Proof of Training

Print name: _____Signature: _____ Date: _____

Infection Control Policy

Though Unger Construction has their own Infection Control Policy it is used primarily for training and development of Unger staff members and Subcontractors. It is not intended to replace the infection control policy for the host facility.

Purpose

The purpose of this policy is to minimize nosocomial (healthcare associated) infections in patients that may arise as a result of exposure to organisms released into the environment during construction, renovation or maintenance activities. Controlling the dispersal of air borne infectious agents concealed within building components is critical to minimizing the risk of these infections. The policy defined below establishes the minimum procedures and standards for an effective Infection Control Program. Our program is consistent with the Association for Professionals in Infection Control and Epidemiology Guidelines.

Scope

This policy will apply to any tasks that have the potential to disturb existing dust or create new dust. In essence all work performed by employees and subcontractors including, but not limited to the following activities: construction, installation, demolition, remodeling, relocation, refurbishment, testing, and servicing or maintenance of equipment or machines and at other times when construction activities are taking place in hospitals, medical office buildings, assisted living environments, skilled nursing environments, outpatient surgery centers and or dental offices are covered by this policy. Unger Construction and their Subcontractors are responsible to integrate the infection prevention and control principles in this policy throughout the planning, managing, and completion phases of their project.

Responsibilities

Management (Board of Directors and Project Managers)

Project Managers are responsible for ensuring the documentation package that is required for working in a healthcare setting is complete and formally approved by the client. The documentation package includes but is not limited to: Pre-Construction Risk Assessment (PCRA), Infection Control Risk Assessment (ICRA) and the associated infection control permit, Interim Life Safety Measures (ILSM), Access Interruption Notice (AIN) or Notice of Interruption (NOI) and when appropriate the Above Ceiling Permit.

Management is responsible for ensuring that the materials (e.g., tools, equipment, personal protective equipment) and other resources (i.e., worker training materials) required to fully implement and maintain this program are readily available where and when they are required. Additionally, management will monitor the effectiveness of the program, provide technical assistance as needed, and review the program bi-annually.

Program Manager

Dave Simpson is responsible for the development, documentation, training and administration of the program. This position carries the responsibility of insuring this program is adhered to and that proper reporting is executed.

Supervisors (Superintendents and Foreman)

Supervisors are responsible for the construction of the infection control enclosure, the daily interim life safety measures, and ensuring the infection control enclosure and the workers are performing as intended. Site supervision will determine the type and design of barrier or enclosure (based on the work activity and the work area) and ensure it is constructed in accordance with this policy.

Supervisors are responsible for ensuring that a task specific job hazard analysis (JHA), also known as a safe work plan, is developed. The JHA will select, implement and document the appropriate site-specific control measures as defined within this policy. Supervisors will direct the work in a manner that ensures the risk to workers is minimized, adequately controlled and that practices defined by this policy will be followed. Supervisors are responsible for ensuring Unger Construction employees and subcontractors are following expectations. Supervisors will be held accountable for enforcing the requirements of this program. Undesirable behavior will not resolve itself, therefore supervisors must be directly involved with modifying behaviors inconsistent with program expectations. Supervisors will be held accountable for enforcing Unger Construction's disciplinary program.

Workers (Employees and Subcontractors)

Infection Control is serious business and cannot be taken lightly or given anything less than your best effort. We expect Unger Construction employees and Subcontractors to perform Infection Control as if their own family members or friends were patients on the other side of our infection control barriers. Ensure your dust is contained in the construction area.

Infection control barriers require a substantial amount of coordination and planning. They can't be thrown together at the drop of a hat or without approval from the plant engineers. In order to maintain a seamless environment of care, close coordination and planning with the hospitals staff is essential. Each client will have their own requirements. However, infection control permits, interim life safety measures and access interruption notices are fairly consistent. Make certain you have all of the necessary forms and signatures, including permission to proceed.

Unger Construction has high expectations and requires safety excellence for each worker, crew, project and for our entire company. Workers are required to follow the minimum procedures outlined in this program. Workers are responsible for knowing the hazards and the control measures established in the JHA. Workers are responsible for using the assigned PPE in an effective and safe manner. Workers are responsible for stopping unsafe acts and correcting unsafe conditions on the spot as soon as they are discovered. Any deviations from this program must be immediately brought to the attention of your supervisor. Workers that choose to conduct themselves in a manner that is inconsistent with these expectations will be held accountable for those decisions and may incur disciplinary actions.

Training

Before any worker is allowed to perform work within a healthcare setting they must be trained in infection control. Subcontractors that work exclusively outdoors are exempt from this training requirement. Subcontractors performing very short (less than 4 hours start to finish) are excused from the training as long as they can be escorted by an infection control trained worker. The escort assumes full responsibility for compliance with this policy. Each project will have site specific infection control awareness training as part of their site specific orientation. Each worker must demonstrate an understanding of the required training; the hazards associated with working in a healthcare setting, safe work procedures, exposure reduction methods/strategies (local exhaust ventilation/ wet methods), setup of enclosures, and personal protective equipment.

Proof of training is available on the “S” drive. The training data base can be sorted by employee name or by subject. This ensures supervisors and employees are able to confirm they have the necessary training and if they don’t which employees do. Employees that need training should contact their project manager or superintendent to make arrangements for them to be trained. Training records for subcontractors shall be kept on the project site.

Retraining

The need for retraining will be indicated when: A workers work habits or knowledge indicate a lack of necessary understanding, Motivation or skills required to properly handle respirable or silica dust, Changes in the workplace make previous training obsolete, Changes in the types of PPE to be used make previous training obsolete or Upon a supervisor request.

Hazardous Material Survey

Unger Construction requires hazardous materials surveys before demolition or renovation work begins. The survey shall include all of the following: A visual inspection of a facility or a portion thereof for suspect materials and sampling and laboratory analysis of any suspect materials found for the presence of asbestos or lead. The survey will also furnish a written report that includes: a description of the area(s) visually inspected, a detailed description of any suspect material sampled, the results of any laboratory analysis of suspect materials, the method of analysis, and the total amount of asbestos containing material. Typically a floor or roof plan is included with the report to reference the written information visually.

The person conducting the survey must be certified pursuant to OSHA and/or EPA regulations. The survey may be performed by a certified Site Surveillance Technician (SST) under the supervision of a licensed consultant. The survey may be performed by a certified Site Surveillance Technician (SST) under the supervision of a licensed consultant. The survey needs to be kept in a project file so that it can be accessed when working on future projects.

If lead or asbestos have been confirmed to be present employees and subcontractors must follow Unger Constructions Lead and/or Asbestos program. If hazards such as asbestos or lead will be disturbed during construction, a properly licensed professional must perform the work and follow appropriate regulations.

Background

Construction activities can have a negative impact on patient wellbeing by disseminating bacteria and fungi via airborne dust giving them a free ride throughout the facility. Construction dust has been linked directly to patient deaths. Fungi and bacteria inhabit nearly every part of every building; they can lay dormant in any place that gathers dust. Accumulated dust inside a healthcare ceiling and within building components has been shown to contain tremendous amounts of bacteria and fungi. Construction and maintenance activities can disturb them and send millions of spores throughout the healthcare facility. Construction dust is a very effective transporter of airborne bacteria. Dust can be on horizontal surfaces or suspended in the air. All personnel working in an infection control area must contain and or control their dust. Do not allow dust into the active area of the healthcare facility. Dust is much easier to contain at the source; use wet cutting methods, plastic barriers, dust free attachments and/or infection control barriers.

Infection control barrier areas are designed to reduce the likelihood that dust and/or contaminants will be transported via air currents, foot traffic, carts or clothing into an active area of the healthcare setting. One of the keys to controlling dust is to control the airflow within the construction area. We achieve this by ensuring the construction area is under negative pressure which means that air flows into the construction area from neighboring areas. From an airflow perspective negative pressure essentially separates the construction environment from the medical environment. We utilize portable negative air machines to achieve negative pressure. These machines are High Efficiency Particulate Air (HEPA) filtered air movers (fans, scrubbers). They are used to pull air from the work space and vent to a non-critical area, preferably to the outside; via roof vents, fans, and or windows.

In order to maintain the negative pressure we utilize Anteroom/Decontamination room. The purpose of the Anteroom/Decontamination room is to maintain a consistent negative pressure while workers enter and exit the work area. In essence the anteroom/decontamination room is a neutral pressure zone keeping airborne particulate in the construction area. The purpose of the anteroom is twofold 1) pressure isolation 2) a place to perform decontamination of tools, personnel and materials that are moved from the construction space into the healthcare space.
The anteroom is the final cleaning station for clothing, shoes, tool bags, tools, materials, carts etc. These items should be vacuumed clean and dust free with a HEPA vacuum before re-entering the healthcare facility. When exiting or entering the anteroom make certain that the interior and exterior doors are not open at the same time. Opening the doors at the same time defeats the purpose of the anteroom by ruining the negative airflow dynamic.

Housekeeping practices for construction projects in a healthcare setting are unique. Do not allow dust or debris to accumulate in your work space. Clean 4 times a day: Before 1st break, lunch, 2nd break and at quitting time. Use a HEPA vacuum, or use floor sweep compound or damp mop regularly during work to reduce dust accumulation and migration.

Workers and materials are not to use patient designated elevators, unless specifically authorized. Materials, tools, and containers or carts used to transport them shall be tightly covered during transport. Debris removed from the work zone shall be in tightly covered containers and transported following the designated route.

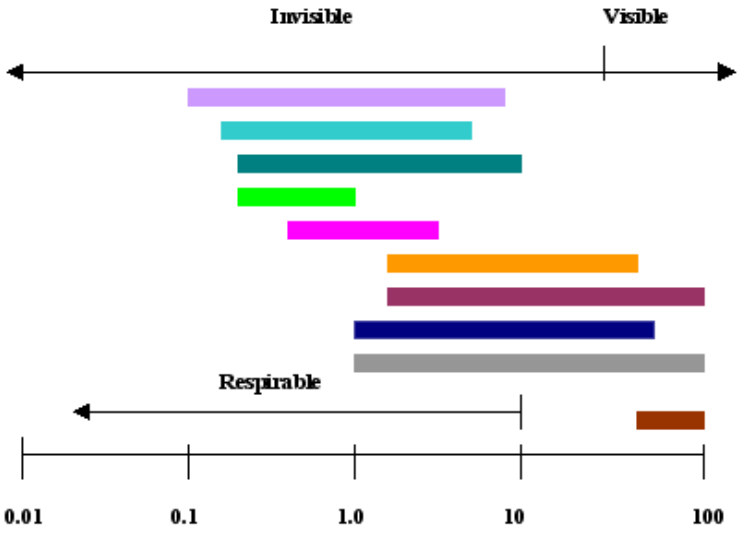
Visible and Respirable Dust

Most dust generating activities produce a mixture of visible and respirable dust particles. Visible dust contains large particles that are easy to see. Respirable dusts are tiny and are not visible to the naked eye. Visible dust can be used as a guide for improving dust suppression efforts. If you see visible dust being generated, the emission of respirable dust is likely to be over acceptable limits. Measures that control dust at its source will reduce all types of particle emissions including respirable particles. Wet cutting and vacuum dust collection can significantly reduce respirable dust levels.

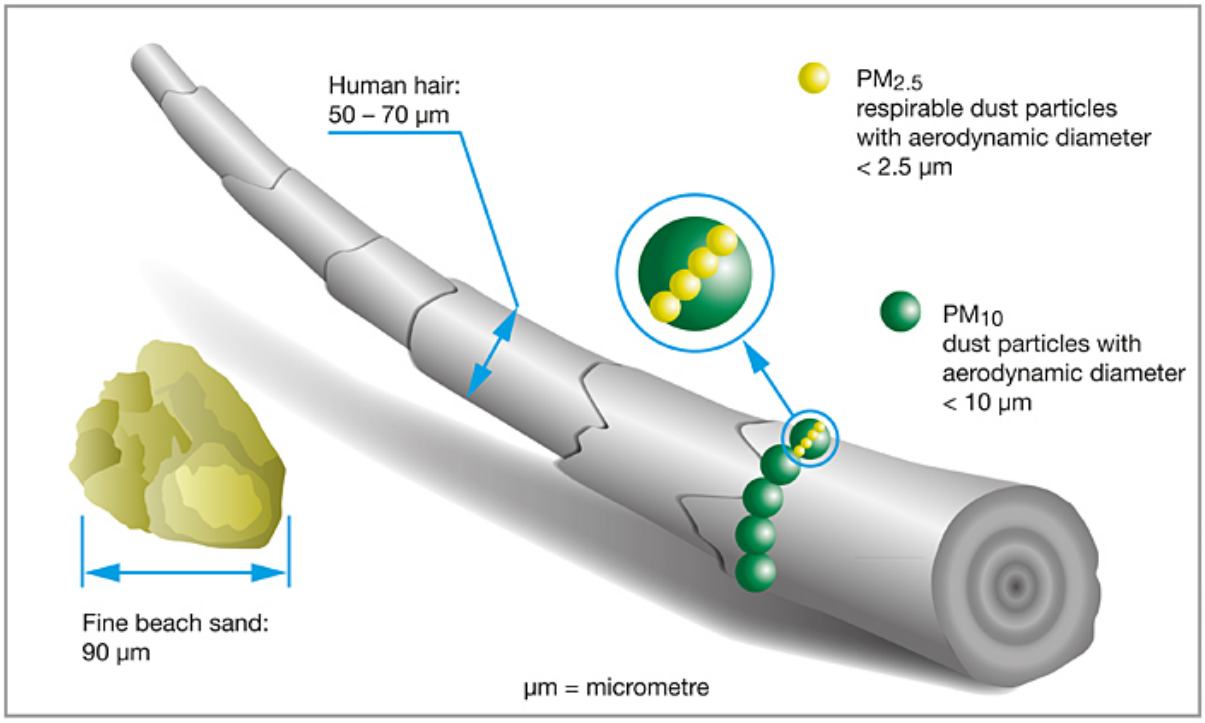
Drywall finishers must reduce their dust by using vacuum dust collection equipment or wet sanding methods in combination with engineering controls.

For housekeeping or clean up tasks take steps to limit the amount of dry sweeping. Reduce the quantity of debris, smaller piles, frequent trash runs. Mop rather than sweep, damp mopping creates far less dust than sweeping. Use floor sweep compounds, floor sweep compounds dramatically reduce dust when compared to dry sweeping. HEPA vacuums also are recommended for cleanup of dust that may have settled on surfaces and for final cleanup. The filter and contents of the HEPA vacuum must be disposed of in impermeable bags or containers in such a way as to prevent release of the debris.

Comparison of Visible and Invisible Dust Particles



Particulate matter – size comparison



Cross Contamination Control

Cross contamination control (not allowing respirable dust to spread) by isolating contaminated areas, erecting containment or enclosure systems, isolating HVAC systems, using supplemental air movers exhausted outside and employing safe work practices. Respirable dust contaminants can be tracked on feet, or spread by wheels that come in contact with the dust. Respirable dust can be spread by natural circulation, HVAC systems or by using air moving equipment (air movers, scrubbers, negative air systems).The most effective way to ensure that respirable dust contaminants do not spread is to isolate work areas by erecting containment or enclosure systems.

Cross contamination control is achieved by engineering and administrative controls that ensure contaminated materials do not spread to non-contaminated areas via; foot traffic, the movement/transportation of contaminated materials/equipment and through air movement. Contaminated materials will be handled in a manner that minimizes the disturbance of particulates and vapors.

Perform controlled demolition, minimize dust generation and aerosolization by using appropriate practices (source controls, vacuum attachments on saws, bagging wet materials immediately.) To prevent the dispersion of particulates and vapors beyond the construction area, containment and special cleaning practices will be utilized.

Cross containment control systems includes physical barriers (rolled plastic or plastic sheeting), pressure isolation (depressurization techniques via negative air pressure machines to maintain a pressure differential of 0.01- 0.03 inches water column), separation and protection of HVAC systems (separating the HVAC system from construction areas and non-contaminated spaces), dust suppression methods (Kett saws, damp wiping and HEPA vacuum cleaning), decontamination procedures (anteroom) and waste disposal (materials will be enclosed in plastic and removed from the building using the shortest direct route leading to the outside of the building).

Containment/ Enclosures Systems

Containment/Enclosures Systems (containment) can control a dusty atmosphere. The primary objectives of containment are to prevent exposure to nearby workers, patients and staff and to limit the amount of dust released into the air and surrounding areas. Containment systems are generally separated in 3 basic types. Source, limited, and full scale containment. Choice of containment should be based on the construction activity, the project duration and the size of the area to be contained. For all containment systems fire retardant materials with a minimum flame spread rating of 25 shall be used.

Containment can consist of a temporary structure (rolled plastic and zip poles) if the project duration is less than two weeks or a rigid structure using metal studs, plastic sheeting or drywall for all projects that have durations greater than two weeks.

When using rolled film (Visqueen) short or narrow sections of containment plastic can be held in place with tape. Tall or Long sections will create enough stress that tape alone will likely fail. For long or tall sections wrap the plastic film around a strip of cardboard, Staple or #6 screw through the plastic and cardboard.

