**SECTION 01 35 33  
INTERIM INFECTION CONTROL MEASURES**

**Spec Writer:** This section required for ALL University of Iowa Hospitals & Clinics projects.

**Spec Writer:** Select project classification. Coordinate and select temporary partition type. Coordinate with 00 73 13 Institution Requirements and 00 74 13 Project Requirements.

**Spec Writer:** Coordinate demolition and construction activities in adjacent areas, especially where access to ceiling areas is required.

**Spec Writer:** If there is a need for Work outside of the Primary Containment Area, then denote the area(s) as Secondary Areas with proper Class on the drawings.

**Spec Writer:** The Design Professional (DP) will develop, with UIHC, an approved detailed IICM plan for the work area, including barrier placement, barrier construction, HVAC isolation details, and Negative Air Machine (NAM) requirements for inclusion in the Bid package. This IICM plan must be presented to and approved by the UIHC Infection Control Risk Assessment (ICRA) Committee.

**Spec Writer**: The ICRA committee and Project Manager should always be made aware of situations where the NAM cannot be exhausted to outside the building envelope.

**Spec Writer:** All of the Negative Air Machine calculations are to be done by the Design Professional and inserted into this document prior to issuing plans for bid. (See 3.3.1.5)

**ARTICLE 1- GENERAL**

**Spec Writer:** **NOTE:** The ICRA Committee will determine which Interim Infection Control Measures Classification to use on the project.  **Most projects inside UIHC Facilities will be Class III or Class IV.** Select applicable class from the following and delete the rest.

* 1. Responsibility
     1. The Constructor shall provide barriers to separate all construction activities from non-construction areas of the hospital, at all times.
     2. The Constructor shall provide and maintain all barriers required for primary and secondary infection control, including all phases and locations of the work, whether indicated or not indicated on the Drawings and in the Specifications.
     3. During construction, provide temporary closures of metal or taped polyethylene on all open ductwork to prevent construction dust from entering ductwork system. All new ductwork and duct accessories shall be sealed in similar manner at the fabricators.
     4. Clean the interior surfaces of all ducts, air handlers, terminal air boxes, diffusers, and other air moving equipment. Interior surfaces shall be wiped down with a clean cloth and a 70% isopropyl alcohol solution as they are installed, and prior to installation of temporary closures.
  2. Quality Assurance
     1. UIHC has a zero tolerance policy. Constructors shall not track any type of dust, debris or foreign material from their respective project sites. All construction sites shall have proper infectious control measures in place prior to commencement of Work. This includes but is not limited to having walk off mats, air scrubbers, negative air machines and requisite containments in place in order to control migration.
     2. Constructors will not be allowed to work inside UIHC facilities if they do not abide by the infection control standards and requirements set forth in this Section. Any offense will result in immediate dismissal of the offending party, and they will no longer be allowed to continue work at UIHC.
     3. The owner has designated this project to require Interim Infection Control Measures- Class [I] [II] [III] [IV].
     4. Healthcare-associated infections of immuno-compromised patients, staff and visitors may be caused by exposure to airborne contaminates.
        1. Construction, renovation and repair activities may generate suspended fungal spores and/or bacterial contaminants from dust, debris and earthwork excavation dust.
        2. Fungal spores can be carried by air currents to remote locations within a facility.
        3. Control of airborne contaminates in smoke, construction dust, debris and excavation dust as required by this Section is imperative.
     5. Interim Infection Control Measures (IICM) shall provide an appropriate level of safety when there are conditions that increase the risk of healthcare-associated infections.
     6. The Owner may provide baseline particle counts and conduct periodic air sampling of protection areas during construction to monitor effectiveness of IICM.
     7. The Constructor shall comply with applicable codes and use installation procedures and methods that satisfy applicable code requirements and procedures.
     8. The Constructor shall verify the maintenance of negative air pressure in containment area relative to protection areas on a continual basis by use of differential pressure monitors.
     9. If the Constructor fails to maintain infection control procedures:
        1. The Owner may issue written warning, Non-conformance Notice, citation and/or dismissal of job site personnel.
        2. The Constructor shall correct non-conformance immediately.
        3. If situation is not corrected immediately, the Owner will have cause to stop Work as provided in Contract Documents at no additional cost to the Owner.
        4. Failure of the Constructor to correct deficiencies may result in corrective action taken by the Owner and deducting all cost associated from the Contract Amount.
  3. DEFINITIONS
     1. Aspergillus: A fungus that causes significant disease among immuno-compromised patients, and can be found in soil, water, dust and decaying material. Aspergillus have been cultured from unfiltered air, ventilation systems, contaminated dust dislodged during hospital renovation and construction, horizontal surfaces, food and plants. Because of their size, they are easily inhaled, which can lead to invasive infection of both the upper and lower respiratory tracts in a susceptible host.
     2. Biocide: A physical or chemical agent that is capable of killing microorganisms.
     3. Immunocompromised: A condition where a patient’s immune response is reduced or absent. Because defense mechanisms are limited in immunocompromised patients, they are susceptible to infections by microorganisms that are present everywhere, but do not cause disease in healthy people.
     4. Nosocomial: An infection that is acquired in a hospital or as a result of medical care.
     5. Airborne contaminant producing activities include, but are not limited to:
        1. Demolition and/or removal of walls, floors, ceilings, and other finish materials.
        2. Demolition of plumbing, mechanical and electrical systems and equipment.
        3. Finish operations such as sanding, painting, and application of special surface coatings.
        4. All other construction activity that may generate dust, smoke or fumes.
        5. Site work operations adjacent to occupied facilities.
     6. Primary Containment Area: The largest area of project work around which infection control (dust) partitions are built.
     7. Secondary Containment Area: Areas of Work within the Protection Area outside of the Primary Containment Area that requires a form of dust control.
     8. Protection Areas: Interior occupied areas within the facility, that are adjacent to a Primary Containment Area, either occupied or used for passage, as well as areas connected to construction area by mechanical system air intake, exhaust and ductwork.
     9. Preparation Area: specific area located as designated by the Owner’s Representative for donning and removing protective clothing prior to entering the Containment Area.
     10. Negative Air Pressure: The relative air pressure difference between two areas in a facility. A space that is at negative pressure has a lower pressure than adjacent areas, ensuring that any directional air movement is from the clean air environment into the contained area and preventing contaminated air from escaping into adjacent rooms or areas through doors, openings and cracks.
     11. High Efficiency Particulate Air (HEPA): A HEPA filter is an air filter capable of capturing 99.97% of particles passing through the filter that are 0.3 microns in size and larger.
     12. Negative Air Machine: A freestanding, portable device that creates negative air pressure. It does so by removing air via flexible ductwork from the containment area. The units can also be placed remotely from the containment area and use ductwork to remove air from the controlled environment.
  4. SUBMITTALS

