorway as practical. Flooring should be seamless, with an applied cove base typically.

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TABLE 2: ARCHITECTURAL

Infection Control Room Type	Access Restrictions	Minimum Room Size (Clear Square Footage) Actual size determined by Equipment Plan	Min. Room Ceiling Height (ft)	Floors Monolithic	Base	Walls
1	Access from semi-restricted hall in a semi-restricted suite, room is restricted during procedure	400 sq. ft. min. clear/ 600 for ortho, cardiac. Equipment may dictate significantly larger	10'-0"	Yes	Integral Min. 6"	FRP/PVC
2	Access from semi-restricted hall, room is semi-restricted or restricted during procedure Not to be a shared semi-restricted hall that also serves Room Type 1 above.	250 sq. ft. code minimum; Equipment may dictate significantly larger	10'-0"	Yes	Integral Min. 6"	FRP/PVC
3	Access may or may not be from a restricted hall, room is unrestricted when sterile field not present	400 sq. ft. code minimum. (Note 1) Equipment may dictate significantly larger	10'-0"	Yes	Integral Min. 6"	FRP/PVC
4	Unrestricted access and room	250 sq. ft. code min. Equipment may dictate significantly larger	9'-0"	Yes	Integral Min. 6"	Washable Free of fissures, open joints.
5	Unrestricted access and room	250 sq. ft. code min. Equipment may dictate significantly larger	8'-0"	Yes	Integral Min. 6"	Washable Free of fissures, open joints.
6	Unrestricted access and room	Highly dependent upon equipment	Highly dependent upon equipment	No	Applied	NA
7	Unrestricted access and room	120 sq. ft. (inpatient) 100 sq. ft. (outpatient) Code min.	8'-0"	Yes	Applied	NA

References:

- Minimum Design Standards for Healthcare in Michigan, 2007
- ASHRAE/ASHE Standard 170- Ventilation of Health Care Facilities, 2008
- UMH Infection Control Policy, Surgical Site Infection Prevention, 2008
- Guidelines for Design and Construction of HealthCare Facilities, 2010

Note:

1. IR Single plane, 600 SF; BiPlane 650 SF; CT/Biplane (Hybrid) 700 SF
   IR Equipment room Single plane 60 SF, BiPlane 80SF, CT/Biplane (Hybrid) 200 SF
   IR Control Room: Single plane 180 SF, BiPlane 200 SF, CT/BiPlane (Hybrid) 250 SF

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TABLE 3: ELECTRICAL

Infection Control Room Type	Wet Location	Number of Power Sources (Note 1)	Isolated Power (IP) Required	Number of IP (Note 5)	Minimum Number of Outlets (Note 2)	Multi-level Room Lights (Note 12)	Battery Lights	Green (Color) Lights (Note 6)	Fire Alarm, Horns and Strobes	Hands Free Intercom (Note 8)	Audio/Visual Ready (Note 9)	Flat screen monitor (White Board) Ready (Note 10)	Radiology Display Ready (Note 10)	Booms (Note 9,11)
1	Yes	2 (Note 3)	Yes	2	48	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
2	Yes	2 (Note 3)	Yes	2	48	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
3	Yes	2 (Note 3 and 13)	Yes	2	36	Yes	Yes	(Note 7)	No	Yes	Yes	Yes	Yes	No
4	No	1 (Note 15)	No	0	24	Yes	No	No	Yes	No	No	No	No	No
5	No	1 (Note 15)	No	0	24	Yes	Yes	No	Yes	No	No	No	No	No
6	No	1 (Note 15)	No	0	16	Yes	No	No	Yes	No	No	No	No	No
7	No	1 (Note 16)	No	0	16	Yes	Yes	No	Yes	No	No	No	No	No

General Notes:

- In room types 1, 2, 3 and 4 provide sufficient battery backed lighting to maintain a minimum of 30-fc, in at least the sterile field area of the room, for the 10-seconds required to bring on line the generator power.
- In rooms needing green lighting, provide multi-lamp fixtures with individual switching controls for at least the sterile field area of the room. Critical Power shall be provided as noted in the following example. The green color shall be achieved through the use of standard 5000-K lamps, but with green color sleeves over the lamps. [One such design scenario might include the use of a six-lamp fluorescent fixture system, in the area of the sterile field. In such a design the middle two (5000-K) lamps would be tied to a Critical Power circuit and would have battery back-up, the two lamps nearest the sterile feed (5000-K) would be tied to a second Critical Power (but with no battery back-up), and the final two would be the green color lights, also tied to Critical Power.]
- Nurse station area in the room, shall have dimmable task light - LED or equivalent.
- Newer Type 1, 2, and 3 rooms have been equipped with a lighting control system to control all lighting in the room. Base systems have typically had 6-buttons – up to 5 ‘scenes’ plus off. Control stations at entrance to the room from the sterile corridor, and another at the nurse’s station in the room. Provide manual overrides to accommodate failure of lighting controller when appropriate.
- Low, recessed, wall mounted lighting (LED or equivalent) shall be provided for the safety of the staff in the room, when main lighting is off as may be required for any given procedure.
- All receptacles served from Critical Power shall be red, with red cover plates. Those fed from normal power shall be ivory, or brown, to match the building standard.