Each containment system shall be fitted with a negative air unit. Negative air units draw dusty air through a large HEPA filter panel before the air is discharged outside the enclosure. Another option to create airflow in the enclosure is to set up ventilating (blower) fans where the dusty air can be discharged to an unoccupied outdoor location.

Source Control

Contamination should be controlled as close to the source as practical. Use techniques that limit particulate and vapors. Work areas should be maintained free from dust as practical. Debris should be bagged immediately. (Touch it once protocol). Use razor knifes or Kett saws rather than tearing materials or using hammers and saws that don't have dust control. Set the cutting depth so that blades do not penetrate all the way through and damage hidden materials or utilities. Contaminated materials should be physically removed during construction. Source control can be achieved by covering surfaces with self-adhering plastic, plastic bags, encapsulates, sealants or physical barriers such as containment systems.

Source containment is generally recommended for areas that are less than 25 square feet. The enclosure around the contaminated area should consist of a single layer of 6-mil, fire-retardant polyethylene film (visqueen). The containment should have a slit entry and covering flap on the outside of the containment area. The polyethylene film can be affixed to floors, walls and ceilings with tape.

When using a rotor hammers or similar tools to drill a few small diameter holes in concrete, brick, masonry block, tile and similar materials you might consider using a point of use dust barrier method as a source control. This method involves inserting the drill bit though a barrier, which is then pressed against the working surface during drilling. This method evolved from the asbestos abatement industry. For shallow holes use a damp sponge that is held or taped in place to ensure a tight seal against the surface. Puncture the sponge with just enough clearance to allow the drill bit to pass through without contacting the sponge. For deeper holes you can fill a waxed cut with shaving cream and drill though the bottom of the waxed cup. Ensure the cup it held firmly against the surface being drilled. It is important to use a waxed cup and not a Styrofoam cup. Waxed cups will compress under pressure, Styrofoam will crack. Do not allow the barrier to become overloaded. Periodically check the barrier as it may be necessary to empty it or replenish the shaving cream. For deeper holes this process may need to be repeated several times.

Limited Containment

Limited containment is generally recommended for areas that are less than 100 square feet. The enclosure around the construction area should consist of a single layer of 6-mil, fire-retardant polyethylene film (visqueen). The containment should have a slit entry and covering flap on the outside of the containment area. Zip poles or metal stud frame can be erected and polyethylene film attached to it.

All supply and air vents, doors, chases, and risers within the containment area must be sealed to minimize the migration of contaminants to other parts of the building. Removal of ceiling materials (tiles or drywall) may impact HVAC systems and the effectiveness of the containment system if the space above the ceiling is used as a return air plenum. In this case, containment should be installed from the floor to the ceiling deck.

The containment area must be maintained under negative pressure relative to surrounding areas. This will ensure that contaminated air does not flow into adjacent areas. This can be done with a HEPA-filtered fan unit exhausted outside of the building. Prevent the construction area from becoming positively pressurized. Cease all work if negative pressure has been lost, don't restart until appropriate pressure differential is re-established.

Full Containment
Full containment is recommended for the cleanup of contaminated surface areas greater than 100 square feet or in any major contamination situation. The enclosure around the construction area should consist of a single layer of 6-mil, fire-retardant polyethylene film (visqueen) or flame rated corrugated plastic (Polygal) or drywall. A decontamination chamber or ante room should be constructed for entry into and exit from the construction area. The entryways to the ante room from the outside and from the ante room to the main construction area should consist of a slit entry with covering flaps on the outside surface of each slit entry.

Removal of ceiling materials (tiles or drywall) may impact HVAC systems and the effectiveness of the containment system if the space above the ceiling is used as a return air plenum. In this case, containment should be installed from the floor to the ceiling deck. The containment area must be maintained under negative pressure relative to surrounding areas. This will ensure that contaminated air does not flow into adjacent areas. This can be done with a HEPA-filtered fan unit exhausted outside of the building. Prevent the construction area from becoming positively pressurized. Cease all work if negative pressure has been lost, don't restart until appropriate pressure differential is re-established.

<u>Ante Room/Decontamination Chamber</u>

Ante rooms/decontamination chambers are designed to prevent cross contamination by acting as a transition space between the construction area and the surrounding clean areas. Workers are required to be clean and dust free prior to exiting the work zone. If used, coveralls are to be removed in the work zone just before entering the anteroom. Vacuuming of clothing may be done in the work zone or the anteroom. Booties are to be removed in the anteroom. Workers shall clean shoes, equipment, transport carts, transport cart wheels to prevent dust from being tracked outside the work zone. Ante rooms should be large enough to move materials into the construction area without requiring both doors to be open at the same time. Opening both doors at the same time defeats the purpose of pressure isolation and will lead to cross contamination. The ante room shall be configured such that protective clothing (coverall, hoods, booties) shall be donned and doffed in this space. The ante room shall have a waste container(s) and HEPA a vacuum to clean tools, materials and personnel as they exit the construction space. Waste containers shall be large enough to place all contaminated PPE and protective clothing. Ante rooms shall be under negative pressure. The anteroom will be constructed to maintain airflow from the clean side through the anteroom and into the work zone.

Contaminated materials (demolition debris) shall be bagged, wrapped or sealed before entering the ante room, from the construction space. Before contaminated materials (demolition debris) are moved from the ante room to the non-contaminated space all outer surfaces shall be HEPA vacuumed and damp wiped.

Tack mats or moist carpet shall be used to prevent tracking. Adhesive walk off mats shall be kept clean and changed frequently to ensure effectiveness. Moistened towels, carpets should be used to prevent premature soiling of the adhesive mats.

Foot prints or dust in the patient care area is an indication that the decontamination steps have failed. This is a serious concern and needs immediate attention. All workers, subcontractor included, are required to stop work and shift their

efforts to immediately cleaning up their immediate and surrounding work area. Any dust for foot prints tracked outside of the anteroom shall be reported to Unger Construction directly upon making the observation.

Pressure Isolation

Airflow should be from the non-contaminated areas (clean area) to the contaminated area. When using limited or full scale containment HEPA filtered negative air machines are required to create pressure differential in relation to surrounding areas. Generally speaking the pressure in the construction area will be between 0.01-0.03 inches of water less than the surrounding areas.

Pressure differential can be measured or monitored by analog or digital manometers, smoke tubes or pencils, or visual inspection (plastic sheeting, billows inwards into the construction area) Based on the scope of work the airflow exchange rate will need to be modified. For low dust producing tasks the airflow exchange rate should be 6 times per hour, for moderate dust producing the exchange rate is 8 times and for high dust producing the exchange rate is 12 times per hour.

Air Changes Per Hour (ACH)

Simply having negative air machines deployed on the project does not eliminate the concerns over airborne dust. Air changes per hour are a critical component of infection control. The rule of thumb for air exchange rate (ACH) is 6, 8 or 12 and depends on the type of work being done.

- For *Low dust producing activities* such as painting, wet sanding, minor plumbing, or electrical trim we target 6 times per hour as our baseline.
- For *Moderate dust* producing activities such as moderate renovation of existing space, removal of flooring, casework, or ceiling tiles or minor duct work, plumbing work, or electrical work above ceilings (not including system demolition or installation) we target 8 times per hour as our baseline.
- For *High dust* producing activities such as dry sanding, cutting of drywall, demolition, removal, or installation of a complete cabling, HVAC, plumbing, medical gas, or electrical system, demolition of major fixed building components, assemblies, fit-out elements, or structural elements we target 12 times per hour as our baseline. Note see the table on the next page to review the time it takes to clear an area of particulate after the work has stopped.

Note the length of time it takes to for the negative air machines to clear the air after construction activities have stopped.

Air changes per hour (ACH) and time required for removal efficiencies of 99% and 99.9% of airborne contaminants

	Minutes required for removal efficiency†	
ACH	99%	99.9%
2	138	207
4	69	104
6	46	69
12	23	35
15	18	28
20	14	21
50	6	8
400	<1	1

Note: “minutes to clear” after the source of the contamination has been removed.

† Time in minutes to reduce the airborne concentration by 99% or 99.9%.

Determining the Number of Negative Air Machines

In order to determine the number of negative air machines required you need to determine the cubic volume of the area in question. Next you need to determine the type of work being done (low = 6 ACH, moderate = 8 ACH, high dust producing = 12 ACH). Fans are rated in standard cubic feet per minute (SCFM) air changes are rated per hour.

For demonstration purposes let's use a room that is 50 feet square with a ceiling height of 10 feet, the type of work will be low dust producing. Here's the formula 50' x 50' x 10' = 25,000 cubic feet. Low dust producing tasks need 6 air changes per hour = 150,000 cubic feet per hour (CFPH). Generally speaking we like to provide a capacity buffer of 25% to ensure we are providing proper air exchange rates throughout the project. The reason being filters degrade over time, exhaust lines can get kinked or have restrictions that create back pressure as they move from place to place within the construction area. The capacity buffer for this room is 37,500 cubic feet, which brings our target capacity up from 150,000 to 187,500 CFPH.

The next step is to determine the capacity of the negative air machine itself. For this example we are using a Model 2200 unit. For most negative air machines the model number is also the capacity of the unit as measured in SCFM. To determine the rating in cubic feet per hour simply multiply the model number by 60. Here's the formula for our example 2,200 x 60 = 132,000 CFPH. Since our target air exchange rate is 187,500 cubic feet per hour one model 2200 negative air machine won't be enough since we are 55,500 CFPH short of our goal. Always round up to the nearest whole machine and ensure a 25% capacity buffer. For this example we could need to add another Model 1000 with an hourly capacity of 60,000 CFPH. This brings our combined total to 192,000 CFPH which exceeds our target of 187,500 CFPH.

We have the following models in our fleet of negative air machines
600 SCFM with an hourly capacity of 36,000 cubic feet per hour
1,000 SCFM with an hourly capacity of 60,000 cubic feet per hour
2,000 SCFM with an hourly capacity of 120,000 cubic feet per hour
2,200 SCFM with an hourly capacity of 132,000 cubic feet per hour

Notice that the type of work dramatically impacts the number of negative air machines for our example 50 x 50 x 10 space. Low dust producing requires 187,500 CFPH, which translates to 1 each Model 2200 and 1 each Model 1000. Moderate dust producing requires 250,000 CFPH, which translates to 2 each Model 2200's. High dust producing requires 375,000 CFPH, which translates to 2 each Model 2200's and 1 each Model 2000. When you are designing your ICRA plan for worst case dust generation this will ensure you have everything on hand.

Another approach is to keep the space where you are performing high dust generating tasks as small as possible; you can do this by providing barriers within barriers (box within a box concept) Sequence the work and move the infection control barriers as the work moves. Control and contain the high the dust activities at its source such that the balance of the work can be classified as low dust producing.

Our negative air machine supplier is Abatix, Address: 14068 Catalina Street, San Leandro, CA, Phone:(510) 614-2340 Hours:· 8:00 am – 5:00 pm, Web: http://www.abatix.com/, Contact: Matt Flynn (916) 807-0009

Negative Air Machines

Environmental (Airborne Particle) Monitoring

Occasionally clients request environmental (airborne particle) monitoring during a project to ensure areas outside of the containment barriers remain free and clear of airborne dust or as a clearance when the construction project is finished and ready to be returned to service. When using numerical criteria for clearance, it will be necessary to set material and test method specific criteria this must be determined before the construction work begins. The sampling plan shall include the associated action plans (means, methods) as well as the manner in which the decision will be determined that the goals have actually been achieved or that they have not yet been achieved.

Setting clearance criteria involves determining ahead of time what indicators or measurable results will be considered evidence of an acceptable outcome or clearance. These criteria need to be set before construction work begins. Setting clearance levels too low will impractically increase costs without additional practical benefit. Clear and achievable goals should be set during planning. All parties involved in the project should understand and agree upon the goals.

Determining the size of the particle to be measured can create confusion and has derailed projects in the past. The most stringent test for airborne sampling in a healthcare environment is identified in United States Pharmacopeial (USP) 797. This test is used to determine the sterility of the pharmacy areas directly neighboring the compounding hoods. The particle size used is 5.0 microns. Counts of 29,300 5.0 micron particles per cubic meter are considered acceptable and normal. Particle sampling for any size under 5.0 microns will require written approval by Unger Constructions Safety Director.

How Much Negative Pressure

This is a common question but a complex answer. There are multiple standards and guidelines. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) , Center for Disease Control (CDC), Facility Guidelines Institute (FGI), Joint Commissions (JCO) Environment of Care Standard, American Institute of Architects (AIA) and the Occupational Health and Safety Administration (OSHA) These standards don't necessarily agree with the stated value of negative pressure. However, they have agreed that asbestos is the most studied indoor airborne contaminant and that construction dusts behave similarly to asbestos fibers and dust. Therefore a target value of -0.02 is set with the minimum being -0.01 inches of water column and the maximum being -0.03 inches of water column. Negative pressure above 0.03 inches of water column can result in containment failures (tape pulls, zip poles bend, walls collapse). See the measuring tools on page 21.

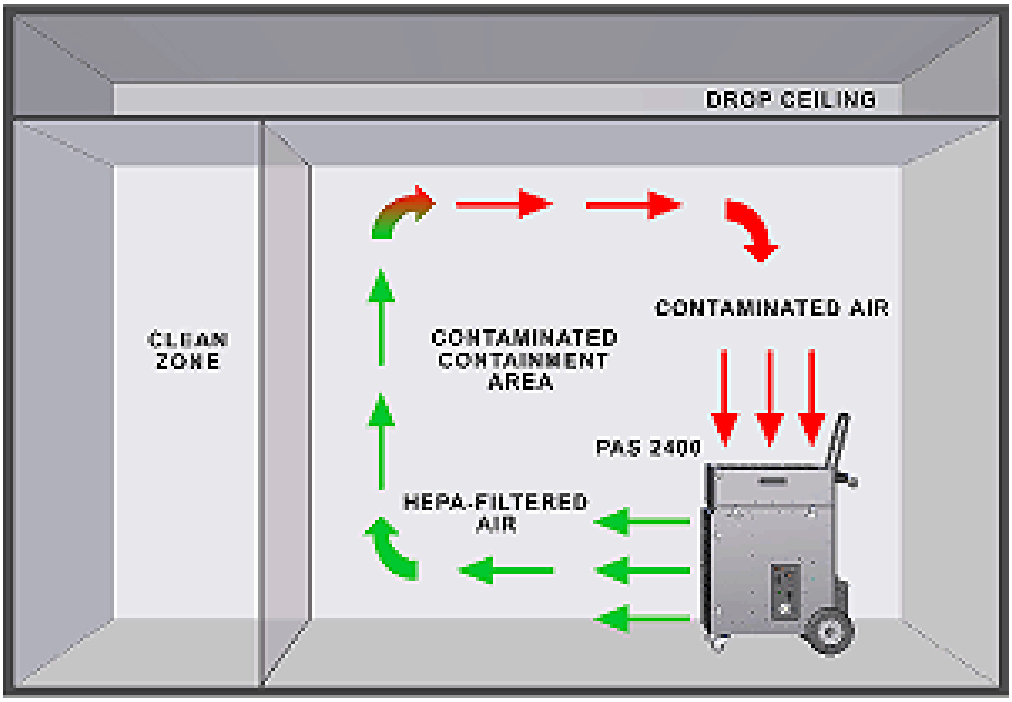
Negative Air versus Air Scrubbing

The terms air scrubber and negative air machine are often used interchangeably; however, the two terms refer to different applications. A negative air machine uses ducting to remove contaminated air from a sealed containment area. The filtered air is exhausted outside of the containment area. This creates negative air pressure (a vacuum effect), which helps limit the spread of contaminants to other areas. An air scrubber stands alone in the center of a room with no ducting attached. The air is filtered and recirculated, over and over again greatly improving the general air quality.

What's the difference between negative and positive air scrubbing? Most often, we will use ducting and an air scrubber to create a negative pressure environment that will contain the hazardous particles within the workspace. Air will always flow from high pressure to low pressure. So, creating and maintaining a negative pressure environment will create a constant inward flow towards the air scrubber, preventing airborne contaminants and odors from escaping the workspace through any leaks or openings. Not all construction projects will have a means to exhaust the air outside of the construction area. When this happens we use the negative air systems as scrubbers, in essence a positively pressurized scrubbing technique. Positive air scrubbing techniques are used less often, they do have their place, but they are far less efficient and need additional controls to reduce the likelihood of spreading the contamination. When setting up a scrubber application positioning of the machines is critical, the intake should be as close to the source of the particulate as practical. One needs to consider the airflow dynamics in the room and be aware of eddy currents (reverse

currents). Generally speaking the interface between the construction space and the anteroom should have an air curtain or air screen. In essence a separate fans system pushing air from the anteroom into the construction area.