**Spec Writer:** Submittal requirements for this section shall be a line item on the submittal log at the end of section 01 33 23 – Submittals, and shall be a required submittal when using Submittal Exchange.

* + 1. Project Information:
       1. Submit drawings indicating Work areas and procedure for containment of airborne contaminants for the Owner’s review and approval.
          1. Indicate locations of all IICM’s including temporary enclosures, barriers, isolation vestibules, negative air machines, exhaust fans, capped ductwork and differential pressure gauge.
          2. Drawings shall indicate, as a minimum, containment areas, protection areas, enclosure types, vestibules, location of negative air machines, and capped ductwork.
       2. Specific means and methods of achieving and maintaining control of airborne contaminants during construction for Owner’s review and approval.
       3. Submit daily inspection reports, noting employees that are ill, on a weekly basis to the Owner’s Representative.

**ARTICLE 2- PRODUCTS**

* 1. MATERIALS
     1. HEPA Vacuums:
        1. HEPA vacuum shall trap 99.999% of particles 0.12 microns and larger. Vacuum shall have a minimum air flow of 90 cfm.
        2. Acceptable products:
           1. ISC Sales “Minuteman Model CRV- 99.999%”
           2. Nilfisk Advance
           3. Pro-Team “Vacer HEPA/ULPA Vacuum”
           4. Design Professional approved equivalent
     2. Polyethylene: 6 mil or 8 mil thick reinforced laminated polyethylene film; shall meet requirements of NFPA 701 large scale flammability test and ASTM E84 Class A.
        1. Include compatible fire retardant tape
        2. Acceptable products:
           1. Ameri Cover “Surface Cover” (tel: 800.747.6095).
           2. Reef Industries “Griffolyn Type 55 FR” (tel: 800.231.6074)
           3. Design Professional approved equivalent
     3. Adhesive-Faced Contamination Control Mats (sticky walk-of mats):
        1. Size of mats shall be the width of the opening and 30” (minimum) depth.
        2. Acceptable products:
           1. ASG “Walk-off Mats” (tel: 216.486.6163)
           2. Controlled Environment Equipment “Cleanline Sticky Mat” (tel: 207.854.9126) or [www.ceecusa.com](http://www.ceecusa.com)
           3. Liberty Industries “Tacky Mat” (tel: 800.828.5656)
           4. Curtain Wall Company “CleanStep” tacky mats (tel: 800.424.8251)
           5. AmeriCover “Surface Cover” (tel: 800.747.6095)
           6. Design Professional approved equivalent
     4. Negative Air Machine: Provide unit sized to meet room requirements. If unit does not exhaust air to the outside of the building, provide additional carbon filtering.
        1. Units shall include prefilters, final filters, HEPA - filters and filter static pressure gauges.
        2. HEPA filters shall be 99.997% efficient at 0.3 micron particle size.
        3. Acceptable manufacturers:
           1. Abatement Technologies (<tel:800.634.9091>)
           2. Phoenix (<tel:800.533.7533>)
           3. Dri-Eaz (<tel:800.932.3030>)
           4. Micro-Trap, Inc. (<tel:877.646.8208>)
           5. Control Resource System Inc
           6. NIKRO Industries, Inc. (<tel:800.875.6457>)
           7. Design Professional approved equivalent
     5. Zipper Lock Entrance:
        1. Fire retardant, reinforced vinyl construction with reinforced stitching. Acceptable products:
           1. Curtain Wall Company “Dust Door” (tel: 800.424.8251)
           2. Pro Venture Inc. “Zip-Up” (tel: 978.744.5000)
           3. Design Professional approved equivalent
     6. Temporary Prefabricated Enclosure Units:
        1. Provide the enclosure with an inspection window and pressure differential porthole.
        2. Acceptable products:
           1. Fiberlock Technologies “Kontrol Kube” with frame #6640, enclosure #6442, wheel base platform #6443 and Milfish 87 cfm vacuum device and manometer.
           2. Specialty Tool Manufacturing “MCU-Quick Wall Mobile Containment Unit”; provide with HEPA vacuum connection (tel: 888.718.3878).
           3. Mintie Technologies “ECU EnteRoom Envelope”
           4. Design Professional approved equivalent