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- When Normal Power is the second source to a room, the number of equally spaced receptacles shall be similar to the number of Critical Power receptacles. In rooms with only one power source being needed, and that source is from the Critical Power branch, also provide at least one normal power receptacle on each wall.
- In room types 4, 5, 6, and 7, located in buildings without generators, provide battery-backed power in the overhead lighting fixtures (or by separately mounted wall 'bug-eye' fixtures) to provide a minimum of 15-foot-candles of lighting for 20-minutes or more.

Notes:

1. When two sources of power are required as noted above, and there is Critical Power from independent transfer switches, use these two Critical Power sources. In other cases use one Critical Power source, and one normal power source.
2. The noted number of outlets indicated is the minimum number required by codes to meet clinical needs, supply additional outlets as clinical needs and/or good practice requires. (Note that the number indicated here is for the number of 'outlets', the number of duplexes is half of these numbers).
3. The outlets from the two sources shall be equally spaced around the room, except as modified by Note 5.
4. Normally not a wet location. Ask the chief clinician if any of the Type 4 rooms will have procedures that should be considered 'wet'. If wet location designation applies to any (or all) such rooms, provide one isolated power (IP) system in those room(s). Rooms, not defined as 'wet location', and not having isolated power, should have a sign at the entrance noting "Room is not equipped with isolated power supplies".
5. When only one isolated power (IP) system is noted or required, confer with the clinician on placement of IP outlets within the room (evenly spaced or not).
6. Noted rooms shall normally be designed for green (color) lighting as a supplement to the white lighting. This green lighting is used in cases where normal white lighting is inappropriate. Affirm need with chief clinician assigned to project team.
7. Confer with the chief clinician assigned to the project team regarding the procedures to be done in some, or all, of the Type 3 rooms in project scope.
8. At minimum, the intercom shall be among noted rooms and the main nurse station (or control station) in suite. Ask if additional locations need to be included in the hands free intercom system.
9. Provide microphone, camera and speaker boxes in ceiling with raceways to an A/V 'hub' location in the room. Also, provide one 2" conduit from each boom to the hub, and two 2" conduits from the hub to a 12"x12" recessed box at nurse's desk. Provide power from isolated power system to the hub location, and to the nurse's desk. Affirm details on quantities of boxes and raceway sizes with assigned Electrical Engineer and Capital Equipment Planner.
10. Normally provide a duplex outlet, and data outlet, on wall at locations defined by chief clinician and/or their designee.
11. Provide power, data, A/V, gases, and other services to booms, confer with Capital Equipment planner.
12. Verify if dimming of lights is also required for certain procedures.
13. Imaging machines and associate controls shall be served by UPS power or sufficient space shall be allotted in the machine room for a future stand-alone UPS unit.
14. Critical power source required with one receptacle in room served by normal power.
15. Normal power source is acceptable with one receptacle in the room served by critical power.
16. Normal power source is acceptable.

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TABLE 4: MECHANICAL

Infection Prevention Room Type	Rm Air Press	Press Monitor	Min Pressure Differential (see SBA 5.16)	Min. ACH (OA)	Min. ACH (Total)	Humidity (%RH)	Temp. Range (User Adj) (Note 1)	Pre-Filter (MERV)	Final Filtration (MERV) (Note 4)	SA Sterile Zone	Non-Aspirating Supply	Ducted RA	Low RA	Re-circ. Air Units	Hand Sink (In Rm)	Scrub Sinks (Out of Rm)	Washable Devices (i.e. T-stat)
1	Out/ Pos.	Yes	Yes	4	20	30-60	65-73	8	17	Yes	Yes	Yes	Yes	No	No	Yes	Yes
2	Out/ Pos.	Yes	Yes	3	15	30-60	68-73	8	14	Yes	Yes	Yes	Yes	No	No	Yes	Yes
3	Out/ Pos.	Yes	Yes	3	15	30-60 (Note 2)	70-75	8	14	Yes	Yes	Yes	Yes	No	No	Yes	Yes
4	N/A	N/A	N/A	2	6	20-60	70-75	11	NR	N/A	N/A	Yes	NR	NR	Yes	No	No
5	In/ Neg.	Yes	Yes	2	12	30-60	68-73	8	14	N/A	N/A	Exh	NR	No	Yes	No	No
6	N/A	N/A	N/A	2	6	Max 60 (Note 2)	70-75	11	NR	N/A	N/A	Yes	NR	NR	Yes	No	No
7	N/A	N/A	N/A	2	6	Max 60	70-75	11	NR	N/A	N/A	Yes	NR	NR	Yes	No	No

References:

- FGI 2018: ASHRAE/ASHE Standard 170- Ventilation of Health Care Facilities, 2017, not amended.
- UMHS Infection Control Policy, Surgical Site Infection Prevention (Viewing UMHS Infection Prevention of Surgical Site Infections Policy (policystat.com))

Notes:

1. Consideration must be given to user requests for reduced and/or elevated temperatures and/or rapid increase of room temperature based on the protocol of the procedures being performed; for example, the need to maintain a 90-degree room temperature. Where non-aspirating supply is required, controls must be in place to maintain the air flow pattern (i.e. "sterile zone") while the temperature is increased.
2. Confirm minimum and maximum humidity levels with imaging or other equipment.
3. Filtration requirements for Room Types 1-6: Refer to ASHRAE 170-2017 Section 6.4 Filtration and Tables 7.1, 8.1 and 9.1 Design Parameters for the relevant building type.
4. Inpatient facilities may require higher filtration levels than listed.