

Hazards and Definitions in PI/Space Registration

Core Hazard Types (EHS Coordinators to identify and update for Space Registration)	
Chemical	Any hazardous chemical as defined in the Occupational Safety and Health Administration's (OSHA) Hazardous Communication (HazCom) regulations.
Biological Materials	Any microorganism or virus, any primary or established cell line, human or animal-derived material, or biological toxin. All Biological Research Registrations must be registered with the EHS Biosafety Program and be approved by the MIT Committee on Assessment of Biohazards. Use of human primary cells or tissue where the "donor" may be identified, requires approval from the MIT COUHES (Committee on Use of Humans as Experimental Subjects) and registration with the EHS OSHA Bloodborne Pathogen Standard compliance program.
General and Lab Safety	Physical hazards as defined in the Occupational Safety and Health Administration and other local, state and federal regulations.
Ionizing Radiation Sources	Substances that emit ionizing radiation. Massachusetts Department of Public Health (DPH) licenses radioactive material use. Any lab using radioactive materials must have a current authorization issued by the MIT Radiation Protection Committee.
Non-ionizing Radiation Sources	Non-ionizing radiation sources includes: lasers and laser systems that require registration with the Radiation Protection Program and the Massachusetts DPH; non-contained radio frequency sources such as radar and microwave (excluding microwave ovens, cell phones, or other such consumer devices); and devices capable of producing static magnetic fields in excess of 5 gauss in spaces accessible to workers.
Shop/Makerspace	Use this hazard type for areas that are designated as shops or makerspaces. These spaces primarily contain machine and hand tools, laser cutters, 3-D printers and other fabrication equipment.
Chemicals - General or Specific	
Combustible Metals	Metals in a form (typically powder or fine particles or thin sections) that allows them to ignite easily in the presence of air and water. Some combustible metals cannot be extinguished with water and require special extinguishing powders (for Class D fires), or special inerting gases.
Gas Cylinders	Any container that is used to contain gases at higher than atmospheric pressure.
Engineered Nanoparticles	The types of nanoparticles to be included in space hazard registration are unbound engineered nanoparticles, tubes, wires or fibers, either dry or in suspension, that could be released into air and pose an inhalation or dermal hazard. Both purchased nanoparticles and synthesized nanoparticles are included. In general these will have one dimension between 1 to 100 nm, though in some cases nanoparticles up to 300 nm will have special properties and be considered a nano material. Examples include quantum dots, carbon nanotubes, fullerenes, nanoscale metal oxides, dendrimers and polymers. This does not include incidental nanoparticles from processes such as engine exhaust or welding fume; it also does not include processes conducted on the nanoscale that would not release unbound particles, such as the fabrication of semiconductor circuits.
Explosives	Any chemical compound, mixture, or device, where the primary or common purpose is to function by explosion. The term includes, but is not limited to, explosives, blasting agents, dynamite, black powder, pellet powder, initiating explosives, water gels, detonators, safety fuses, squibs, detonating cord, igniter cord, and igniters. Explosive materials include, but are not limited to, all items in the "List of Explosive Materials" provided in ATF 555.23.

Flammable Liquids >10 Gal. Total	Liquids with a flash point of less than 140° F in quantities greater than 10 gallons total.
High Performance Liquid Chrom.	Enter the number of high performance liquid chromatography equipment in the room under the supervision of the PI or supervisor for the roomset.
Highly Reactive Materials	Any of the following: --materials that are normally unstable or readily undergo violent change without detonating; --materials that, when mixed with water, react violently, form potentially explosive mixtures, or generate toxic gases, vapors, or fumes; --materials that contain cyanide or sulfide and can generate toxic gases, vapors, or fumes when exposed to pH conditions between 2 and 12.5; --materials that are capable of detonation or explosion under different conditions.
Hydrofluoric Acid (HF)	An especially toxic acid that requires users to have a specific antidote (calcium gluconate) on hand in the laboratory.
Large Volume Oil >55 Gal. Single Container	Oil (including cooking oil) in quantities exceeding 55 gallons in a single container, not in the aggregate, at any one time.
Perchloric Acid & Organic Peroxides	Chemicals that may form explosive compounds or otherwise become unstable and therefore require special precautions.
Toxic Gases	Gases such as arsine, phosphine, silane, diborane, germine, hydrogen selenide that are poisonous and require special ventilation and monitoring systems.
Chemical Wastes	
Less Than 90-day Storage Area	An area where RCRA chemical waste may be stored for up to 90 days. This type of storage area does not have to be at the point of generation. All less than 90-day storage areas must be established and managed by the EHS Environmental Management Program.
Satellite Accumulation Area	(SAA) The temporary storage of waste materials at the point of generation. Enter the number of SAAs in the room under the supervision of the PI or supervisor for the roomset.
Biological	
Autoclave	Autoclave: special equipment designed to produce and withstand high pressures and high temperature and used only to sterilize liquids or materials. This is done by timed exposure of liquids or materials to high pressure and high temperatures such that all viable microorganisms in the liquids, materials within chamber are killed. Enter the number of autoclaves in the room under the supervision of the PI or supervisor for the roomset.
Biosafety Cabinet	Enter the number of biosafety cabinets in the room under the supervision of the PI or supervisor for the roomset.
Containment Level BL1	BL1 containment work with biological agents/materials that are not known to consistently cause disease in healthy adults.
Containment Level BL2	BL2 containment: work with agents/materials that can cause diseases in humans but the mode of transmission is by ingestion, needlestick, exposure to blood, cut or splash to eyes, nose or mouth.
Containment Level BL2+	BL2+ containment: work with agents/materials that may cause serious or lethal disease but is not transmitted by aerosol inhalation.
Containment Level BL3	BL3 containment: work with agents/materials that can cause serious or even lethal disease, transmitted by aerosol inhalation.
Radiation Sources	
Accelerator	A device that emits ionizing radiation by the acceleration of particles.