     7. Airflow Direction Indicator:
        1. Acceptable products:
           1. Airflow Direction Inc. “ADI-69-V-N” (tel: 888.334.4545)
           2. Austin Ventrues “Model LN102” (tel: 909.043.8172)
           3. Design Professional approved equivalent
     8. Dust Catching Device:
        1. Disposable, dry, electrostatic cloths or mitts for dust removal.
        2. Disposable, wet cloths, presoaked with cleaning solution, for dust removal.
        3. Acceptable products:
           1. Proctor & Gamble “Swiffer Dry”, “Swiffer Mitt” or “Swiffer Wet”
           2. Reckitt Brenckiser “Mop & Glo”
           3. S.C. Johnson & Sons “Pledge Grab It”
           4. Design Professional approved equivalent
     9. Magnehelic Differential Pressure Sensor
        1. Dwyer #2000-00
           1. Range 0 - 0.25” w.c.
           2. Minor divisions 0.005
           3. Calibrated for vertical scale position
     10. Disposable Coveralls, Hair Nets, Beard Nets, Shoe Covers (Required in many Class IV Infection Control Environments)
         1. Uline Products (800-295-5510) “Uline Deluxe” <https://www.uline.com/BL_1219/Uline-Deluxe-Protective-Clothing>
         2. Other acceptable manufacturers are:
            1. 3M
            2. Dupont
            3. Enviroguard
            4. Lakeland Industries, Inc.
            5. Kimberly-Clark

**ARTICLE 3- EXECUTION**

* 1. GENERAL

NOTE: All barriers visible to patients and/or the public shall be hard painted barriers.

* + 1. The Owner reserves the right to inspect the work at any time to verify that the Constructor is complying with these infection control requirements.
    2. The Constructor’s personnel shall notify the Owner’s Representative at least fourteen (14) calendar days prior to preparing a containment area or starting work activity outside of the containment area or in Owner occupied spaces.
    3. The Constructor’s personnel shall not track dust into adjacent areas, or open windows or doors that would allow airborne contaminants into adjacent hospital areas.
    4. For both interior and exterior work, direct exhaust, dust and fumes away from building air intakes, windows and doors. Ensure that filters on building air intakes are operational and protected from airborne contaminants.
    5. Workers shall wear clean clothing and footwear.
    6. Disposable protective clothing such as coveralls, shoe covers, hair & beard nets, shall be replaced if torn or dirty. Washable protective clothing shall be washed when dirty or weekly, as a minimum.
    7. Polyethylene is only allowed for use on a very limited basis. When allowed by the bid documents, seal to walls, floors and ceilings with “gaffers” tape. Blue painters tape is not allowed.
  1. CLEANING- GENERAL
     1. Maintain Containment Area free of waste materials, debris and rubbish. Maintain site in clean and orderly condition.
     2. Remove debris and rubbish from pipes chases, plenums and other closed or remote spaces, prior to enclosing the space.
     3. Clean interior areas using HEPA vacuum prior to start of surface finishing and continue cleaning to eliminate dust.
     4. Remove waste materials, debris and rubbish from the site daily and dispose of off-site.

**Spec Writer:** Edit the following classes to meet project requirements. Keep in mind that the majority of projects inside the UIHC Facilities will be class III or class IV. Delete “Classes” below that are not needed.

* 1. STANDARD OPERATION PROCEDURES FOR CLASS I AREAS
     1. Operation in Class I Areas
        1. Execute work by methods to minimize raising dust from construction operations.
        2. Immediately replace ceiling tile displaced for visual inspection.
        3. Wet Mop and/or HEPA vacuum before leaving area.

3.3 STANDARD OPERATION PROCEDURES FOR CLASS II AREAS

3.3.1 Preparation and Operation Class II Areas:

3.3.1.1 Water misting of work surfaces is not permitted except for cleaning debris carts and work surfaces.

3.3.1.2 To contain dust and debris, duct tape doors for demolition and/or construction activities that produce large amounts of dust or utilize “work enclosures”.