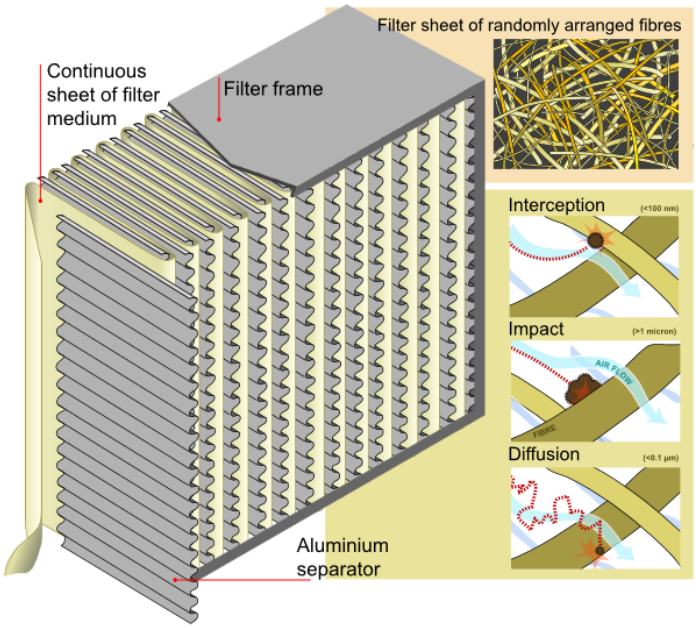
Running in Scrubber Mode



HEPA Filtration

In order to be classified as a HEPA filter the filter must satisfy standards of efficiency set by the United States Department of Energy (DOE). To qualify as HEPA an air filter must remove 99.97% of particles that have a size of 0.3 microns or larger. HEPA filters are composed of a mat of randomly arranged fibers that to the naked eye look like paper. Key factors affecting function are fiber diameter, filter thickness, and face velocity. The common assumption that a HEPA filter acts like a sieve where particles smaller than the largest opening can pass through is incorrect. See the figure below.

HEPA Filter



HEPA Filter Certification (Di-Octyl Phthalate) DOP/ (Poly Alpha Olefin) PAO Testing

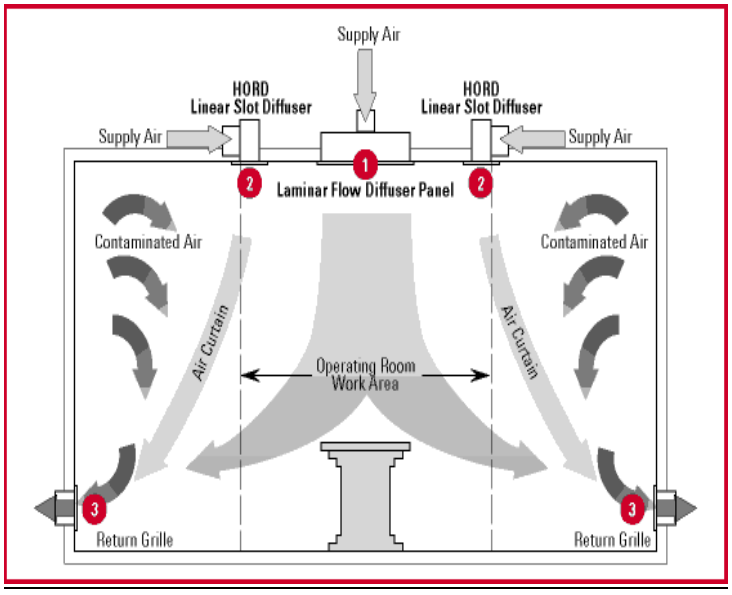
DOP/PAO testing is a very quick process that tests the integrity of the HEPA filter in their operational conditions. The test will certify the HEPA filter is fully functioning and there is no leakage or damage. During the testing, the dispersed aerosol is introduced into the filter and measured at the filter's exhaust. A filter passes the test when the aerosol measured at the exhaust is less than 0.03% (i.e. the filter has captured 99.97% of the aerosol). HEPA filters should be tested annually. For the best results testing should be done on-site to ensure that the units have not been damaged due to transportation or daily activities at the work site. DOP/PAO testing is an annual requirement per section 6.2 of the Institute of Environmental Services and Technology; IEST-RP-CC034.1 Type C. Some clients require DOP/PAO testing when units are first brought onto their campus. Generally speaking we use Master Testing Services (916) 912-3295 to perform our DOP/PAO testing. They are a local provider that will travel throughout our projects; they are very flexible and include repairs units as part of the testing fee. With that said here are some alternative suppliers;
Redline Environmental Brian King 916-997-6647. Enviro-Star Ed Guzman (925) 285-3717
After passing the test the unit will receive a certification sticker and a hard copy of the inspection. Hard copies should be scanned and placed in the infection control files located in the job files.

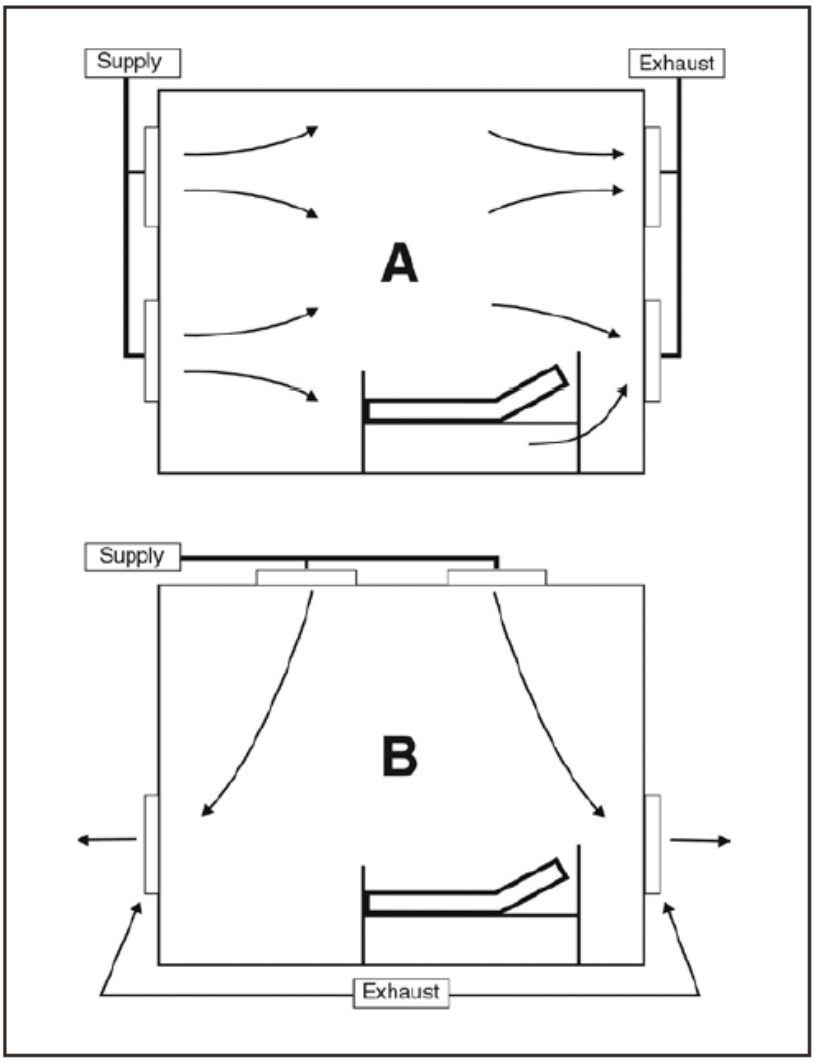
HVAC Systems

Healthcare environments are highly engineered from an HVAC perspective. Failing to coordinate with the healthcare engineering department could have catastrophic results. Operating rooms are positively pressurized, supplying more air than they remove. Isolation Rooms are negative pressure rooms, removing more air than they supply. Interruption of existing airflows (installing temporary walls such as containment systems), or shutting down HVAC system components requires written permission in the form of an Infection Control Risk Assessment (ICRA) and an infection control permit. The ICRA will determine how you will: remove or isolate the HVAC system in areas where work is being performed, block off and seal air vents, seal all penetrations into the work area to contain airborne dust.

When a containment system pulls air from one space and releases it outdoors or to another space this impacts the delicate balance of the HVAC system. It is critical that the healthcare engineering staff be involved to ensure the systems are operating appropriately. Rebalancing of the HVAC Systems may be required. Any and all adjustments to the HVAC system require coordination with the healthcare engineering department.

Operating Room

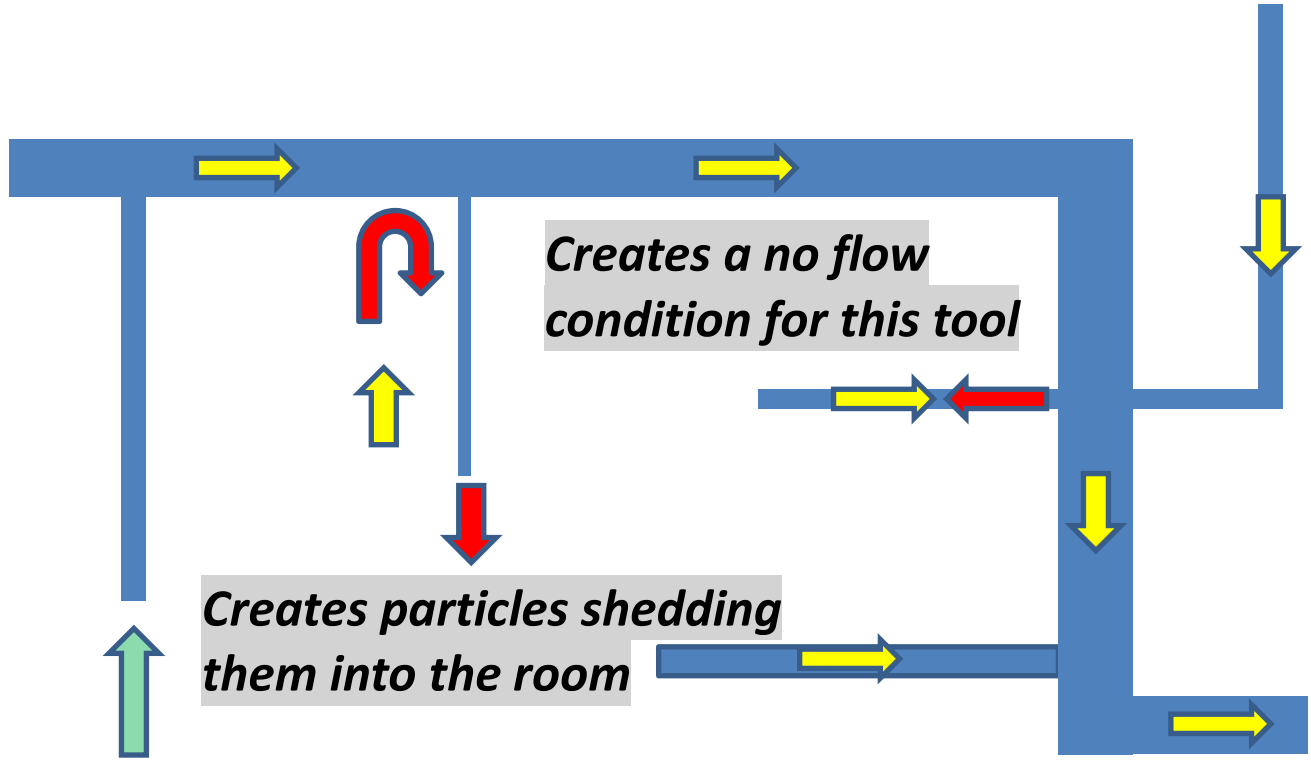




Generally speaking we avoid connecting our negative air machines into the existing HVAC system preferring to send the exhaust outside of the area through a window or a heat exhaust or roof vent. Coordinate and gain written permission to connect our negative air exhaust streams to local exhaust for heat. Figure 4 (next page) demonstrates how adding a single negative air machine into a House HVAC system could cause high static pressure creating contraflow, backwards flow. Particles that line the duct could be lifted off of the walls and blown into the patient care space. The reason being that each return line is balanced based on the flow demands for each branch. Adding additional flow from a negative air machine could cause high static pressure, more pressure in the duct than the fan can effectively move. High static pressure could create a no flow condition in one or more legs. In essence the static pressure in the duct equals the static pressure in the branch circuit. In this situation the airflow in the branch circuit effectively is stopped. High static pressure could also create a contraflow or backflow condition when the static pressure in the duct exceeds that of the branch circuit. In this situation the high static pressure from the duct will be redirected through the branch circuit and flow into the room. Particulate that is normally passive (held against the walls of the duct) will “flag”, tear off and shed into the room. When this happens significant contamination takes place which could result in catastrophic injuries or illnesses.

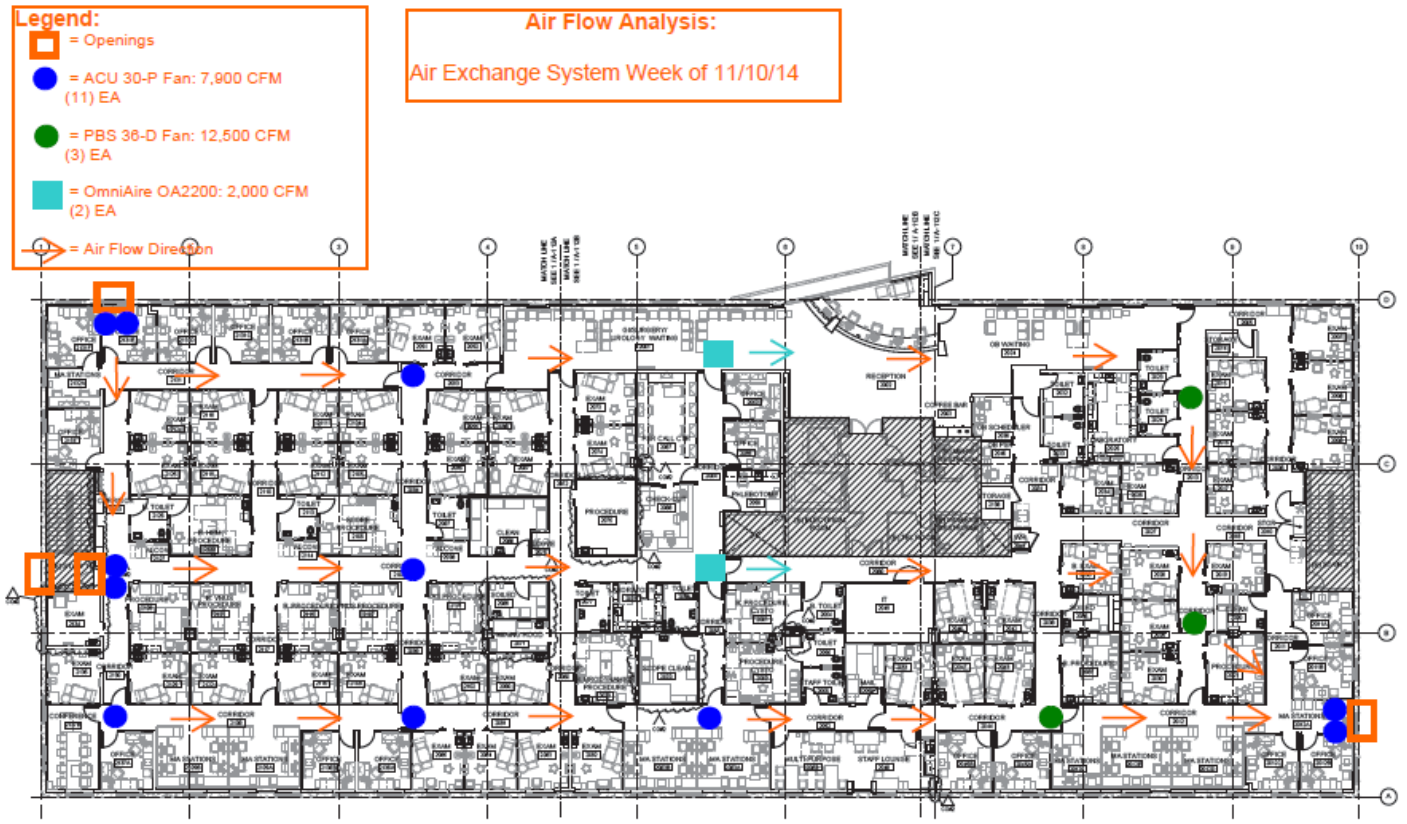
Figure 4

Unintentionally Creating Contra Flow



Airflow Analysis

Large scale construction projects within a healthcare environment will likely need an air flow analysis. The air flow analysis determines the amount of negative air machines, placement of pedestal fans and the amount of fresh air make up to ensure dust is managed to an acceptable level. Below is an example of an air flow analysis



Calculation II

2F Cubic Feet: 25,000 sf x 14' ceiling ht = 350,000 CF
Stairwell CF: 30 sf x 41' ceiling ht = 1,260 CF
Total CF: = 351,260 CF

Fresh Air
ACU 30-P Fan: 7,900 CFM x (4) EA = **31,600 CFM of Fresh Air** is brought into SPMF

60 Min / 1 HR x 31,600 CF / 1 Min = **1,896,000 CF per Hour of Fresh Air** is brought into SPMF 2F

351,260 CF / X Min x 1 Min / 31,600 CFM = **11.12 Min Fresh air** is exchanged through the 351,260 sf of the SPMF 2F TI

60 Min / 1 Hr x X Hr / 11.12 AC Min = 5.4 air changes in 1 Hour or **5.4 ACH of Fresh Air**

Scrubbed Air
OmniAire OA2200: 2,000 CFM x (2) EA = **4,000 CFM** of air is **Scrubbed** in SPMF 2F

60 Min / 1 HR x 4,000 CF / 1 Min = **240,000 CF per Hour** of air is **Scrubbed** in SPMF 2F

351,260 CF / X Min x 1 Min / 4,000 CFM = **87.8 Min** air is **Scrubbed** through the 351,260 sf of the SPMF 2F TI

60 Min / 1 Hr x X Hr / 87.8 AC Min = 0.7 air changes in 1 Hour or **0.7 ACH of Scrubbed Air**

5.4 ACH + 0.7 ACH = **6.1 ACH of Clean Air**

Ventilation Systems (Fans)

Ventilation systems (fans, air movers) are not effective for dust control when used alone and should not be the primary method of managing dust. Fans can be useful as a supplement to other control methods such as enclosed areas where dust would build up due to poor air circulation. Fans can be set up in a push pull manner to displace the dust outside of the workers breathing zone to the captured away from the worker. Typically the flow rate, across the workers face, needs to be greater than 250 feet per minute. The distance of the worker from the fan is critical. The fans capture efficiency when used in the pull mode (exhaust) drops off quickly. Here's an example of a four foot square fan exhausting through a window to outside. The strongest capture rate is directly in front of the fan. At two feet away from the fan the capture rate drops by 50%, at four feet the capture rate is 7%.