Generally Licensed Devices / Material	<p>A generally licensed device is a device containing radioactive material that is typically used to detect, measure, gauge, or control the thickness, density, level, or chemical composition of various items. Examples of such devices are gas chromatographs (detector cells), density gauges, fill-level gauges, and static elimination devices.</p> <p>Generally licensed material is radioactive material typically in quantities not requiring a license. Examples are naturally occurring uranium and thorium compounds, calibration sources for radiation detectors, self illuminating exit signs, and check sources for radiation survey equipment.</p>
Radioactive Material	<p>Substances that emit ionizing radiation. Massachusetts DPH licenses radioactive material use. Any lab using radioactive materials must have a current authorization issued by the MIT Radiation Protection Committee.</p>
X-Ray Machine	<p>A device that emits ionizing radiation. Used as an analytical tool for x-ray fluorescence, diffraction and irradiation work. Also includes diagnostic machines used in medical, dental, and veterinary areas.</p>
Non-ionizing Radiation Sources	
Class 3b and 4 Lasers	<p>Lasers and laser systems that require registration with the Radiation Protection Program and the Massachusetts DPH. All lasers are required by regulation to be labeled with their class.</p>
Magnets	<p>Devices capable of producing static magnetic fields in excess of 5 gauss in spaces accessible to workers. Typical devices are nuclear magnetic resonance (NMR) spectroscopy and magnetic resonance imaging (MRI) systems.</p>
RF Sources	<p>Non-contained radio frequency sources such as radar and microwave. This does not include microwave ovens, cell phones, or other such consumer devices.</p>
General and Lab Safety	
Cranes / Lifts	<p>Machine for lifting and lowering a load and moving it horizontally, with the hoisting mechanism an integral part of the machine. Cranes whether fixed or mobile are driven manually or by power.</p>
Cryogenics	<p>Fluids existing at temperatures -100° F (-60° C) to -460° F (-266° C), low enough to damage body tissues after prolonged contact with the fluids, surfaces cooled by fluids, or evolving gases.</p>
Elevated Platforms	<p>Identify all unguarded elevated platforms. An elevated platform is a platform, scaffold or work surface, permanent or temporary, that is 4 feet or greater in height. This would include temporary platforms on equipment that was being serviced, maintained, repaired, adjusted or tested.</p> <p>OSHA regulations require that any platform, scaffold or work surface, permanent or temporary, that is 4 feet or greater in height be guarded by railings. If this is not feasible, then fall protection (harness and lanyard) would be necessary.</p> <p>If elevated platforms are identified, contact EHS for further guidance.</p>
Equipment Requiring Lock Out / Tag Out	<p>Identify all equipment required to have the energy source locked out during maintenance and repairs. All sources of energy are included: mechanical, electrical, hydraulic, pneumatic, chemical, and thermal.</p> <p>This would not include equipment where the energy is controlled completely by unplugging the equipment from an electric outlet and where the person doing the service or maintenance has exclusive control of the plug.</p> <p>OSHA requires that workers, researchers or contractors that service or maintain machines or equipment where the unexpected startup, energization, or the release of</p>