3.3.1.3 Block off and seal HVAC supply, return and exhaust terminal, registers, grilles, and diffusers in the rooms affected by construction.

3.3.1.4 Masks are optional by the person doing the cutting.

3.3.1.5 Holes cut or punctured in walls and partitions, ceilings, floors and doors cannot be left exposed longer than four (4) hours. If work cannot be completed within the four (4) hour time period, the holes shall be covered.

3.3.2 Flooring removal in Class II Secondary Containment areas:

3.3.2.1 Construction materials and equipment shall be stored within designated areas.

3.3.2.2 Only flooring areas of a size that can be removed, replaced and completed in one work period shall be worked on.

3.3.2.3 Removal of flooring:

3.3.2.3.1 Vacuum carpet before removal with a HEPA vacuum.

3.3.2.3.2 Damp mop sheet vinyl and vinyl composition tile flooring.

3.3.2.3.3 Use motions and methods that minimize the dispersing of dust and debris while removing flooring.

3.3.2.3.4 HEPA vacuum floor after removal of flooring, adhesive and leveling of area prior to installation of new flooring.

3.3.3 Clean-up of Class II areas:

3.3.3.1 At the completion of the work, the following shall occur:

3.3.3.1.1 Clean work surfaces and debris carts with water.

3.3.3.1.2 Contain construction waste before transport in clean, tightly covered containers or sealed plastic bags.

3.3.3.1.3 Wet mop and/or vacuum with HEPA filtered vacuum before leaving the work area.

3.3.3.1.4 Remove isolation of HVAC system in areas where work is being performed.

* 1. STANDARD OPERATION PROCEDURES FOR CLASS III AREAS
     1. Preparation of Class III Areas:
        1. Refer to the drawings for location of pathways to the Containment Area. Entry and exit locations to the Containment Area shall be coordinated with the Owner’s Representative.
        2. The Constructor shall completely install all barriers before construction begins. Dust barriers shall be set up around the specific areas of the project before the balance of the work begins.
           1. Full height, noncombustible, fire-rated construction, with minimum ½ inch thick fire-rated gypsum board both sides with 3-1/2 inch thick R-11 insulation or acoustical insulation to reduce noise.
           2. Use 3 inch wide drywall tape and one coat of joint compound to tightly seal top, bottom and all seams, to prevent spread of dust to occupied areas, including above ceiling. Surfaces exposed to public view shall be painted with two (2) coats of low odor semi-gloss latex paint, color to match adjacent wall surfaces with vinyl base to match.
           3. Doors shall be 4’-0” minimum width, fire rated, with hollow metal frame and finish hardware, including mortise store room function lockset, door closer, four (4) heavy weight 5” x 4-1/2” ball bearing hinges, door sweep and weather-stripping to prevent flow of dust. Door and frame shall match adjacent door and frame color/finish.
           4. The use of damaged doors and frames removed from previous projects is not allowed.
           5. Swing door into the construction area. Keep enclosure door locked at all times.
           6. Electronic door access shall be installed and connected to the Owner’s system; the Constructor will be assigned key fobs to unlock the door electronically.
           7. Install an airflow direction indicator (magnehelic) within the temporary barrier following the manufacturer’s installation procedures to indicate if improper direction airflow exists. A pressure differential meter (magnehelic) shall be installed to indicate negative pressure. Unit shall be installed adjacent to door opening.
           8. The location and details of the enclosure construction shall be as indicated on the drawings.
           9. Materials for enclosure shall be precut off-site to the greatest extent possible.
           10. No explosives or pneumatic driven fasters will be allowed.
           11. Provide fire rated partitions, doors and doorframes.
        3. Provide two adhesive faced contamination control mats at the construction entry point on the construction side of the dust barrier. Workers shall step on both mats when exiting a containment area. Carts shall be moved across both mats. Mats shall be wider than the carts.
        4. Provide the necessary quantity of negative air machines to maintain each separate project work area at a negative pressure with respect to the patient care areas to control the spread of contaminants from the Containment Areas to adjacent Protection Areas. Include the number of air machines needed on the infection control signage posted at the job site entrance. Refer to mechanical plans for additional detail.
           1. Negative air pressure machines equipped with high efficiency particulate (HEPA) filters shall be used in conjunction with a sealed work area to maintain a negative pressure inside the work area relative to non-work areas.

A sufficient quantity of negative pressure ventilation machines equipped with filtration shall be utilized to provide one workplace air change every 15 minutes. This requirement shall apply to the removal of the dust and contaminants from the air.

To calculate total airflow requirement: DP should do the volume calculation and insert cf/min value here.