Ventilation Fans

Control Cubes

Control Cubes are portable fully contained enclosures design for ceiling work or wall work. They have negative air machines, HEPA filters, expandable or telescoping walls, room for a ladder, power outlets for common tools, HEPA vacuum cleaners.

Working with and Without a Control Cube

We utilize control cubes from several different suppliers. They can be found on the "S" drive, shared, infection control, control cubes. Below is a link to a video clip that demonstrates a control cube.

The Solution Portable Infection Control Ceiling Access System.mp4

Control Cubes

Here are the links to several control cube manufacturers. Prevent Life safety solutions http://www.thesolutioncontainment.com/, Hepa cart http://www.hepacart.com/Abatement Technologies http://www.abatement.com/construction-renovation/healthcare-products-containment-barriers.htm, Fiberlock Technologies http://www.fiberlock.com/containment/index.html, Kontrol Kube http://www.kontrolkube.com/topsider.html, Mintie http://www.mintie.com/products, Spycor http://www.spycor.com/Mobile_Containment_s/48.htm

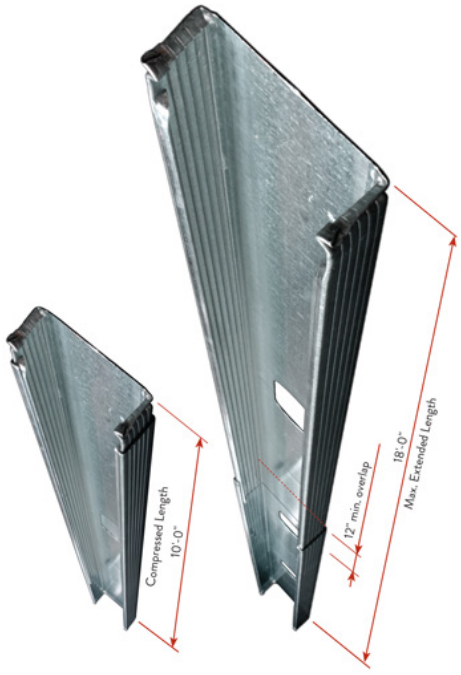
Polygal

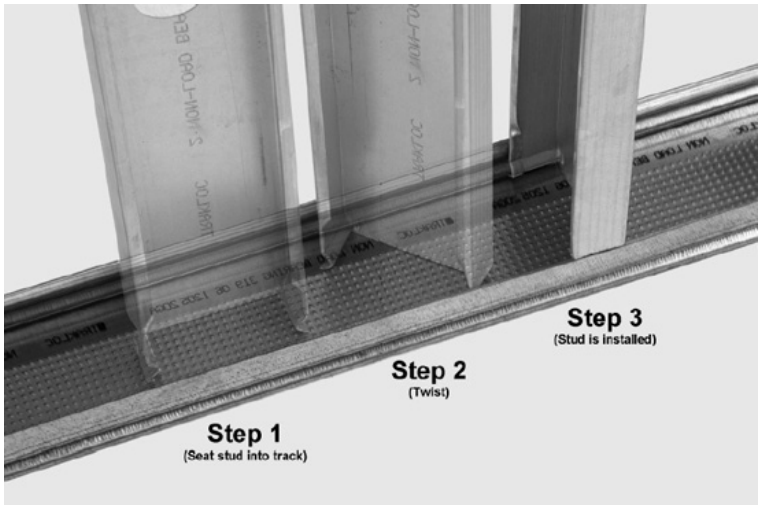
Polygal is a twin wall polycarbonate thermoplastic sheet product that is used as a hard wall for our common containment system. It is light weight, flexible yet rigid. It comes in various thicknesses (6, 8, 10 mm), various lengths, widths and is made to order, although we do have a number of panels in inventory. The most common sizes is 4' x 8' panels. Panels can be made in widths up to six feet and in lengths up to twenty four feet. Delivery is approximately 3 weeks, so plan accordingly. The panels have a flame spread rating similar to drywall, but they do not have a fire rating such as 1 hour. Flammability ratings are as follows ASTM-E-84 = Class A, ASTM D-635 = CC-1, BS 476/7 = Class 1
The panels are rated for electrostatic discharge and are easy to clean. Polygal comes in a variety of colors white and translucent are the most common colors used at Unger Construction. More information can be found of the "S" drive, shared, infection control, corrugated plastics.

PolyGal, Typical delivery 14 days (2 weeks), Supplier = Interstate Plastic, Address: 330 Commerce Cir, Sacramento, CA 95815, Phone: (916) 422-3110 | (800) 742-3444, Hours:· 8:00 am – 5:00 pm, Contact: Jeramie Jones jeramie@interstateplastics.com, Web: https://www.interstateplastics.com/index.php, Part Numbers, Thickness = 6mil, Color = White or Ice, Length = Typical 8' or 12' can be cut in 4' intervals up to lengths up to 24', Width = 4' or 6'
Here's the link to Interstate and Polygal, https://www.interstateplastics.com/, http://www.polygal-northamerica.com/

Trakloc

Trakloc is a telescoping metal stud system that snaps into place. No measuring of the studs, no cutting of the studs and no noise to install. The track twists into place without the need for mechanical fasteners. This system is very handy for the construction of infection control barriers. Studs can be ordered for 8, 10, or 12 foot tall ceilings. Elevator studs fit into a standard elevator for transportation but can be telescoped out to 15 feet, in essence deck to deck. More information can be found of the "S" drive, shared, infection control, Trakloc. Typical delivery is 3 days. Supplier = Starr's Building Supply , Address: 1421 Cannon St, Sacramento, CA 95815, Phone:(916) 925-7820, Hours:· 6:00 am – 4:30 pm, Web: http://www.starrsbs.com/ Contacts: Adam R. Starr adam@starrsbs.com or mike@starrsbs.com, Part Numbers: 362TLE125-30 (3-5/8 Elevator Studs – 30 mil), Length: 14'-2", Cost ~ $13.00 and 362TTS137-30 (3-5/8 TRAKLOC Top/Bottom track – 30 mil) Length: 10'-0", Cost ~$9.00
Here's the link to Trakloc.http://www.clarkdietrich.com/products/drywall-framing/trakloc-drywall-framing-system



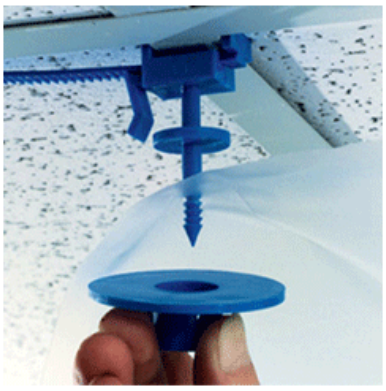


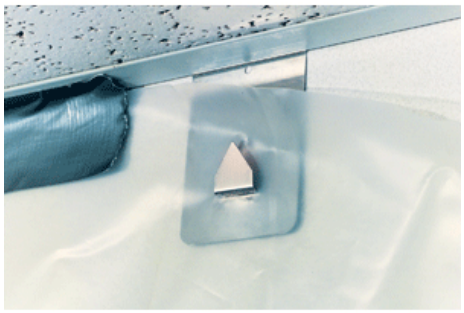
Doors

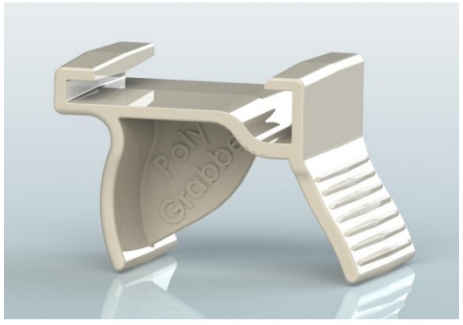
We have a variety of door types and styles (Standard door, Polygal pocket door, storm door, zipper door, magnetic catch/close door, strip door, Polygal custom door to name a few). When determining your door configuration you need to consider your points of entry as well as the size of the materials that will be transported into and out of the construction area. Remember that a key element to effective pressure isolation is that both doors into and out of the anteroom should not be opened at the same time. Don't take this lightly. Doors are the most common breach of the infection control system. In situations that the door placement cannot be offset enough to keep one of the anteroom doors closed while stocking or removing materials then an administrative control limiting the time in which this activity can take place shall be used. The best time for this activity is before the beginning of the shift. The reason being it is the cleanest time to do it. Refer to page 7, the amount of time it takes the negative air machines to clean up the air after the work has stopped. It takes over an hour for the air to be cleaned after the work has stopped. Here are the links to the various door suppliers. http://www.fastcap.com/estore/pc/Magnetic-Dust-Barrier-Door-System-p13403.htm, https://www.youtube.com/watch?v=WB-L4MuCFJQ, https://www.zipwall.com/xcart/zip/jobplanner/ order the heavy duty version.http://stripdoorsonline.com/stripdoors-info

Poly Grabbers/Hangers

Poly grabbers and hangers are used to connect rolled film plastic to T-bar ceilings; they can also be used to hang extension cords to keep them from becoming trip hazards. https://www.polygrabbers.com/, http://www.polyhangers.com/products1.html, http://www.visclips.com/about.php







Zip Poles

Zip poles are used to hold the rolled film plastic against the ceiling and the floor. Here are the links to the suppliers. Zipwall https://www.zipwall.com/, Surface shields http://www.surfaceshields.com/dust-containment-poles Curtain Wall http://www.curtain-wall.com/home.html, Quick Wall http://www.stmanco.com/quikwall.htm

Walk Off Mats (Tack Mats)

Tack mats come in two colors (blue and white) both work the same however the blue doesn't show as much dirt and is our preferred color. They come in eight different sizes (18 x 36, 18 x 45, 24 x 36, 26 x 45, 36 x 36, 36 x 45, 36 x 60, 40 x 48) so it's pretty easy to find one that will fit your purpose. Tack mats should be installed at the interface between the construction area and the anteroom. Occasionally tack mats will be installed between the anteroom and the patient space. Note this is used to ensure the workers and carts were properly decontaminated before they left the anteroom. Foot prints or wheel marks on this mat is an indication of failed decontamination.

Walk Off Mats can be carpet, artificial turf or towels. In order to remove particulate walk off mats are moistened with water. It is important to use as little water as is practical in order to prevent a slip hazard. Having dry carpet sections on both sides of the moisten carpet mat helps workers keep their shoes from slipping. Moistened towels need to be changed out twice per day. Moistened carpet mats need to be changed out and laundered weekly to prevent mold and odors.

Walk off and tack mat supplier = Abatix, Address: 14068 Catalina Street, San Leandro, CA, Phone:(510) 614-2340 Hours:· 8:00 am – 5:00 pm, Web: http://www.abatix.com/, Contact:Matt Flynn (916) 807-0009 and http://www.innotechprod.com/sticky-mat-frames.html#1-YToxOntzOjQ6ImdyaWQiO2k6MDt9

Tack Mats

Differential Pressure Measurement (Manometer)

Differential pressure gauges come in two types, analog and digital both have their pluses and minuses. Analog is simple to install mainly due to the fact that it does not need power to operate so they can virtually be placed anywhere. The challenge with analog gauges is purchasing a gauge that has the proper pressure range. Our target set point for negative pressure is very low 0.02 inches of water column which is very close to zero (on most common gauges) making it difficult to read. Most clients are concerned about maintaining the negative pressure reading while the door to the anteroom is opened. Gauges that have a zero reading at the top of the scale, a negative range on one side and a positive range on the other side address this need well. Sensocon Model S2000-00 has worked well, they are a special order delivery is usually 3-4 weeks so you will need to plan accordingly. Here's the link to the analog gauges we typically use.
https://www.sensocon.com/Differential-Pressure-Gauges-and-Switches/

Digital manometers require power which can limit their placement due to available power outlets and routing of the power cord. Digital gauges offer a wide range of scales and units of measure (metric, international units) which can be complex and difficult for some users. One of the benefits of a digital manometer is the trending function, they can trend and record the pressure throughout the time the containment enclosure is installed (some clients require this). When using the trending function make certain the power source is guaranteed and dedicated to the digital meter. You don't want the power to be unplugged by someone that is looking for a power source for a tool. Digital manometers are fragile, they don't like to be bumped or dropped handle and store them with care. Here are some links to digital manometers. http://www.dwyer-inst.com/Product/Pressure/Manometers/Digital/
http://www.extech.com/instruments/categories.asp?catid=15

Airflow Measurement

Occasionally clients want proof that air is actually flowing from the patient area into the construction area. To demonstrate this we use a smoke or puff test. When this test is being performed you need to make certain the smoke detectors in the area of the test are placed on standby, otherwise the fire department will respond thinking there is actually a fire. Smoke and puff tests are quick and relatively simple. Smoke and puff devices produce a visible cloud that can be released near the seal in question. Observation of the cloud will determine the direction of the airflow. Here are the links to smoke and puff test products.

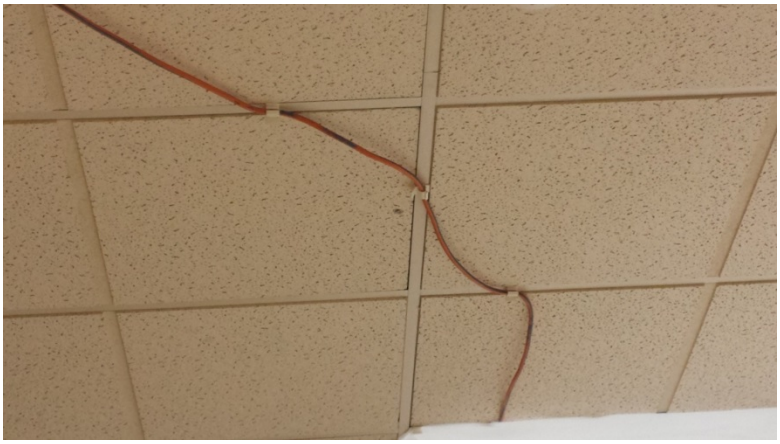
Powder Puff
http://www.basspro.com/Dead-Down-Wind-e3-Checkmate-Wind-Checker/product/13032606064210/
http://www.basspro.com/Hunters-Specialties-Windicator-Super-Fine-Odorless-Powder/product/9633/

Smoke Pencils
http://www.smokepencil.com/
https://store.metermall.com/air-flow--tracer-smoke-c2.aspx

Concern for the Mobility Challenged

Healthcare environments frequently have mobility challenged visitors and patients which will require some adaptations from typical construction projects. Walk off and tack mats should not be placed in a position such that mobility challenged individuals will come in contact with them. See picture below

Power cords should not be placed on the floor, they should be routed overhead.

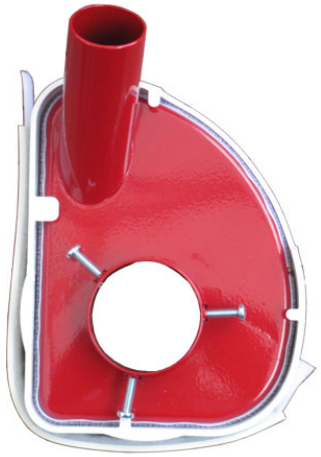


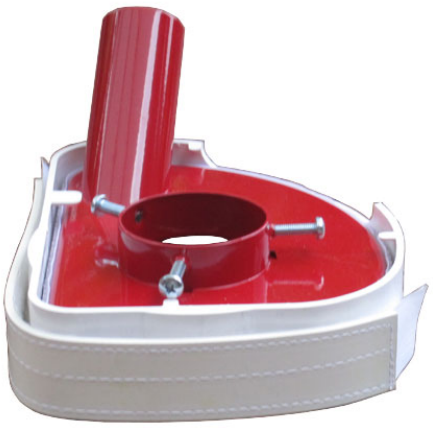
Dust Control Systems

Due to the regulations becoming much more restrictive with respect to respirable and silica dust exposure all of the common tool manufacturers have develop dust control systems. Here are some examples of dust control systems that use vacuum as the primary engineering control. The options are nearly limitless, which should eliminate excuses.