	<p>stored energy could cause injury, be protected from this potential hazard. The Control of Hazardous Energy (Lock Out/Tag Out) standard requires the adoption and implementation of practices and procedures to shut down equipment, isolate it from its energy source(s), and prevent the release of potentially hazardous energy while maintenance and servicing activities are being performed. Locks are supplemented by DANGER tags which identify the person responsible for the lock out, the reason, date, etc.</p> <p>If equipment requiring lock out / tag out is identified, contact EHS for further guidance.</p>
Ergonomics Hazard or Lifting	Excessive repetitive motion or awkward positions like computing, pipetting or microscopy.
Exposed High Voltage	Exposed wiring and equipment greater than 600 volts.
Heat Stress	Operations involving high air temperatures, radiant heat sources, high humidity, direct physical contact with hot objects, or strenuous physical activities have a high potential for inducing heat stress in employees engaged in such operations. At MIT, potential heat stress areas are steam tunnels and areas near furnaces or boilers at the MIT Central Utilities Plant (CUP).
Hot Work Area	Area where welding, cutting, brazing, using open flames or similar operations are performed.
Noise > 85 dB	Regular or continual noise sources in a room that are loud enough to require people to raise their voices to be understood by another person standing at a distance of 3 feet or less.
Permit-required Confined Space	<p>Identify all permit-required confined spaces. A permit-required confined space meets all of these criteria:</p> <ul style="list-style-type: none"> • Is large enough and so configured that a person can bodily enter and perform assigned work or research. • Has limited or restricted means for entry or exit. • Is not designed for continuous person occupancy. <p>and one of the following:</p> <ul style="list-style-type: none"> • Contains or has a potential to contain a hazardous atmosphere. • Contains a material that has the potential for engulfing an entrant. • Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section. • Contains any other recognized serious safety or health hazard. <p>If permit-required confined spaces are identified, contact EHS for further guidance.</p>
Pressure Vessels	Vessels containing a volume more than 120 gallons of water under pressure, having internal or external pressure in excess of 15 psi, and an inside diameter of more than 6 inches.
Powered Industrial Vehicles	Fork lift trucks, tractors, platform lift trucks, motorized hand trucks, and other specialized industrial trucks.
Powered Machine Tools	Machines and tools such as saws, lathes, drill press, milling machines.
Vacuum Oven	Oven or furnace where a vacuum pump is used to displace oxygen and, in most cases, to reduce the water vapor content or dew point as well.
Safety Equipment	
Eye Wash Station	Enter the number of eye wash stations in the room under the supervision of the PI or Supervisor for the room set that meet the American National Standards Institute (ANSI) standard (dual nozzle with remain-on feature).

Fire Extinguisher	A fire extinguisher is a portable device, carried or on wheels and operated by hand, containing an extinguishing agent that can be expelled under pressure for the purpose of suppressing or extinguishing fire.
Fumes Hood	Enter number of fume hoods in the room under the supervision of the PI or Supervisor for the roomset.
Gas Monitors	Gas monitors refer to fixed or portable equipment used by a DLC to detect the release or presence of a hazardous gas, or the presence of a hazardous atmosphere. Examples include toxic gas detectors in areas where semi-conductor work is done, Freon monitors at the power plant, carbon monoxide monitors, oxygen detectors, or confined space entry monitoring equipment. For those monitors that are fixed in place, the location of the monitor should be noted. For those monitors that are portable, the location where equipment is stored when it is not in use should be noted. The exception is equipment maintained at the EHS Office.
Glove Box	A glove box is a sealed container that provides a controlled environment that protects contamination-sensitive materials from ambient conditions and allows the user to manipulate those materials while being outside that environment. They can operate under a vacuum, inert gas atmosphere or under positive or negative pressure.
Emergency Shower	An emergency shower, also known as a safety shower, is a device specifically designed and intended to deliver flushing fluid in sufficient volume to cause that fluid to cascade over the entire body.
Self-Contained Breathing Apparatus (SCBA)	SCBA is an acronym that stands for "Self-Contained Breathing Apparatus". SCBA is a type of respirator that consists of a facemask, a cylinder of breathing air that is often carried by a backpack-like structure on the users back, and any regulators needed to properly adjust the pressure of the air that is delivered to the user from the cylinder. Generally, SCBA respirators offer the highest degree of respiratory protection possible.
Special Local Exhaust Vent	Exhaust ventilation that serves specialized laboratory and shop equipment, other than the traditional fume hood. It includes exhaust ventilation serving gas cabinets, reactors, drops or snorkels for vacuum pump exhaust, enclosures for lab equipment, slot exhaust, spray paint booths, etc. Each drop should have an Industrial Hygiene Program (EHS) tag on it.
Spill Response Material	Spill response material is equipment and materials available for minor spills of hazardous materials present in the lab or space.