Total cubic feet/minute = volume of work area (in cubic feet)

15 minutes

To calculate the quantity of units needed for the dust control in a specific work area:

Quantity of units needed = total cubic feet/minute

capacity of unit in cubic feet/minute

The total quantity of negative air machines required is dependent upon the total quantity of simultaneous containment areas being occupied by the Constructor. Refer to the plans to calculate the construction barriers indicated on the drawing.

Change dust filter media as recommended by the manufacturer for the negative air machines.

* + - * 1. Make-up air for the air exhausted from the spaces shall be taken from the existing HVAC system.
        2. Negative air machines (NAM) shall be connected to emergency power and run continuously.
        3. Vent negative air machines to the outside by removing existing windows and replacing them with vented panels having fittings for exhaust holes, or as detailed by the plans and specifications.
        4. Change filters as frequently as recommended by the manufacturer for duration of Work within the Containment Area to maintain a negative pressure of 0.1 – 0.2 IN of water gauge.
        5. Negative air machines shall be DOP tested and certified prior to being placed in service, and when dropped, damaged or moved extensively.
        6. Thoroughly clean each unit and replace both pre-filters and the primary filter after every job.
        7. Encapsulate and remove each NAM after each job.
        8. Dispose of used filters by placing in a plastic bag and sealing it first.
      1. Each phase of construction shall be considered a separate area.
      2. Duct Caps: Block off all existing return, exhaust and supply air ductwork within the Containment Area by capping ducts to withstand airflow, and so they are dust tight.
    1. Operation in Class III Areas:
       1. The containment control mats shall be monitored and replaced before they become loaded with dirt.
       2. The dust partitions shall be wiped down daily with a moist cloth or dust catching device.
       3. Traffic between containment areas and protection areas shall be kept to a minimum.
       4. Keep doors into containment areas closed at all times.
       5. All vacuuming of area outside of the work area not within the barriers shall be done by the Constructor with HEPA vacuums.
       6. All holes, pipes, conduit, punctures and exposures shall be sealed appropriately.
       7. Removal of debris from the project work areas shall be as follows:
          1. Removal of debris shall be done by the Constructor.
          2. The Constructor shall notify the Owner’s Representative when there is debris to be removed. Debris shall be removed on an “as needed” daily basis.
          3. Transport removed material in tightly sealed, rubber-tired containers provided by the Constructor to protect Protection Areas.
          4. The Owner’s Representative will review the type of cart and condition of the carts proposed for use.
          5. Containers shall be fitted with clean, tight fitting covers, completely sealed at perimeters by taping.
          6. Before leaving the Containment Area all containers shall be wiped or HEPA vacuumed clean to prevent tracking of dust. The cart shall be rolled over the adhesive faced contamination control mats inside the entrances.
          7. Place covers over debris boxes (roll-offs), truck beds etc., between periods when not being filled.
       8. Supplies and tools shall be brought into the Containment Area in accordance with the following procedure:
          1. Tools and supplies shall be wiped clean or wrapped in plastic sheeting and moved by Constructor provided rubber-tired carts/containers, from a staging area to the containment area (construction site).
          2. The containers shall be vacuumed with HEPA vacuum cleaners by the Constructor prior to moving through the occupied space to the Containment Area. The Constructor shall notify the Owner's Representative of the need to move these containers through Protection Areas prior to entering the Containment Area.
          3. Tool and supply removal from the Containment Area shall follow the same procedure specified for debris removal from the Containment Area.
       9. The following procedure shall be implemented when construction personnel are required to pass through a Protection Area to enter a Containment area:
          1. Personnel shall don protective clothing required by the Owner’s Representative within the Preparation Area before passing through Protection Areas.
          2. The constructor shall provide an anteroom within the dustproof enclosure.
          3. Protective clothing shall be removed in the anteroom prior to entering the Containment Area.
       10. The following procedure shall be implemented when construction personnel are required to pass from a Containment area through a Protection area:
           1. Prior to leaving the containment area, construction workers shall vacuum themselves with the HEPA filtered vacuum cleaners. After being vacuumed, the workers may leave the containment area (construction site) into the anteroom.
           2. Personnel shall re-don protective clothing in the anteroom before re-entering the protection area.
           3. Personnel shall remove the protective clothing in the Preparation Area.
           4. All dust and debris tracked outside the construction area shall be vacuumed up immediately by the Constructor.
       11. Supplies and tools shall be brought into the Containment Area in accordance with the following procedure:
           1. Tools and supplies shall be wiped clean or wrapped in plastic sheeting and moved by Constructor provided rubber-tired carts/containers, from a staging area to the containment area (construction site).
           2. The containers shall be vacuumed with HEPA vacuum cleaners by the Constructor prior to moving through the occupied space to the Containment Area. The Constructor shall notify the Owner’s Representative of the need to move these containers through Protection Areas prior to entering the Containment Area.
       12. Tool and supply removal from the Containment Area shall follow the procedure specified for debris removal from the Containment Area.
    2. Flooring Removal in Class III Secondary Containment areas:
       1. Construction materials and equipment shall be stored within designated areas.
       2. Only flooring area of a size that can be removed, replaced, and completed in one work period shall be worked on.
       3. Removal of flooring:
          1. Vacuum carpet prior to removal with a HEPA vacuum.
          2. Damp mop sheet vinyl and vinyl composition tile flooring.
          3. Use motions and methods that minimize the dispersing of dust and debris while removing flooring.
          4. HEPA vacuum floor after removal of flooring, adhesive and leveling of area prior to installation of new flooring.
    3. Work within existing ceiling spaces, outside of Containment area, shall be performed as follows:
       1. Scheduled in advance and notify the Owner’s Representative at least seven (7) calendar days prior to commencing work in ceiling or interstitial spaces above Protection Areas to allow the Owner to relocate or protect occupants.
       2. Constructor shall abide by any active Above Ceiling Work Permit process the Owner may have in effect.
       3. Inform the Owner’s Representative so that doors to Protection spaces near ceiling work can be kept closed while Work is in progress.
       4. Cover all horizontal surfaces, except flooring, to protect from dust and debris.
       5. HEPA vacuum the top of the ceiling system to be removed, and surrounding affected area, to remove dust prior to removal.
       6. Acoustical ceiling panels or ceiling access panels opened for investigation outside of the containment areas shall be closed when unattended.
       7. Whenever acoustical ceiling panels or access panels are opened in Protection Areas, provide a portable enclosure that encloses the ladder and seals off opening. Fit enclosure tight to ceiling.
       8. Exercise caution when handling fluids within ceiling or interstitial spaces.
       9. When working with fluids provide a watertight barrier beneath the work area to catch and retain all spillage before it reaches the ceiling below.
       10. Vacuum and clean surfaces free of dust before their removal.
    4. Cleaning Class III Areas:
       1. Barriers may not be removed from work areas until the completed project is inspected by the Owner’s Representative and thoroughly cleaned by the Constructor.
       2. Remove all debris, extra materials and equipment from the Containment Area before beginning final cleaning.
       3. Work areas shall be vacuumed with HEPA filtered vacuums and/or wet mopped by the Constructor.
       4. When construction is complete, the temporary partitions shall be wiped down using a moist cloth or dust catching device before removal. The partitions shall be removed without creating additional dust in the area.
       5. Clean blockage of air vents, diffusers and registers, before removal. Then remove.
  1. STANDARD OPERATION PROCEDURES FOR CLASS IV AREAS
     1. Preparation of Class IV Areas:
        1. Refer to the drawings for location of pathways to the Containment Area. Entry and exit locations to the Containment Area shall be coordinated with the Owner’s Representative.
        2. The Constructor shall construct an anteroom and require all personnel and tools to pass through this room so they can be vacuumed using a HEPA vacuum cleaner before leaving the Containment Area.
        3. The Constructor shall completely install all barriers before construction begins. Dust barriers shall be set up around the specific areas of the project before the balance of the work begins.
           1. Full height, noncombustible, fire-rated construction, with minimum ½ inch thick fire-rated gypsum board both sides with 3-1/2 inch thick R-11 insulation or acoustical insulation to reduce noise.
           2. Use 3 inch wide drywall tape and one coat of joint compound to tightly seal top, bottom and all seams, to prevent spread of dust to occupied areas, including above ceiling. Surfaces exposed to public view shall be painted with two (2) coats of low odor semi-gloss latex paint, color to match adjacent wall surfaces with vinyl base to match.
           3. Doors shall be 4’-0” minimum width, fire rated, with hollow metal frame and finish hardware, including mortise store room function lockset, door closer, four (4) heavy weight 5” x 4-1/2” ball bearing hinges, door sweep and weather-stripping to prevent flow of dust. Door and frame shall match adjacent door and frame color/finish.
           4. The use of damaged doors and frames removed from previous projects is not allowed.
           5. Swing door into the construction area. Keep enclosure door locked at all times.
           6. Electronic door access shall be installed and connected to the Owner’s system; the Constructor will be assigned key fobs that will be used to unlock the door electronically.
           7. Install an airflow direction indicator (magnehelic) within the temporary barrier following the manufacturer’s installation procedures to indicate if improper direction airflow exists. A pressure differential meter (magnehelic) shall be installed to indicate negative pressure. Unit shall be installed adjacent to door opening.
           8. The location and details of the enclosure construction shall be as indicated on the drawings.
           9. Materials for enclosure shall be precut off-site to the greatest extent possible.
           10. No explosives or pneumatic driven fasters will be allowed.
           11. Provide fire rated partitions and doors.
        4. Provide two adhesive faced contamination control mats at the construction entry point on the construction side of the dust barrier. Workers shall step on both mats when exiting a containment area. Carts shall be moved across both mats. Mats shall be wider than the carts.
        5. Provide the necessary quantity of negative air machines to maintain each separate project work area at a negative pressure with respect to the patient care areas to control the spread of contaminants from the Containment Areas to adjacent Protection Areas. Include the number of air machines needed on the infection control signage posted at the job site entrance. Refer to mechanical plans for additional detail.
           1. Negative air pressure machines equipped with high efficiency particulate (HEPA) filters shall be used in conjunction with a sealed work area to maintain a negative pressure inside the work area relative to non-work areas.