1-3/8" BitBuddie

1-4" BitBuddie





Signage

Infection control barriers will change to look and feel of the patient and staff area. Make certain to install way finding signage such that patients and staff can easily find their way around. Additionally, install signs that indicate whom is responsible for the infection control area itself. Below is an example of our infection control signage.

Follow the arrows to the new location

Follow the arrows to the new location

Infection Control Provided by

UNGER
CONSTRUCTION CO.

Key Contacts:

Steve Gardner	Superintendent	(916) 803-3328
Carol Reed	Project Manager	(916) 802-9859
Dave Simpson	Safety Manager	(916) 718-6190

Setting Up the Jobsite for Infection Control

Employees and subcontractors will need infection control awareness training in addition to the typical site safety orientation. A template for the Infection Control awareness training is located on the s drive, shared, infection control, infection control orientation. A copy is located on page 30.

Infection Control is a program and will need dedicated and or shared support (one person cannot do it all). As you set up the project staffing levels you will need to determine the roles and responsibilities for Unger Construction employees with respect to Infection Control. Utilize the roles and responsibilities template located on page 29.

Unger Construction has a host of infection control materials and equipment which is shared amongst the healthcare projects. Some of the materials and equipment are stored in the warehouse the balance is scattered throughout the healthcare projects. Before your project starts you need to determine the quantity of infection control materials that would be necessary to start the project. For example: Control Cubes, Enclosure types, (rolled film plastic or sheet plastic), Structural supports (zip poles, studs, Trakloc), Tape (blue tape, white tape), Walk off (tack mats, moist carpet) HEPA vacuum cleaners, Pressure gauges (digital, analog), Negative air systems, Exhaust tubing, Doors (storm, pocket, Polygal), Signage (way finding, Infection Control Provided by), Pedestal and Floor fans, Signage (way finding and ownership of the infection control enclosure).

Planning for Infection Control

Planning for infection control is a multidisciplinary, collaborative process which requires working directly with representatives from the host facility (typically Infection Control Nursing, Plant Engineering, Representatives from the affected department, Environmental services (EVS), and Security). In addition representatives from the construction project should be involved (typically the Project Manager for the host facility, the Architect, Representatives from the following subcontractors: electrical, HVAC, plumbing, drywall, flooring, paint) as well as Unger Constructions Project Manager, Superintendent, Carpenter Foreman and Labor Foreman. Infection Control is a complex process and is heavily regulated which translates to lots of documentation and multiple approvals. Planning and gaining formal approval can take 2-3 weeks. Plan your work and then work to your plan. You must stick to the plan; deviations from the plan must be authorized in writing.

The following are examples of documentation and approval: Pre-construction Risk Assessment (PCRA), Infection Control Risk Assessment (ICRA), Interim Life Safety Measures (ILSM), Access Interruption Notice (AIN) some clients use Notice of Interruption (NOI), Daily inspection logs for the infection control area itself. Plans need to include how the space will be commissioning at the end of the project. This needs to be part of the original plan and approved by all partied before the construction activities begin. Setting clearance criteria involves determining ahead of time what indicators or measurable results will be considered evidence of an acceptable outcome or clearance. These criteria need to be set before construction work begins. Setting clearance levels too low will impractically increase costs without additional practical benefit. Clear and achievable goals should be set during planning. All parties involved in the project should understand and agree upon the goals. Contingency / back out plans are used to identify points of no return as well as how to recover if plans suddenly change or an unforeseen condition is experienced.

To determine the PCRA/ICRA requirements, the Infection Control Team, will review the project Scope of Work, design, surrounding locations, and the impact on utility systems. Construction Activity Type, Risk Group, and Classification will be assigned. The ICRA may be revised throughout all stages of the project, as conditions warrant. An example PCRA/ICRA con be found on pages 32-36.

The ILSM determines alternative means and methods for life safety systems for example smoke detection, fire suppression and emergency egress. In essence devices, systems and procedures that protect the facility from fire, natural disasters and other unforeseen emergencies. If we alter Life Safety Measures during construction we will institute equivalent protection via alternative means and methods in order to maintain consistency with the facilities Life Safety Measures. If you need to temporarily disable a smoke detector/fire alarm you need to get written

authorization including making provisions for a dedicated Fire Watch and placing the system back online. Determine if the sensors need to be disabled (punched out of the program) or protected (covered) to prevent accidental activation during construction activities. The ILSM policy is found on pages 46-52.

AIN and NOI are used to determine impact to an area such as corridors, rooms, parking or a utility such as power, water, gas, HVAC. They are also used for changes to environmental controls; heating, ventilating, air conditioning, and/or lighting, Pedestrian traffic flow (patients, staff, construction workers), and/or way finding.

Designing the Infection Control Area

Everything depends on what you are planning to do, where you are planning to do it and how long it will take for you to do it. There are a significant number of variables to be considered when designing the infection control area including but not limited to: Pedestrian traffic flow (patients, visitors, staff and construction workers), Way finding signage for all, Environmental controls (interruption of HVAC airflow), Lighting (normal, task, emergency), Temporary power or permanent power, utility disruption (water, drains, hydronics, med gas), Interim life safety measures, Emergency response (egress/access), Duration (days, weeks, months).As a designer of the infection control space you must make certain the design criteria are understood by those that will be building the infection control area, work directly with the builders of the infection control area. The infection control builders checklist is located on the shared drive.

Determine the location of the air intakes and returns, thermostat. Investigate whether the ventilation system for the surrounding areas will function correctly with the containment system installed. If the negative air machine is to be exhausted into a HVAC return air or exhaust air duct, the PM, IC, and the Plant Engineering Department will review the installation prior to connection. HVAC registers and vents within the construction area shall be capped or tapped shut unless specifically approved by the PM or IC. The method for capping shall be dust tight and shall withstand the static air pressure.

Determine if you are going to use recirculated air (Scrubber mode) or negative pressure
Determine the extent and locations of the dust barriers.
Determine the locations of the nearest firewalls use of these can reduce the amount of temporary above ceiling barriers.
Determine the locations for the negative air machines and the exhaust routes (windows, vents)
Determine the points of entry, doors (number, type, style of doors, door swings) and emergency egress.
Determine the size of the materials that will be needed, this can determine the configuration of your ante room
Determine the sequence of activities and the contingencies; this can't be done unless that is already complete.
Determine the go-no go decisions, the "back out plan" and the point of "difficult return".

Establish communication with affected Department Managers / Shift Supervisors is essential to your success. Meet and greet. Share the plan. Share the schedule. Walk the area. Adjust the plan as needed, gain written approval. Develop communication protocol. Every morning, 3 times per week, whatever works best. Over communication is rarely a problem. Make it easy for them to contact you and they won't be contacting folks that you wished they hadn't.
It is important to establish a working relationship with the department managers and the shift supervisors in your work area. These are the folks that will be either your first line of defense or the generators of 90% of the complaints. Often times they can filter the complaints they receive from their staff or patients, as long as they know what is going on. Once you have established a relationship you will be more likely to gain their assistance when noise complaints surface. Noise complaints are the number one cause of work stoppages. Infection control protocol breaches are usually the second reason for work stoppages. If it's easy for them to contact you they won't run these issues up the email flag pole. Translation – you will have local control.

Constructing the Infection Control Area

Do not start without an approved plan! Make certain you have an approved copy of the PCRA, ICRA, AIN, NOI, and ILSM Review them to make certain you fully understand the plan, Post them on the infection control barrier. Develop a detailed checklist based on the approved plan to ensure nothing is overlooked, reference the builders checklist on the shared drive. Meet with our project manager/engineer, the plant engineer, and the infection control representative from the hospital to review the plan.

Maintaining the Infection Control Area

Infection control barriers need to be inspected 4 times per day for cleanliness and barrier isolation integrity (first break, lunch, second break, end of shift) Inspections shall be assigned to an Unger Construction team member more than one member of the team should be trainee to perform the inspections to accommodate changes in work schedules and unplanned absences. Inspections include the negative air machines ensuing negative pressure and flowrates, spare filters, record readings. Inspections must be logged at the time of the inspection. Repairs should be made directly upon discovery. Inspect the infection control barriers in detail seal holes, pipes, conduits, and punctures appropriately, If the tape sealing the edges of a barrier wall appears to be separating, fix the problem. In general tape is more effective if the plastic is taped on the positive pressure (hospital) side

Everyone should be on the lookout for tracking (foot prints or debris trails) if they are found corrections need to be immediate. Work in the area will need to be stopped until the problem is corrected.

Removing the Infection Control Area

Before removing the infection control area get confirmation from every subcontractor (those that are onsite and offsite) that is on contract with us and those on contract with the owner. Ensure in writing that they are either finished or won't need access into the area before removing an infection control barrier.

Perform a general clean first. Remove large debris, excess materials, tools and anything that won't be in the room when it is turned over. Clean inside the project area with the barrier in position. First, HEPA vacuum all horizontal and vertical surfaces. If work was performed above an existing suspended ceiling, vacuum the top of the ceiling tiles. Second, completely clean the inside of the barrier – all dust, dirt, debris, and grime must be cleaned from all surfaces located within the project area. Clean the covers that are isolating the HVAC system. Clean the outside of the negative air machine and its exhaust duct. Double sweep the floor. Clean sweep floor compound, then dry sweep. Remove the covers from the HVAC system and restore the HVAC air. If this action produces any dust or dirt, the pre-barrier removal cleaning and inspection will be repeated.

Most areas will be given an additional clean by the facilities EVS department. This will need to be scheduled in advance typically 48 hours.

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Sample Infection Control Roles and Responsibilities

Item	Responsible Parties
Proactive Construction Risk Assessment (PCRA)	Jack/Carol
Interim Life Safety Measures (ILSM)	Jack
Access Interruption Notice (AIN) Notice of Interruption (NOI)	Jack
Infection Control Permit	Jack/Carol
Designing the Infection Control Area	
Disabling smoke detectors	Carol
Disabling nurse call or fire pull stations	Miller w/ PCRA author
Interrupting airflow with temporary walls	Miller w/ PCRA author
Shutting down HVAC components	Miller w/HVAC sub
Blocking off or sealing HVAC grills	Coleman will direct the workers
Sealing wall, floor, ceiling penetrations	Coleman will direct the workers
Negative air machine, size, number, vents	Carol
Lighting	Coleman/Carol
Power	Coleman/Carol
Pedestrians – patients, staff, construction workers	Coleman will direct the workers
Doors	Coleman/Carol
Signage	Larry
Constructing the Infection Control Area	
Communicating design criteria to our installation team	Coleman
Determining the area is ready for use by trades	Carol
Maintaining the Infection Control Area	
Daily inspections of the area and the components within the area	Porter/Vic
Inspecting patient areas near construction areas for dust/debris	Porter/Vic
Removing the Infection Control Area	
Determining that the scope of work is complete	Coleman
Assigning the demolition of the infection control area	Coleman
Assigning the final clean of the area	Coleman
Walk through with facility infection control representative	Carol

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Infection Control Training Insert Project Name Here

Training date: _____ Company:_____ Name: _____

Classification of work

Type A work: Activities which creates little or no dust, Inspection for non-invasive activities, Removal of ceiling tiles for visual inspection, Painting/wet sanding of small patches (smaller than your hand), Wall coverings, electrical trim, minor plumbing, Installing phones, computers, TV's, etc. Initials:_____
Type B work: Involves low dust producing activities, disturbance of less than 10 sq feet of building material, Cutting or sanding small areas (wet method), Repair small section of insulation, Install telephone or computer cabling, Minor electrical, Removal and replacement of wall or ceiling fixtures. Initials:_____
Type C work: Involves moderate dust producing tasks, less than 100 sq feet of building material, tasks that can be completed within one work shift. (In, out, done in one) Demo a small section of sheet rock, Sanding of walls for painting, Removal of floor coverings or ceiling tiles, New wall construction, Minor duct work or electrical work above ceiling, Major cabling activities. Initials:_____
Type D work: Involves high dust producing tasks, disturbs more than 100 sq feet of building material, tasks that require more than one shift of work. Demolition of building components, Total remodel of an area, Heavy demolition or removal of cabling system, New Construction, Floor or substrate grinding, Core drilling, Initials:_____

Dust

1. When working in health care settings dust is a significant health concern. Initials:_____
2. Dust is a very effective transporter of airborne bacteria. Particles of dust give a free ride to bacteria that look for weak and vulnerable hosts (patients). Initials:_____
3. Construction dust can infect the sinus, ears, eyes, lungs, central nervous system, cardiac valves, gastrointestinal tract, bone and skin. Initials:_____
4. Construction dust has been linked directly to patient deaths. Initials:_____
5. Dust control is required prior to construction; planning, before you make any dust. Determine the best dust control method to use (wet, HEPA vacuum). During construction to keep the dust confined to the immediate work area. After construction to clean up and remove the dust before turning the area back over. Initials:_____
6. Methods of controlling dust include minimizing the dust generation at the source of the work. Wet cutting methods; use a HEPA vacuum at the source of the dust. Maintain negative air pressure within work area utilizing HEPA equipped air filtration units. Use clean sweep when cleaning up, Wet mop and/or vacuum the floor with HEPA filtered vacuum before leaving work area. Initials:_____
7. Other methods of dust control: Seal all penetrations into the work area to contain airborne dust. Seal holes, pipes, conduits, ducts and punctures appropriately. Initials:_____

Infection Control Barriers

1. Infection control barrier areas are designed to reduce the likelihood that dust will be transported via air currents, foot traffic, carts or clothing into an active area of the hospital. Initials:_____
2. Infection control barriers will include fire resistant plastic, sealed floor to ceiling, an ante room, walk off mats, negative air machines. Initials:_____
3. Never alter an infection control barrier without authorization from one of the following; insert team members names and phone numbers here Initials:_____
4. If an infection control barrier is in need of repair or service contact insert team members names and phone numbers here Initials:_____
5. Report work conditions that have the potential to create excess dust levels in the work area to one of the following; insert team members names and phone numbers here such that they can help you develop an acceptable method of control. Initials:_____

Negative Air Pressure

1. What is negative pressure? Negative pressure is pressure that is less than that of the surrounding area meaning airflow is into the construction area **not** from the construction area into the active area of the hospital. Initials:_
2. Why is negative pressure so important? From an airflow perspective negative pressure essentially separates the construction environment from the medical environment. Ensuring dust is contained in the construction area. Initials:_____
3. Negative air machines are HEPA filtered exhaust fans. They are used to pull air from the work space and vent to a non-critical area, preferably to the outside. Initials:_____
4. Don't turn off negative air machines. Loss of negative pressure can allow dust to migrate out of the area. Initials:_____
6. If the negative air machine is not functioning properly or if you feel it needs to be relocated contact insert team members names and phone numbers here Initials:_____

Ante Room / Decontamination Room

1. Anterooms allow you to maintain a consistent negative pressure while entering and exiting the work area. In essence a neutral pressure zone. Initials:_____
2. Purpose of the ante room is pressure isolation. When exiting or entering the ante room make certain that the interior and exterior doors are not open at the same time. This defeats the purpose of the ante room and ruins the negative airflow. Initials:_____
3. The anteroom is the final cleaning station for clothing, shoes, tool bags, tools, materials, carts etc. These items should be vacuumed clean and dust free with a HEPA vacuum before re-entering the medical facility. Initials:___
4. Anterooms are not to be used for storage of equipment or materials. Initials:_____

Infection Control Protocol/Procedures

1. All personnel working in an isolated containment area must contain their dust. Do not allow dust into the active area of the facility. Initials:_____
2. Dust is much easier to contain at the source; use wet cutting methods, plastic barriers, dust free attachments. Initials:_____
3. Use a HEPA vacuum regularly during work to reduce dust accumulation and migration. Do not allow dust or debris to accumulate in your work space. Initials:_____
4. Clean up your area 4 times per day. Each trade is to clean their floor area before, break, lunch, 2nd break and quitting time. Initials:_____
5. Servicing the sticky mats is everyone's responsibility. Lift the edges and fold inward to reduce the spread of dust. Contact insert team members names and phone numbers here when more sticky mats are needed. Initials:_____
6. Anytime foot prints are noticed outside of construction areas call insert team members names and phone numbers here Initials:_____
7. Hallway cleanup is the responsibility of the trade that made the mess which was tracked out of the area. Initials:_____

Summary

In summary dust is a very effective transporter of bacteria. Construction dust has been linked to hospital illness. There are many sources of dust from construction such as environmental, construction materials and worker apparel. Infection control protocol, barriers, negative air machines are critical and cannot be modified without permission. We must ALL take preventative measures with regard to dust in order to protect the patients and the hospital staff.
I understand the requirements for infection control and that failure to comply with these expectations will lead to disciplinary actions up to and including dismissal from the jobsite or termination.