A sufficient quantity of negative pressure ventilation machines equipped with filtration shall be utilized to provide one workplace air change every 15 minutes. This requirement shall apply to the removal of the dust and contaminants from the air.

To calculate total air flow requirement: DP is to perform this computation and insert cf/min value here.

Total cubic feet/minute = volume of work area (in cubic feet)

15 minutes

To calculate the quantity of units needed for the dust control in a specific work area:

Quantity of units needed = total cubic feet/minute

capacity of unit in cubic feet/minute

The total quantity of negative air machines required is dependent upon the total quantity of simultaneous containment areas being occupied by the Constructor. Refer to the plans to calculate the construction barriers indicated on the drawing.

Change dust filter media as recommended by the manufacturer for the negative air machines.

* + - * 1. Make-up air for the air exhausted from the spaces shall be taken from the existing HVAC system.
        2. Negative air machines (NAM) shall be connected to emergency power and run continuously.
        3. Vent negative air machines to the outside by removing existing windows and replacing them with vented panels having fittings for exhaust holes, or as detailed by the plans and specifications.
        4. Change filters as frequently as recommended by the manufacturer for duration of Work within the Containment Area to maintain a negative pressure of 0.1 – 0.2 IN of water gauge.
        5. Negative air machines shall be DOP tested and certified prior to being placed in service, and when dropped, damaged or moved extensively.
        6. Thoroughly clean each unit and replace both pre-filters and the primary filter after every job.
        7. Encapsulate and remove each NAM after each job.
        8. Dispose of used filters by placing in a plastic bag and sealing it first.
      1. Each phase of construction shall be considered a separate area.
      2. Duct Caps: Block off all existing return, exhaust and supply air ductwork within the Containment Area by capping ducts to withstand airflow, and so they are dust tight.
    1. Operation in Class IV Areas:
       1. The containment control mats shall be monitored and replaced before they become loaded with dirt.
       2. The dust partitions shall be wiped down daily with a moist cloth or dust catching device.
       3. Traffic between containment areas and protection areas shall be kept to a minimum.
       4. Keep doors into containment areas closed at all times.
       5. All vacuuming of area outside of the work area not within the barriers shall be done by the Constructor with HEPA vacuums.
       6. All holes, pipes, conduit, punctures and exposures shall be sealed appropriately.
       7. Removal of debris from the project work areas shall be as follows:
          1. Removal of debris shall be done by the Constructor.
          2. The Constructor shall notify the Owner’s Representative when there is debris to be removed. Debris shall be removed on an “as needed” daily basis.
          3. Transport removed material in tightly sealed, rubber-tired containers provided by the Constructor to protect Protection Areas.
          4. The Owner’s Representative will review the type of cart and condition of the carts proposed for use.
          5. Containers shall be fitted with clean, tight fitting covers, completely sealed at perimeters by taping.
          6. Before leaving the Containment Area all containers shall be wiped or HEPA vacuumed clean to prevent tracking of dust. The cart shall be rolled over the adhesive faced contamination control mats inside the entrances.
          7. Place covers over debris boxes (roll-offs), truck beds etc., between periods when they are being filled.
       8. Supplies and tools shall be brought into the Containment Area in accordance with the following procedure:
          1. Tools and supplies shall be wiped clean or wrapped in plastic sheeting and moved by Constructor provided rubber-tired carts/containers, from a staging area to the containment area (construction site).
          2. The containers shall be vacuumed with HEPA vacuum cleaners by the Constructor prior to moving through the occupied space to the Containment Area. The Constructor shall notify the Owner's Representative of the need to move these containers through Protection Areas prior to entering the Containment Area.
          3. Tool and supply removal from the Containment Area shall follow the same procedure specified for debris removal from the Containment Area.
       9. The following procedure shall be implemented when construction personnel are required to pass through a Protection Area to enter a Containment area:
          1. Personnel shall don protective clothing required by the Owner’s Representative within the Preparation Area before passing through Protection Areas.
          2. The constructor shall provide an anteroom within the dustproof enclosure.
          3. Protective clothing shall be removed in the anteroom prior to entering the Containment Area.
       10. The following procedure shall be implemented when construction personnel are required to pass from a containment area through a protection area:
           1. Prior to leaving the containment area, construction workers shall vacuum themselves with the HEPA filtered vacuum cleaners. After being vacuumed, the workers may leave the containment area (construction site) into the anteroom.
           2. Personnel shall re-don protective clothing in the anteroom before re-entering the protection area.
           3. Personnel shall remove the protective clothing in the Preparation Area.
           4. All dust and debris tracked outside the construction area shall be vacuumed up immediately by the Constructor.