Print Name: _____ Signature:_____

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Pre-Construction Risk Assessment (PCRA)

Determine the construction activity type using Table 1. Activity types are defined by the amount of dust that is generated, the duration of the activity, and the amount of shared HVAC systems.

TABLE 1: Construction Activity Type Definition Matrix

Type A	**Inspection and non-invasive activities that produce no noticeable dust** Includes, but is not limited to: • Opening of a single ceiling tile for visual inspection or tile replacement. Opening 1 tile per 10 tiles. (Limited to 2 tiles per 50 feet) • Painting (but not sanding) • Wall covering, electrical trim work, minor plumbing, and activities which do not generate dust or require cutting of walls or access to ceilings other than for visual inspection
Type B	**Small scale, short duration activities that create minimal dust** Includes, but is not limited to: • Opening of more than one ceiling tile per 10 tiles • Installation of telephone and computer cabling • Access to mechanical chase or shaft spaces • Cutting of walls or ceiling where dust migration can be controlled • Minor renovation of existing space • Wet sanding of walls • Minor electrical such as cutting in boxes, or the removal or replacement of light fixtures • ADA compliant upgrades for wall mounted fixtures, railing
Type C	**Work that generates a moderate to high level of dust** Includes, but is not limited to: • Dry sanding of walls • Cutting of walls, removal of drywall or building finish components where work is limited to one room or suite (including removal of floor coverings, ceiling tiles, and casework) • Wall demolition or new wall construction • Minor duct work, plumbing work, or electrical work above ceilings (not including system demolition or installation) • Moderate renovation of existing space • Removal of flooring, casework, or ceiling tiles • Major cabling activities where multiple access points are needed throughout the run • Any activity which requires construction of a barrier that does not qualify as Type D • Generally speaking activities that cannot be completed in a single work-shift, unless alternative means of protection are being utilized.
Type D	**Major demolition and major construction projects** Includes, but is not limited to: • Activities which require the closure of a unit/wing or relocation of an entire patient area • Demolition, removal, or installation of a complete cabling, HVAC, plumbing, medical gas, or electrical system • Demolition of major fixed building components, assemblies, fit-out elements, or structural elements • New construction located in close proximity (as determined by the Infection Control Team) of the hospital building • Outdoor construction of new structures located in close proximity (as determined by the Infection Control Team) to existing patient care facility • Excavation activities within close proximity (as determined by the Infection Control Team) of hospital building

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Pre-Construction Risk Assessment (PCRA)

Determine the Risk Group for the area where the construction will occur using Table 2. If multiple departments are impacted use the higher risk group.

TABLE 2: Risk Group Matrix

Low Risk	Medium Risk	High Risk	Highest Risk
• Mechanical spaces • Medicine labs • Medicine areas not directly adjacent to patient care areas. • Office areas not attached to or adjoining patient care areas or used for patient interviews, exams, or evaluations • Public corridors and spaces not on or directly attached to patient units or treatment locations. • Conference rooms • Staff Lounges • EVS	• Admissions • Cardiac Rehab • Clinical Laboratories, (except Microbiology and Virology) • DME Room - Dirty • Exam Rooms (not in "high" or "highest"). • Echocardiography • Endoscopy • Main Kitchen • Linen Building • Neurophysiology • Nuclear Medicine • OB-Gyn. • Off site outpatient clinics • Orthotics • Outpatient Rehab • Physical Therapy • Preadmissions • Clinics not listed under "High" or "Highest" risk groups • Radiology/MRI/CT/ Ultrasound • Patient care areas not listed under "High" or Highest"	• Aphaeresis Lab • Blood Bank • Breast Center/Clinic • Cardiology • Cafeteria • Central Processing - Dirty • Clin Labs Microbiology Lab • Clin Labs Virology Lab • DME Room –Clean • Emergency Department • HVOC • Lab collection areas • Labor & Delivery • Laundry Storage • Newborn Nursery • Nuclear Medicine • Outpatient Surgery • Orthopedics • Pharmacy – locations that do not prepare intravenous meds • PACU • Pediatric Rehab • Postpartum • Pulmonary Care • Respiratory Care • Same Day Unit • Supply & Distribution	Any area caring for immune compromised patients • Bronchoscopy Lab • Burn Unit • Cancer Center • CVOU • Central Processing - Clean • C-Section Rooms • Cardiac Cath/EP Lab • Dialysis Center • Endoscopy • Fertility processing • Fertility procedure • GYN/ONC • HVCU, HVICU, HVOU • Infusion / Dialysis • Interventional Radiology • MICU, MIMCU • Negative Pressure Isolation rooms • NICU • NSICU, NIMCU • Operating rooms • Oncology • PICU, PIMCU • Pharmacy – locations that prepare intravenous meds • Radiation Therapy • SICU, SIMCU • Surgery/OR • Sterile Processing • Pediatric Clinic • Pulmonary Function • Plastics Clinic • Surgical Specialties

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INFECTION CONTROL RISK ASSESSMENT CLASSIFICAITON MATRIX

Use the criteria identified in Table 1 (Construction Type) and Table 2 (Risk Group) to identify the ICRA Classification in the table below.

TABLE 3: ICRA Classification Matrix

CONSTRUCTION TYPE →	TYPE A	TYPE B	TYPE C	TYPE D
RISK GROUP ↓	ICRA Class ↓:	ICRA Class ↓:	ICRA Class ↓:	ICRA Class ↓:
Low Risk	I	II	II	III or IV
Medium Risk	I	II	III	IV
High Risk	I	II	III or IV	IV
Highest Risk	II	III or IV	III or IV	IV

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Infection Control Risk Assessment/ Permit

Project # and Name:				Permit #:	
Location of Work (depts, areas, etc.):				Project Start Date:	
Facility Project Manager:		Phone #		Estimated Duration:	
Contractor Supervisor:		Phone #		Permit Expiration Date:	
Contractor(s) Involved in work:					
Brief Work Description:					

(Check one)	RISK GROUP	(Check one)	Construction Activity TYPE
☐	Low Risk Area	☐	TYPE A: Inspection, non-invasive activity
☐	Medium Risk Area	☐	TYPE B: Small scale, short duration, minimal levels of dust
☐	High Risk Area	☐	TYPE C: Activity generates moderate to high levels of dust.
☐	Highest Risk Area	☐	TYPE D: Major duration and construction activities.

CONSTRUCTION TYPE →	TYPE A	TYPE B	TYPE C	TYPE D
RISK GROUP ↓	ICRA Class ↓:	ICRA Class ↓:	ICRA Class ↓:	ICRA Class ↓:
Low Risk	I	II	II	III or IV
Medium Risk	I	II	III	IV
High Risk	I	II	III or IV	IV
Highest Risk	II	III or IV	III or IV	IV

Note: Infection Control approval and an IC Permit is required for Class III or Class IV projects.

Complete the following for Class III and Class IV projects.
Identify the areas surrounding the project area and the risk group for those locations.
If more than one risk group is identified, select the higher risk group.

Unit Below	Unit Above	Lateral	Lateral	Behind	Front
Risk Group:	**Risk Group:**	**Risk Group:**	**Risk Group:**	**Risk Group:**	**Risk Group**

Potential for unplanned HVAC, plumbing, and electrical outages that could impact patient care:	Low: ☐	Med: ☐	High: ☐
Potential risk of water incursion occurring to areas outside the work area:	Low: ☐	Med: ☐	High: ☐

Method of HVAC system isolation during work:	Cover SA & RA Grills ☐	Local Shutdown Affecting Only Work Area ☐	System Shutdown Affecting Areas Outside Work Area ☐

What shifts will the majority of the work be done?	Regular Hours ☐	Early Mornings ☐	Evenings ☐	Nights ☐

ICRA containment Barrier type:	
ICRA containment Door type:	
Size of HEPA negative air machine and how will it be exhausted:	

Anteroom Required?	Yes: ☐	No: ☐
Will a continuous read negative air pressure monitor (chart recorder) be used?	Yes: ☐	No: ☐

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All Infection Control Requirements for the assigned Class will be implemented in addition to the requirements of the lower Classes.

CLASS I	1. Execute work by methods to minimize raising dust from construction operations. 2. Immediately replace any ceiling tile displaced for visual inspection.	3. All policies & procedures for renovation/construction/maintenance will be followed. 4. Contractor is educated before the start of the project about the importance of adhering to Infection Control measures. 5. When complete immediately clean up any dirt or debris.
CLASS II	1. Provide active means to prevent air-borne dust from dispersing into atmosphere, which may include the use of a Control Cube. 2. Water mist work surfaces to control dust while cutting. 3. Seal unused doors with masking tape. 4. Block off and seal air vents. 5. Doors and windows within the work zone to remain closed at all times except during ingress/egress.	6. Place adhesive mat at entrance and exit of work area as necessary. 7. Cover transport receptacles or carts. 8. Contain construction waste before transport in tightly covered containers. 9. Use designated removal route/elevators for removal of debris. 10. Wet mop and/or vacuum with HEPA filtered vacuum at end of job or end of work shift. Area to be free of dust and or debris.
CLASS III	1. Isolate HVAC system in area where work is being done to prevent contamination of duct system. Maintain until barrier is removed at completion of project. 2. Designate entry and exit traffic pattern, unauthorized personnel are not permitted to enter work zone, traffic control signs placed. 3. Complete all critical barriers or implement control cube method before construction begins. Will stay in place until IC or PM authorizes removal. 4. Maintain negative pressure within work site and utilize HEPA equipped negative air machines. Both will be maintained until project & terminal cleaning are completed and IC authorizes removal. 5. Air pressure to be monitored & documented at least daily. 6. Adhesive mats placed at all entrances & exists of work area.	7. The contractor will maintain the construction zone in a clean manner. The area will be HEPA-vacuumed or damp mopped daily or more often as necessary to minimize dust. Daily cleanup of debris, material and waste shall be completed. Adhesive mats monitored & changed on a regular basis so that they remain effective. Any dust or construction debris tracked outside of the work area will be promptly cleaned. 8. Terminal cleaning will be performed following protocol. 9. The terminal cleaning will be inspected by the Owner prior to the authorization for the barrier removal. 10. Air samples may be performed following IC/Safety protocol. 11. Barriers will be removed carefully to minimize spreading of construction dust and debris.
CLASS IV	1. Seal all holes, pipes and conduits penetrations in work area. 2. Construct anteroom for staging of equipment & donning of coveralls. 3. Workers will wear coveralls in work area. Upon completion of major dust generating activities, coverall requirement is removed. 3. Coveralls are removed in work zone before entering anteroom. 4. Any residual dust left on workers shall be removed by vacuum. 5. Shoe covers will be worn by workers and removed in the ante room when exiting area.	6. All renovation, construction, maintenance & tool carts leaving area must be covered & the wheels wiped down with a bleach solution. 7. Environmental Health Service (EHS) or a contract cleaner will vacuum or damp mop the area outside the work zone and adjacent areas.

ADDITIONAL COMMENTS OR REQUIREMENTS:

Obtain authorization from the Facility Project Manager and the Infection Control Manager – each print, sign, and date below

Infection Control Manager:		**Date:**
Facility Project Manager:		**Date:**
Contractor Representative:		**Date:**

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Daily Infection Control Area Inspection Log

Location: ______________________________

Date	Time	Negative Pressure	Air Machines (Initials)	Cleanliness (Initials)	Sealing Surfaces (Initials)	Walk off Mats (Initials)	Tracking - Footprints (Initials)	Corrections (what was done)

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Daily Infection Control Area Inspection (Multiple Areas)

Areas to be Continually Inspected

Area 1 = _____ Area 2= _____ Area 3 = _____

Area 4 = _____ Area 5= _____ Area 6 = _____

Area	Date/ Time	Negative Pressure	Corrections	Area	Date/ Time	Negative Pressure	Corrections

Area	**Date/ Time**	**Negative Pressure**	**Corrections**	**Area**	**Date/ Time**	**Negative Pressure**	**Corrections**

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ACCESS INTERRUPTION NOTIFICATION (NOI) / NOTICE OF INTERRUPTION (NOI)

REQUESTED BY: _____CELL: _____

DATE OF RTEQUEST: _____

PURPOSE:

_____

_____

_____

_____

_____

_____

_____

TYPE OF INTERRUPTION: _____
(Traffic Flow, Parking, Loading/Unloading, Pedestrian Flow, Patient Area, Staff Area, Common Area, Stairs, Elevators, Utilities- Power, Water, HVAC, Gas, Drain)

SPECIFIC AREAS AFFECTED:

_____

_____

_____

_____

_____

_____

DATE, TIME & DURATION OF INTERRUPTION: _____

_____

_____

_____

MITIGATION PLAN: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

COMMUNICATION PLAN: _____

_____

_____

_____

_____

APPROVAL: _____ *SIGNATURE:* _____ *DATE:* _____

APPROVAL: _____ *SIGNATURE:* _____ *DATE:* _____

APPROVAL: _____ *SIGNATURE:* _____ *DATE:* _____

APPROVAL: _____ *SIGNATURE:* _____ *DATE:* _____

APPROVAL: _____ *SIGNATURE:* _____ *DATE:* _____

AUTHORIZATION TO PROCEED:

APPROVAL: _____ *SIGNATURE:* _____ *DATE:* _____

APPROVAL: _____ *SIGNATURE:* _____ *DATE:* _____

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ABOVE CEILING PERMIT

Must Be Used in All Areas Outside of Major Project Areas

Company: _____ Name: _____

Date:_____ Target Completion Date: _____

Describe the *above ceiling* activity:

_____

_____

_____

_____

_____

_____

Provide schematic on-line diagram showing the system layout and all *above ceiling* penetrations with floor plans attached. Include all methods for closing and smoke tight sealant with brief description of methods. Include also a description of anchoring any utility runs.

Client Approval

Print: _____ Department: _____
Signature: _____ Date: _____

Print: _____ Department: _____
Signature: _____ Date: _____

Print: _____ Department: _____
Signature: _____ Date: _____

Post Work Inspection

To be performed at the end of the task	Approval/Rejection
Above ceiling penetrations	_____
Utility Anchorage	_____
Ceiling Tile	_____

Notes: _____

_____

_____

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Infection Control Work Permit (IC Permit)

Project #:_____ **ICRMR #:** _____

Date:_____

Brief description of project scope:

Step One: *Indicate the project* ***Construction Type****:*

Type A	**Inspection and non-invasive activities that produce no noticeable dust** Includes, but is not limited to: • Opening of a single ceiling tile for visual inspection or tile replacement. • Painting (but not sanding) • Wall covering, electrical trim work, minor plumbing, and activities which do not generate dust or require cutting of walls or access to ceilings other than for visual inspection
Type B	**Small scale, short duration activities that create minimal dust** Includes, but is not limited to: • Opening of more than one ceiling tile per 10 tiles • Installation of telephone and computer cabling • Access to mechanical chase or shaft spaces • Cutting of walls or ceiling where dust migration can be controlled • Minor renovation of existing space • Wet sanding of walls • Minor electrical such as cutting in boxes, or the removal or replacement of light fixtures
Type C	**Work that generates a moderate to high level of dust** Includes, but is not limited to: • Dry sanding of walls • Cutting of walls, removal of drywall or building finish components where work is limited to one room or suite (including removal of floor coverings, ceiling tiles, and casework) • Wall demolition or new wall construction • Minor duct work, plumbing work, or electrical work above ceilings (not including system demolition or installation) • Moderate renovation of existing space • Removal of flooring, casework, or ceiling tiles • Major cabling activities where multiple access points are needed throughout the run • Any activity which requires construction of a barrier that does not qualify as Type D • Any activity that cannot be completed in a single work-shift
Type D	**Major demolition and major construction projects** Includes, but is not limited to: • Activities which require the closure of a unit/wing or relocation of an entire patient area • Demolition, removal, or installation of a complete cabling, HVAC, plumbing, medical gas, or electrical system • Demolition of major fixed building components, assemblies, fit-out elements, or structural elements • New construction located in close proximity of the hospital building (as determined by the IC Team) • Outdoor construction of new structures located in close proximity (as determined by the Primary IC Team) to existing patient care facility • Excavation activities within close proximity (as determined by the Primary IC Team) of hospital building

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Step Two: *Determine the **Risk Group** for the job location. If more than one group is identified, select the higher one.*

Low Risk	Medium Risk	High Risk	Highest Risk
• Mechanical spaces • Medicine labs • Medicine areas not directly adjacent to patient care areas. • Office areas not attached to or adjoining patient care areas or used for patient interviews, exams, or evaluations • Public corridors and spaces not on or directly attached to patient units or treatment locations. • Conference rooms • Staff Lounges • EVS	• Admissions • Cardiac Rehab • Clinical Laboratories, (except Microbiology and Virology) • DME Room - Dirty • Exam Rooms (not in "high" or "highest"). • Echocardiography • Endoscopy • Main Kitchen • Linen Building • Neurophysiology • Nuclear Medicine • OB-Gyn. • Off site outpatient clinics • Orthotics • Outpatient Rehab • Physical Therapy • Preadmissions • Clinics not listed under "High" or "Highest" risk groups • Radiology/MRI/CT/ Ultrasound • Patient care areas not listed under "High" or Highest"	• Aphaeresis Lab • Blood Bank • Breast Center/Clinic • Cafeteria • Central Processing - Dirty • Clinic Labs Microbiology Lab • Clinic Labs Virology Lab • DME Room –Clean • Emergency Department • HVOC • Lab collection areas • Labor & Delivery • Laundry Storage • Newborn Nursery • Nuclear Medicine • Outpatient Surgery • Orthopedics • Pharmacy – locations that do not prepare intravenous meds • PACU • Pediatric Rehab • Postpartum • Pulmonary Care • Respiratory Care • Same Day Unit • Supply & Distribution	Any area caring for immune compromised patients • Bronchoscopy Lab • Cancer Center • CVOU • Central Processing - Clean • C-Section Rooms • Cardiac Cath / EP Lab • Dialysis Center • Endoscopy • Fertility processing • Fertility procedure • GYN/ONC • HVCU, HVICU, HVOU • Infusion / Dialysis • Interventional Radiology • MICU, MIMCU • Negative Pressure Isolation rooms • NICU • NSICU, NIMCU • PICU, PIMCU • Pharmacy – locations that prepare intravenous meds • Radiation Therapy • SICU, SIMCU • Surgery/OR • Sterile Processing • Pediatric Clinic • Pulmonary Function • Plastics Clinic • Surgical Specialties

Step Three: *Identify the areas surrounding the project area and the risk group for that location. If more than one risk group is identified, select the higher risk group.*

Unit Below	***Unit Above***	***Lateral***	***Lateral***	***Behind***	***Front***
Risk Group:	***Risk Group:***	***Risk Group:***	***Risk Group:***	***Risk Group:***	***Risk Group***

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Step Four: *Determine the **ICRA Class** by combining the **Risk Group** and the **Construction Type.***

CONSTRUCTION TYPE →	TYPE A	TYPE B	TYPE C	TYPE D
RISK GROUP ↓	ICRA Class ↓:	ICRA Class ↓:	ICRA Class ↓:	ICRA Class ↓:
Low Risk	**I**	**II**	**II**	**III or IV**
Medium Risk	**I**	**II**	**III**	**IV**
High Risk	**I**	**II**	**III or IV**	**IV**
Highest Risk	**II**	**III or IV**	**III or IV**	**IV**

Step Five: *Identify the specific site of activity eg. patient room, corridor, medication room*.

Step Six: *Identify issues related to HVAC, plumbing, and electrical in terms of the probability of unplanned outages that will impact patient care.*

Step Seven: *Water Incursion: Indicate potential risk of water damage outside construction zone:*

Step Eight: *Identify ICRA containment measures:*

1. Wall type:
2. Anteroom (yes/no):
3. Door Type:
4. Size of HEPA negative air machine:
5. Will a continuous read negative air pressure monitor (chart recorder) be used?
6. Frequency of manual verifications and documentation of negative air:
7. Method of HVAC system isolation during work – cover RA/SA grills, system shutdown only in work area, or system shutdown affecting areas outside the work area.
8. If temporary ventilation or humidification is necessary, how will this be accomplished?

Step Nine: *Identify the time and duration of the work.*

1. Work Hours: Will the work be done during non-patient care hours?
2. What shifts will the majority of the work be done – regular hours, early mornings, evenings, or nights?

Step Ten: *Consult with Infection Control on the design as it relates to:*

1. Clean and Soiled Utility rooms:
2. Hand washing sinks:
3. Support services space:
4. Isolation (positive pressure) rooms:
5. Negative pressure rooms:
6. Wall and floor coverings:
7. Ceiling type:

Step Eleven: *Other construction and containment issues to be discussed with the construction team:*

1. Maintenance of barriers during project:
2. Maintaining a clean job site daily:
3. Only HEPA filtered ‘shop style’ vacuums may be used:
4. Proper cleaning and removal of barriers at completion of project:
5. Cleaning protocol:
6. Commissioning Protocol:

UNGER CONSTRUCTION CO.

INTERIM LIFE SAFETY MEASURES (ILSM) PROGRAM

Purpose: To assure that interim life safety measures are implemented and fully adhered to whenever construction activities affect the current Fire, Life, Safety Systems. This program is designed to minimize the risk of fire and smoke and other dangers and to provide additional measures to ensure the safety of patients, staff and visitors.

Scope: Any activity resulting in the impairment of any life safety system (detection, suppression, alarm, response, egress) shall require implementing the interim measures outlined in this policy. Unoccupied or new buildings are not included in the scope of this policy unless the activities occurring at those sites affect the Life Safety Systems of adjoining buildings.

Pre-task Planning: Approval must be granted in writing from the facility manager or their designated representative before any impairment occurs to any Life Safety System. Communication shall be provided to workers in the affected departments' such that they are aware of the alternative plans of protection. Temporary signage needs to be posted in the area indicating the alternative means of protection. Way finding for patients is a premium concern. Once communication is complete for staff and patients then the construction project team members can be informed.

Alternative Means of Protection: The following are an example of alternative means which include but are not limited to:

a) Providing temporary but equivalent fire alarm and detection systems for use when a fire system is impaired.
b) Providing additional fire-fighting equipment
c) Using temporary construction partitions that are smoke-tight and made of noncombustible or limited combustible material that will not contribute to the development or spread of fire.
d) Increasing surveillance of buildings, grounds and equipment; giving special attention to construction areas.
e) Enforcing storage, housekeeping and debris-removal practices that reduce the level of flammable and combustible materials to the lowest feasible level.
f) Placing the alarm and detection systems on test to prevent accidental activation.

Means of Egress: All means of egress shall be kept unobstructed at all times. Exits shall be inspected daily. The width of an egress corridor shall not be reduced to less than 4 feet without an alternative means of protection. For example using expandable and collapsible temporary barriers; expanded when construction work is occurring, collapsed when construction is idle.

Criteria for Implementing Fire Watch: Whenever a fire alarm, detection or suppression system will be out of service or impaired for more than 4 hours project personnel must evaluate the need for fire watch. As a general rule the security department implements the fire watch. On occasion, the responsibility for establishing fire watch is delegated to the general contractor. While all situations cannot be covered in this document it is expected that each situation will receive a risk assessment to determine if fire watch is required. With that said here are some general rules of thumb. Placing a shield over one smoke detector for more than 4 hours to prevent false alarms from dust does not warrant fire watch. Covering all smoke detectors in an area would require fire watch. Closing fire suppression valves to prevent an accidental discharge or working on the fire alarm or sprinkler systems would require fire watch. Open flame or spark generating activities would require fire watch.

Procedure(s) for Implementation:

I. Responsibilities:

A. Unger's Project Manager and/or Superintendent are responsible for:
   1. Assessing the project, prior to start of work, as to whether Interim Life Safety Measures are necessary.

2. Completing the **ILSM Assessment**
3. Posting **Renovation/Construction Permit**
4. Ensuring construction personnel are complying with all required ILSM's as evidenced throughout and completion of **Construction/Renovation Inspection**

B. Client Project Manager is responsible for:
1. Coordinating Interim Life Safety Measures (ILSM) developed by contractor with engineering, department managers, and other facility personnel.
2. Reviewing and approving planned Interim Life Safety Measures as evidenced by sign off.
3. Contacting the fire department or Security, whenever a fire watch is needed.
4. Communicating the ILSM to affected staff.
5. Auditing the project's ILSM documentation and making plan adjustments as needed.
6. Advising Unger's Project Manager of any concerns regarding inadequate compliance with this policy and/or individual Interim Life Safety measures.

II. Procedures:

A. General
1. For all new construction/renovation projects Unger's Project Manager and/or Superintendent, must complete **ILSM Assessment.**
2. Upon completion of **ILSM Assessment**, if the determination of an Interim Life Safety Plan is ***not warranted (all No's)***, Unger's Project Manager will file the form in the project file and submit to client. Upon completion of **ILSM Assessment**, if it is determined that an Interim Life Safety Plan ***is warranted***, ***(any Yes's)*** the corresponding ILSM Administrative Actions will be applied to the project. Unger's Project Manager and Client's Project Manager will collaborate to develop all required ILSM implementation determinations and administrative actions. Copies of both forms to be placed in the project file.
3. Unger's Project Manager or designee is expected to continually review the project for any changes to ISLM and notify the Client's Project Manager of any changes. In addition, Unger's Project Manager will complete as appropriate and file in the project folder the **ILSM Construction/Renovation Inspection Form**. Project will be surveyed at least daily during active construction, renovation and/or repair. Any deficiencies are to be documented and addressed immediately.

Interim Life Safety Assessment Form

Project Title/Location	
Client Project Manager	
GC Project Manager	
Estimate Start Date	
Hours of Work	
Estimated Completion Date	

		YES	NO
A	Will general construction, renovation or significant repairs take place within an occupied space? **If YES, complete ILSM action items 6**		
B	Will any egresses or exits become obstructed by construction partitions or Infection Control measures? **If YES, complete ILSM action items 1**		
C	Will access to any building emergency responder or fire equipment, fire hydrant or connection be blocked or obstructed? **If YES, notify emergency responders of issue and take action to provide alternative access points.**		
D	Will fire alarm, fire detection, and/or fire suppression system be impaired or shut down? **If YES, complete ILSM action items 3 & 5**		
E	Will a temporary fire alarm system be required? **If YES, complete ILSM action items 3**		
F	Will smoke or fire walls be temporarily re-constructed/adjusted and thus not maintain barrier integrity? **If YES, complete ILSM action items 4**		
G	Will it be necessary to erect temporary construction partitions? **If YES, complete ILSM action items 1, 2, & 4**		
H	Will construction affect the safety of the exterior grounds, i.e., pits, storage, equipment, walkways, etc? **If YES, complete ILSM action item 2 & 6**		
I	Will welding, cutting or brazing be required? **If YES, complete ILSM action items 3, 5, & 6**		

Completed by:_____ **Date:**_____

Approved by:_____ **Date:**_____

UNGER CONSTRUCTION CO.

Interim Life Safety Assessment Form

Project Title/Location	
Client Project Manager	
GC Project Manager	
Estimate Start Date	
Hours of Work	
Estimated Completion Date	

#	ILSM Interruption	Mitigation Measures	Date Started	Date Complete	Initials
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

UNGER CONSTRUCTION CO.

ILSM Administrative Action Items

ILSM #1: Ensure free and unobstructed exits

Ensure that staff gets additional training when alternative exits are designated. Buildings or areas under construction must maintain escape routes at all times and the means of exiting construction areas are inspected daily.

ILSM #2: Ensure free and unobstructed access to emergency services

Emergency equipment, fire alarm pull stations, fire extinguishers, external connections and other emergency equipment necessary for internal as well as external emergency forces, must be clear and accessible at all times.

ILSM #3: Ensure that fire alarm, detection, and suppression systems are in good working order

Fire Watch shall be established for the affected portions of the building when the fire alarm system or automatic sprinkler system is out of service in an occupied building.

Formal procedures need to be developed for closing fire suppression valves to prevent accidental discharge or placing fire detection systems on test to prevent accidental activation of an alarm. Before the end of each shift Unger's Superintendent/foreman and the clients building representative will confirm the fire suppression and detection systems have been returned to normal. Written confirmation via initials of each party is required.

ILSM# 4: Temporary construction partitions

Any temporary construction partition must be smoke tight and constructed of non-combustible or limited combustible material that will not contribute to the development or spread of a fire. These partitions may be a component of the project work itself or part of Infection Control.

ILSM# 5: Additional firefighting equipment

Provide additional firefighting equipment and training of personnel as its appropriate to the hazard potential.

ILSM # 6: Housekeeping

Strictly enforce the medical center's housekeeping policies/procedures with regard to refuse removal and, if necessary, develop additional policies to ensure a safe work environment during the duration of the project.
Develop and enforce storage practices that reduce and maintain combustible load at the lowest level acceptable for hospital operations.

ILSM # 7: Penetrations:

Penetrations in floors, walls and ceilings, uncovered or created during the course of construction must be fire-stopped immediately upon the completion of that task.

ILSM # 8 Chemicals

Chemicals and products used are to be low VOC unless specifically approved by the facilities management team. Flammable or combustible liquids shall be stored in an approved fire cabinet. Material safety data Sheets (MSDS) for all products shall be readily available

ILSM #9 Hotwork Permit

The Hot Work Permit Program is effectively used to supervise and control the potential ignition hazards associated with cutting, welding, or other "hot work". Hot work is defined as any temporary activity that produces sparks, heat or flame. Examples of hot work include welding, cutting, grinding, soldering, brazing, a torch applied to a roof, using a chop saw to cut metal studs, using a cut off saw to cut pipe, etc. Any hot work conducted indoors or outdoors on the site should be managed by using a hot work permit. Hot work permits should be issued for hot work performed by anyone at the site (employees or subcontractors). Refer to our Fire Prevention Program for more details and the fire watch checklist.

UNGER CONSTRUCTION CO.

ILSM Construction Inspection Form

Project Title:
Week Beginning (Date):
Inspection By:

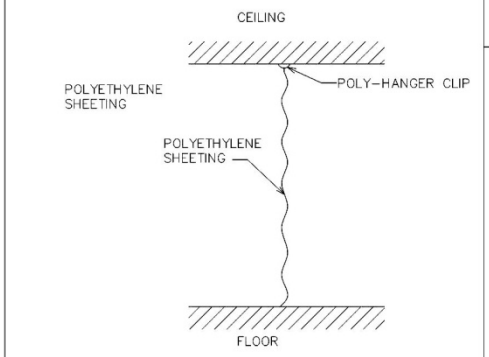
	Area(s) of Project/Job Inspected (Denote Yes, No, N/A)	M	T	W	Th	F	S	S
1	Exits are readily accessible and provide an unobstructed egress path.							
2	Exits are clearly identifiable and able to be seen in the event of an emergency or fire.							
3	Fire evacuation routes are posted and reflect up-to-date changes and alternate escape routes due to construction deficiencies.							
4	Fire alarm, detection, and suppression equipment are intact and operational.							
4a	If no, a fire watch is established consistent with expectations							
5	A visual inspection of temporary fire alarm, detection or suppression systems/equipment has been completed.							
6	Storage of materials, waste and debris from the construction/renovation area is maintained to minimize the potential for fire or safety hazards during daily operations.							
7	Fire and smoke barriers are fully in intact and functional.							
7a	If no, temporary partitions are constructed to be smoke tight.							
8	A “Hot Permit” has been secured when spark, heat or flame generating activities are performed on the premises and additional fire safety precautions are in place.							
9	Additional and supplemental portable fire extinguishers are in place and readily available.							
10	Fire watch inspection logs are current.							
11	Before the end of each shift Unger’s Superintendent/foreman and the clients building representative will confirm the fire suppression and detection systems have been returned to normal. Written confirmation via initials of each party is required.							
	Initials of Person Completing Inspection							

Back page of Form B --------Issues log			
Date	**Problem**	**Plan for Correction**	**Verification of Resolution**

UNGER
CONSTRUCTION CO.

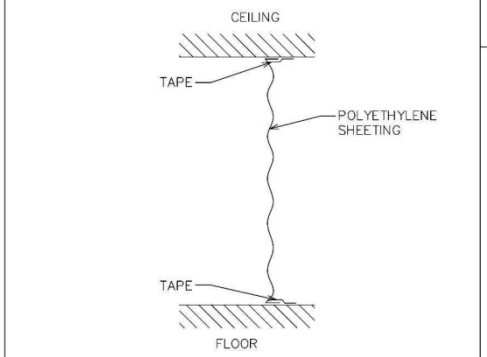
Examples of Barrier Types

B–1



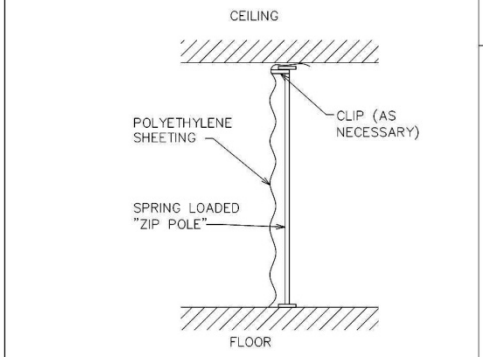
DESCRIPTION:
SINGLE LAYER 6 MIL. FLAME RESISTANT POLYETHYLENE SHEETING, HUNG FROM CEILING WITH THE FOLLOWING CLIPS:
POLY–HANGER CLIP #3, PART #55084 (OR EQUAL)
OR
POLY–HANGER CLIP #4, PART #55085 (OR EQUAL)

B–2



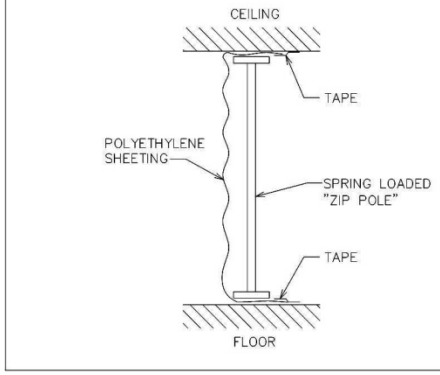
DESCRIPTION:
SINGLE LAYER 6 MIL. FLAME RESISTANT POLYETHYLENE SHEETING, HUNG FROM CEILING, TAPED AT TOP, BOTTOM AND SIDEWALLS.