       11. Supplies and tools shall be brought into the Containment Area in accordance with the following procedure:
           1. Tools and supplies shall be wiped clean or wrapped in plastic sheeting and moved by Constructor provided rubber-tired carts/containers, from a staging area to the containment area (construction site).
           2. The containers shall be vacuumed with HEPA vacuum cleaners by the Constructor prior to moving through the occupied space to the Containment Area. The Constructor shall notify the Owner’s Representative of the need to move these containers through Protection Areas prior to entering the Containment Area.
       12. Tool and supply removal from the Containment Area shall follow the procedure specified for debris removal from the Containment Area.
    2. Flooring Removal in Class IV Secondary Containment areas:
       1. Construction materials and equipment shall be stored within designated areas.
       2. Only flooring area of a size that can be removed, replaced, and completed in one work period shall be worked on.
       3. Removal of flooring:
          1. Vacuum carpet prior to removal with a HEPA vacuum.
          2. Damp mop sheet vinyl and vinyl composition tile flooring.
          3. Use motions and methods that minimize the dispersing of dust and debris while removing flooring.
          4. HEPA vacuum floor after removal of flooring, adhesive and leveling of area prior to installation of new flooring.
    3. Work within existing ceiling spaces outside the Containment area shall be performed as follows:
       1. Scheduled in advance and notify the Owner’s Representative at least seven (7) calendar days prior to commencing work in ceiling or interstitial spaces above Protection Areas to allow the Owner to relocate or protect occupants.
       2. Constructor shall abide by any active Above Ceiling Work Permit process the Owner may have in effect.
       3. Inform the Owner’s Representative so that doors to Protection spaces near ceiling work can be kept closed while Work is in progress.
       4. Cover all horizontal surfaces, except flooring, to protect from dust and debris.
       5. HEPA vacuum the top of the ceiling system to be removed, and surrounding affected area, to remove dust prior to removal.
       6. Acoustical ceiling panels or ceiling access panels opened for investigation outside of the containment areas shall be closed when unattended.
       7. Whenever acoustical ceiling panels or access panels are opened in Protection Areas, provide a portable enclosure that encloses the ladder and seals off opening. Fit enclosure tight to ceiling.
       8. Exercise caution when handling fluids within ceiling or interstitial spaces.
       9. When working with fluids provide a watertight barrier beneath the work area to catch and retain all spillage before it reaches the ceiling below.
       10. Vacuum and clean surfaces free of dust before their removal.
    4. Cleaning Class IV Areas:
       1. Barriers may not be removed from work areas until the completed project is inspected by the Owner’s Representative and thoroughly cleaned by the Constructor.
       2. Remove all debris, extra materials and equipment from the Containment Area before beginning final cleaning.
       3. Work areas shall be vacuumed with HEPA filtered vacuums and/or wet mopped by the Constructor.
       4. When construction is complete, the temporary partitions shall be wiped down using a moist cloth or dust catching device before removal. The partitions shall be removed without creating additional dust in the area.
       5. Clean blockage of air vents, diffusers and registers, before removal. Then remove.
  1. WORK ENCLOSURE OUTSIDE OF THE PRIMARY CONTAINMENT AREA (SECONDARY CONTAINMENT)
     1. Whenever work is necessary outside of the containment area:
        1. Work shall be scheduled in advance with the Owner’s Representative.
        2. Contain work within a full height portable enclosure. Constructors may use prefabricated enclosure unit.
        3. Seal opening upon entering or leaving enclosure.
        4. At no time shall construction equipment or material be stored outside of the enclosure.
        5. Dust shall not be tracked outside of construction area. In the event of such an occurrence, the dirt shall be cleaned up immediately.
        6. The Constructor shall have necessary manpower and equipment (HEPA filtered vacuum, dust and wet ops, brooms, buckets and clean wiping rags) to keep adjacent occupied areas clean at all times.
  2. WORK CONFINED TO INDIVIDUAL ROOMS
     1. Work activities which are required within a protection area which can be confined to individual rooms may be permitted as follows:
        1. Scheduled in advance and notify the Owner’s Representative at least seven (7) calendar days prior to commencing work in the room to allow the Owner to relocate or protect occupants.
        2. The room shall be treated as a containment area.
        3. Keep the door to such areas closed and sealed while work is being performed.
        4. Cap HVAC ductwork or seal air supply diffusers and return grills.
        5. Provide negative pressure in the room by use of negative air machine.
        6. Traffic between the room and adjacent areas shall be kept to a minimum.
        7. Transport materials and waste into and from the room through adjacent areas by transporting in tightly covered and sealed containers or carts.
        8. At no time shall construction equipment or materials be stored outside the room.
        9. All dust tracked outside of the room shall be cleaned up immediately.
        10. Vacuum and clean surfaces free of dust after completion of the Work.
        11. Have necessary work force and equipment (HEPA filtered vacuum, walk off mats, dust and wet mops, buckets and clean wiping rags) to keep adjacent areas clean at all times.

**END OF SECTION 01 35 33**