B–3



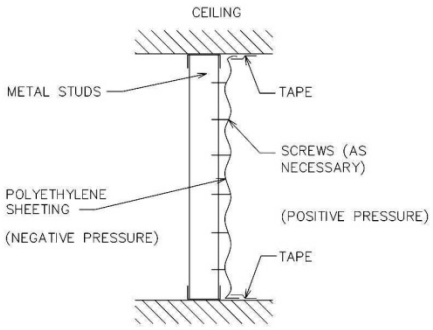
DESCRIPTION:
SINGLE LAYER 6 MIL. FLAME RESISTANT POLYETHYLENE HUNG FROM "ZIP" POLES. CLIPPED AT TOP.

B–4



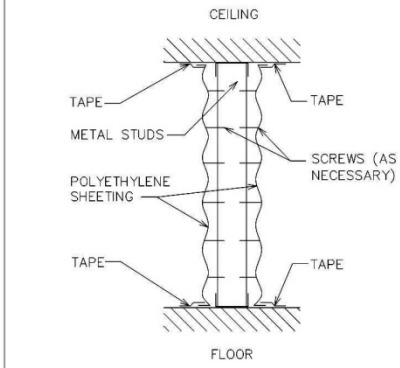
DESCRIPTION:
SINGLE LAYER 6 MIL. FLAME RESISTANT POLYETHYLENE HUNG FROM "ZIP" POLES, TAPED AT TOP AND BOTTOM.

B–5



DESCRIPTION:
METAL STUDS WITH 6 MIL. FLAME RESISTANT POLYETHYLENE SHEETING ON POSITIVE PRESSURE SIDE OF BARRIER. TAPED AT TOP, BOTTOM AND SIDES.

B–6

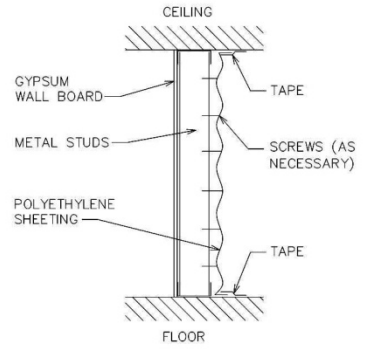


DESCRIPTION:
METAL STUDS AT 24" O.C. WITH 6 MIL. FLAME RESISTANT POLYETHYLENE ON BOTH SIDES. TAPED AT TOP, BOTTOM AND SIDEWALLS.

UNGER CONSTRUCTION CO.

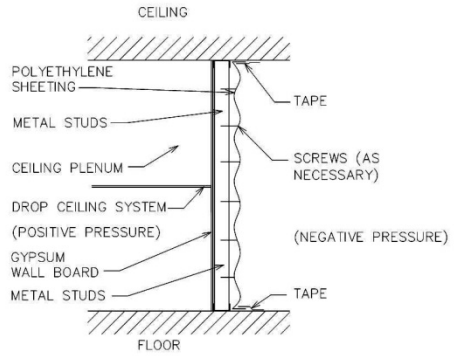
Examples of Barrier Types

B–7



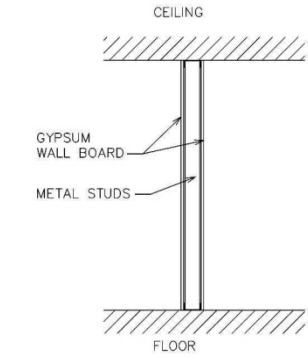
DESCRIPTION:
METAL STUDS AT 24" ON CENTER MAXIMUM WITH 1/2" GYPSUM WALL BOARD ATTACHED WITH SCREWS ON ONE SIDE. OTHER SIDE 6 MIL. FLAME RESISTANT POLYETHYLENE SHEETING, TAPED AT TOP, BOTTOM AND SIDEWALLS.

B–8



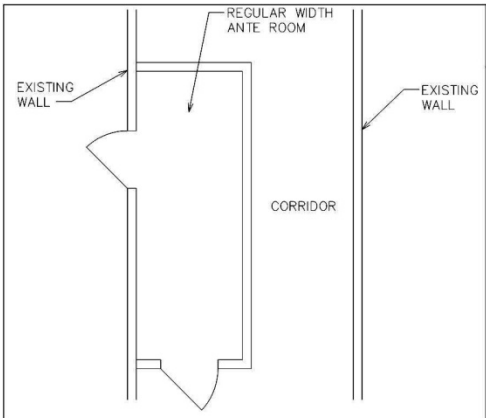
DESCRIPTION:
BELOW CEILING – METAL STUDS AT 24" ON CENTER WITH 1/2" GYPSUM WALL BOARD ON ONE SIDE. ON OPPOSITE SIDE, 6 MIL. FLAME RESISTANT POLYETHYLENE SHEETING TAPED AT TOP, BOTTOM AND SIDEWALLS.
ABOVE CEILING – 6 MIL. FLAME RESISTANT POLYETHYLENE SHEETING ON OPPOSITE SIDE, SUPPORTED BY METAL STUDS. TAPE AT TOP AND SIDEWALLS.

B–9



DESCRIPTION:
METAL STUDS WITH 1/2" GYPSUM WALL BOARD ON BOTH SIDES. TAPE ALL JOINTS IN GYPSUM WALL BOARD. SEAL AT TOP, BOTTOM AND SIDEWALLS.
NOTE: USE FIRE RESISTANT WHERE REQUIRED BY CODE.

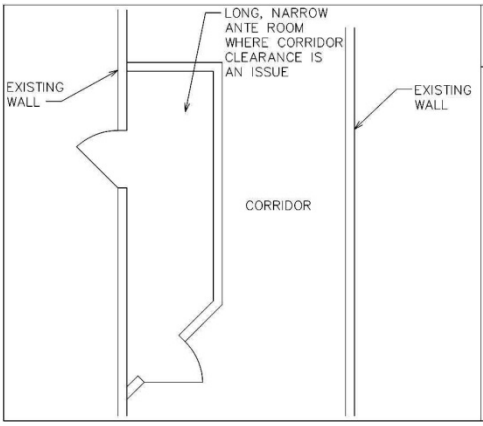
B–10



DESCRIPTION:
METAL STUDS WITH 1/2" GYPSUM WALL BOARD ON OUTER SIDE AND FIRE RESISTANT POLYETHYLENE ON INNER SIDE. TAPE ALL JOINTS IN GYPSUM WALL BOARD. SEAL AT TOP, BOTTOM AND SIDEWALLS. MINIMUM 36" SOLID WOOD DOOR IN A METAL FRAME OR METAL DOOR IN A METAL FRAME. FRAME TO HAVE STOPS AND FRAME TO BE SEALED TO BARRIER WALL. HARDWARE MUST FUNCTION PROPERLY.
NOTE: USE FIRE RESISTANT WHERE REQUIRED BY CODE.

NOTE: SWING OF DOORS MAY BE REVERSED AS REQUIRED BY THE PROJECT.

B–11



DESCRIPTION:
METAL STUDS WITH 1/2" GYPSUM WALL BOARD ON OUTER SIDE AND FIRE RESISTANT POLYETHYLENE ON INNER SIDE. TAPE ALL JOINTS IN GYPSUM WALL BOARD. SEAL AT TOP, BOTTOM AND SIDEWALLS. MINIMUM 36" SOLID WOOD DOOR IN A METAL FRAME OR METAL DOOR IN A METAL FRAME. FRAME TO HAVE STOPS AND FRAME TO BE SEALED TO BARRIER WALL. HARDWARE MUST FUNCTION PROPERLY.
NOTE: USE FIRE RESISTANT WHERE REQUIRED BY CODE.

NOTE: SWING OF DOORS MAY BE REVERSED AS REQUIRED BY THE PROJECT.

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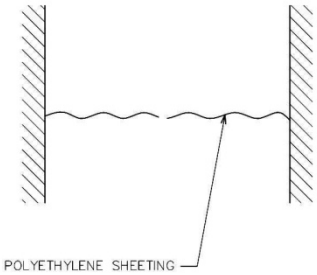
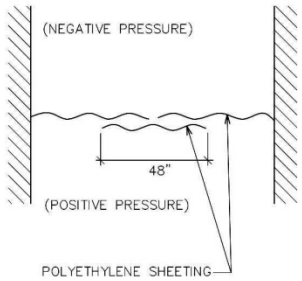
Examples of Barrier Types



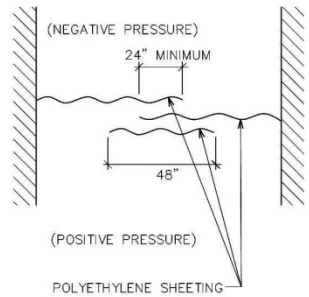
D–1

DESCRIPTION:
HANGING 6 MIL. FIRE RESISTANT POLYETHYLENE SHEETING. SLIT IN MIDDLE AS REQUIRED FOR ACCESS.



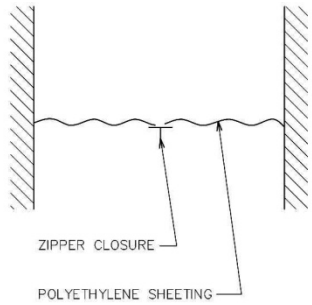
D–2

DESCRIPTION:
HANGING 6 MIL. FIRE RESISTANT POLYETHYLENE SHEETING. SLIT IN MIDDLE AS REQUIRED FOR ACCESS. SLIT COVERED BY 48" WIDE PIECE OF SHEETING, PLACED ON SIDE OF BARRIER WITH POSITIVE PRESSURE.



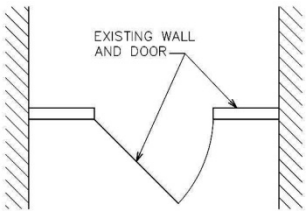
D–3

DESCRIPTION:
HANGING 6 MIL. FIRE RESISTANT POLYETHYLENE SHEETING. OVERLAP SHEETS IN MIDDLE AS REQUIRED FOR ACCESS. OPENING COVERED BY 48" WIDE PIECE OF SHEETING, PLACED ON SIDE OF BARRIER WITH POSITIVE PRESSURE.



D–4

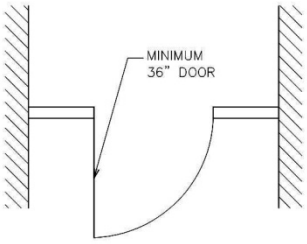
DESCRIPTION:
SINGLE LAYER OF 6 MIL. FLAME RESISTANT POLYETHYLENE SHEETING WITH A ZIPPER CLOSURE.



D–5

DESCRIPTION:
EXISTING HINGED WOOD OR METAL DOOR, CONTINUOUS WITH EXISTING WALL. HARDWARE MUST FUNCTION PROPERLY.

(D–5 SHALL BE USED WHEN AN EXISTING WALL / DOOR ASSEMBLY IS USED AS THE INFECTION CONTROL BARRIER)



D–6

DESCRIPTION:
MINIMUM 36" SOLID WOOD DOOR IN A METAL FRAME OR METAL DOOR IN A METAL FRAME. FRAME TO HAVE STOPS AND FRAME TO BE SEALED TO BARRIER WALL. HARDWARE MUST FUNCTION PROPERLY.

NOTE: SWING OF DOORS MAY BE REVERSED AS REQUIRED BY THE PROJECT.

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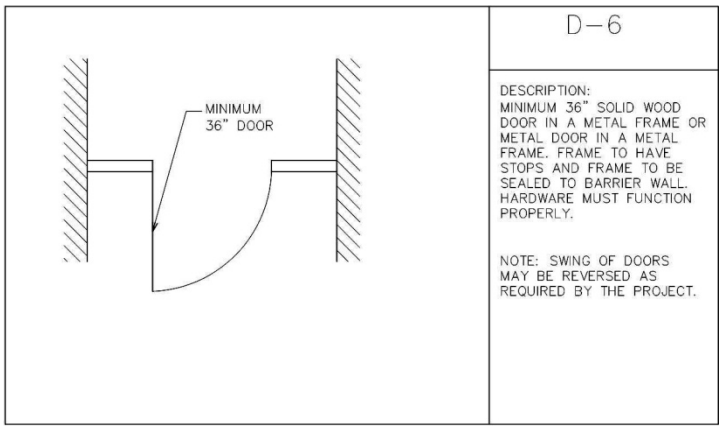
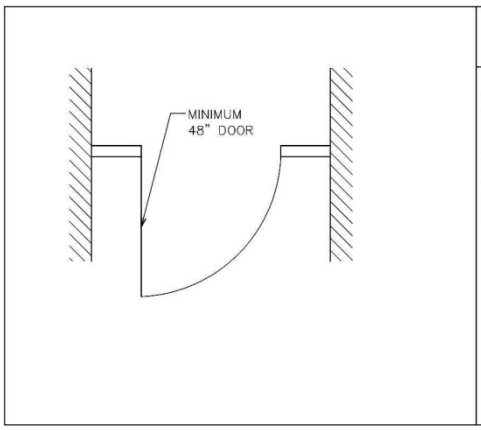
Examples of Barrier Types



D–6

DESCRIPTION:
MINIMUM 36" SOLID WOOD DOOR IN A METAL FRAME OR METAL DOOR IN A METAL FRAME. FRAME TO HAVE STOPS AND FRAME TO BE SEALED TO BARRIER WALL. HARDWARE MUST FUNCTION PROPERLY.

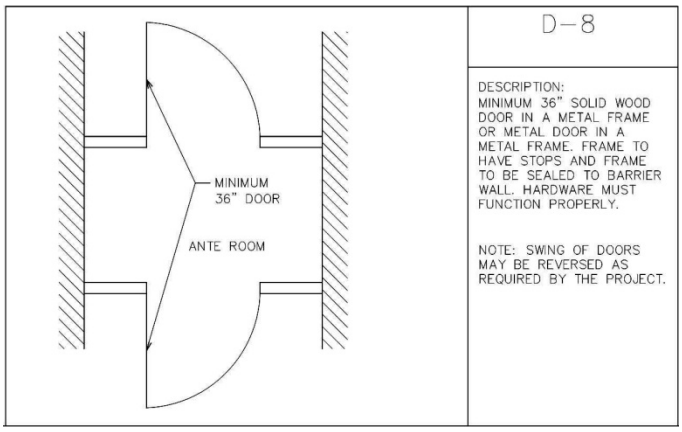
NOTE: SWING OF DOORS MAY BE REVERSED AS REQUIRED BY THE PROJECT.



D–7

DESCRIPTION:
MINIMUM 48" SOLID WOOD DOOR IN A METAL FRAME OR METAL DOOR IN A METAL FRAME. FRAME TO HAVE STOPS AND FRAME TO BE SEALED TO BARRIER WALL. HARDWARE MUST FUNCTION PROPERLY.

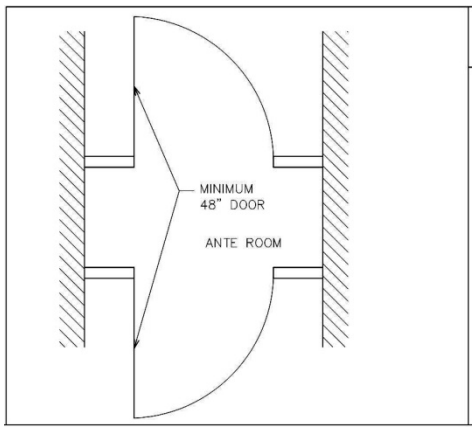
NOTE: SWING OF DOORS MAY BE REVERSED AS REQUIRED BY THE PROJECT.



D–8

DESCRIPTION:
MINIMUM 36" SOLID WOOD DOOR IN A METAL FRAME OR METAL DOOR IN A METAL FRAME. FRAME TO HAVE STOPS AND FRAME TO BE SEALED TO BARRIER WALL. HARDWARE MUST FUNCTION PROPERLY.

NOTE: SWING OF DOORS MAY BE REVERSED AS REQUIRED BY THE PROJECT.



D–9

DESCRIPTION:
MINIMUM 48" SOLID WOOD DOOR IN A METAL FRAME OR METAL DOOR IN A METAL FRAME. FRAME TO HAVE STOPS AND FRAME TO BE SEALED TO BARRIER WALL. HARDWARE MUST FUNCTION PROPERLY.

NOTE: SWING OF DOORS MAY BE REVERSED AS REQUIRED BY THE PROJECT.