

Scientific Equipment & Furniture Association

SEFA 2 - 2020 Installations Standard



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Foreword

SEFA Profile

The Scientific Equipment and Furniture Association (SEFA) is an international trade association comprised of manufacturers of laboratory furniture, casework, fume hoods and members of the design and installation professions. The Association was founded to promote this rapidly expanding industry and improve the quality, safety and timely completion of laboratory facilities in accordance with customer requirements.

SEFA Standards

SEFA and its committees are active in the development of Standards having domestic and international applications. Standards are developed by the association taking into account the work of other standard-writing organizations. Liaison is also maintained with government agencies in the development of their specifications.

SEFA's Standards are developed in and for the public interest. These Standards are designed to promote a better understanding between designers, architects, manufacturers, purchasers, and end-users and to assist the purchaser in selecting and specifying the proper product to meet the user's particular needs. SEFA's Standards are periodically updated. The Standards are numbered to include an annual suffix which reflects the year that they were updated. SEFA encourages architects to specify the Standard as follows: "SEFA 2-2020 Installation Standard"

PLEASE NOTE ON NOVEMBER 7, 2025 AT SEFA'S ANNUAL CONFERENCE THE MEMBERSHIP UNANIMOUSLY APPROVED CHANGING THE NAME OF THIS DOCUMENT FROM "SEFA RECOMMENDED PRACTICES" TO "SEFA STANDARD."

SEFA Glossary of Terms

SEFA has developed a Glossary of Terms which has been incorporated into this document, for the purpose of promoting a greater understanding between designers, architects, manufacturers, purchasers and end users. The terms defined by SEFA are frequently used in contracts and other documents, which attempt to define the products to be furnished or the work involved. The Association has approved this Glossary in an effort to provide uniformity among those who use these terms. Where a specific Standard contains definitions which differ from those in the Glossary of Terms, then the definitions in the specific Standard should be used.

SEFA encourages all interested parties to submit additional terms or to suggest any changes to those terms already defined by the Association. The definitions should be used to help resolve any disputes that may arise or to incorporate the applicable terms in any contract or related documents.

SEFA Disclaimer

SEFA uses its best effort to promulgate Standards for the benefit of the public in light of available information and accepted industry practices. SEFA does not guarantee, certify, or assure the safety or performance of any products, components, or systems tested, installed, or operated in accordance with SEFA Standards or that any tests conducted under its Standards will be non-hazardous or free from risk. SEFA encourages the use of third party independent testing where appropriate.

1.0 Scope

This Standard is intended to provide information about the installation practices recommended by manufacturers of scientific laboratory furniture and equipment. This information is for the use by architects, specifying engineers, contractors, and other purchasers, specifiers or end users of laboratory equipment.

2.0 Purpose

SEFA offers these Standards for use by federal agencies, architects, engineers, consultants, builders, specification writers, contractors and owners who specify and/or accept scientific laboratory furniture and equipment and its installation.

This information, if used as a guide for coordination and work sequencing, will afford the owner a quality installation of furniture consistent with economic utilization of resources employed.

This Standard is not intended to override local building codes and may conflict with certain "localized" construction practice.

3.0 Glossary of Terms

Abrasion Resistance: A measure of the resistance of the surface to wearing from articles slid across it. Can be determined by loss in weight or thickness caused by an abrasive agent moved across the surface following a fixed schedule

Acceptance Levels: The acceptance level for each performance criteria is based on the cumulative experience of actual field testing and laboratory results of SEFA members. Acceptance levels describe the expected outcome of each test procedure.

Access Opening: The part of the fume hood through which work is performed; sash or face opening.

Accessory: A component which can, at the discretion of the user be readily added, removed, or replaced and which when removed, will not

prevent the fitting from fulfilling its primary function.

Acid Storage Cabinets: Cabinets in which Acids are stored to avoid having large quantities of hazardous material in the laboratory work area. This reduces the risk of personnel injury or damage to the work area of the laboratory.

Aerator: Any of a number of types of devices designed to deliver a mixture of air and water, at a specific G.P.M. rate. (May not be allowed in certain applications or jurisdictions.)

Air Foil: Curved or angular member(s) at the fume hood entrance. A horizontal member across the lower part of the fume hood sash opening. Shaped to provide a smooth air flow into the fume chamber across the work surface.

Air Gap: The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture or other device and the flood level rim of the receptacle.

Air Volume: Quantity of air normally expressed in cubic feet per minute (cfm)

Angel Panel Mount: A type of mounting unit at a 30 degree or 45 degree angle to the table top.

Angle Stops: See angel valve

Angle Valve: A 90 degree valve, its inlet and outlet ports at 90 degrees with the operating stem at 180 degrees to the inlet port.

ANSI/ASHRAE 110-2016: A fume hood performance test developed and promulgated by the American Society of Heating, Refrigerating, and Air Conditioning Engineers and The American National Standards Institute.

ANSI/BIFMA: ANSI is the American National Standards Institute. Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer. BIFMA is the Business and Institutional Furniture Manufacturer's Association, an association of manufacturers of desk products and the like.

Anti-Siphon Vacuum Breaker: A device or means to prevent back siphonage of water. (See Vacuum Breaker; check local codes for use and applications for vacuum breaker types).

Apparatus: A machine or group of machines and accessories.

Approved: Acceptable to the authority having jurisdiction.

Arithmetic Mean: A number obtained by dividing the sum of a set of quantities by the number of quantities in a set; average.

Aspirator: A device supplied with fluid under positive pressure which passes through an integral orifice or “construction” causing a partial vacuum. (Check local codes for use and applications for vacuum breaker types.)

ASTM: American Society for Testing and Materials.

Authority Having Jurisdiction: An organization, office or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, and installation, or a procedure.

Auxiliary Air: Supply or supplemental air delivered to a laboratory fume hood to reduce room air consumption.

Baffle: Panel located across the rear wall of the fume hood chamber interior and directs the air flow through the fume chamber.

Ball Type Valve: Valve used for the purpose of controlling gases or water. The seal is achieved by the use of a spherical “ball” which is positioned between two (2) gasket type devices which are within body housing and prevent bypass of fluids or vapors.

Base Cabinets: A base cabinet is a storage device consisting of two ends, a back, and a face. The face may be open, to access the storage area, or may be outfitted with one or more drawers and/or door(s). The base cabinet may or may not include a top. A base cabinet is always mounted on the floor and normally supports a surface.

The top surface is normally no more than 42” (1,066.8mm) off the floor surface.

Blower: Air moving device, sometimes called a fan, consisting of a motor, impeller and housing.

Broom Clean: A condition in an interior area in which surface debris has been removed by dry methods.

BS 7258: A fume hood containment test developed by the British Standard Association, used in most commonwealth countries.

Built-In Fitting: A fitting, the body of which is concealed behind the finished wall.

Bypass: Compensating opening in a fume hood that functions to maintain face velocity as the sash is raised or lowered.

Cabinet Depth (Deep): Given a front, bottom, two sides, and a top, the cabinet depth is a measure of the side of the cabinet, in its normal upright position, from the back to the front.

Cabinet Height: Given a front, bottom, two sides, and a top, the cabinet height of the side of the cabinet in its normal upright position, from the bottom to the top, excluding any additional surface.

Cabinet Width: Given a front, bottom, two sides, and a top, the cabinet width is a measure of the front of the cabinet in its normal upright position from one side to the other.

California Type Hood: A rectangular enclosure used to house distillation apparatus that can provide visibility from all sides with horizontal sliding access doors along the length of the assembly.

Canopy Hood: Ventilating enclosure suspended above work area to exhaust heat, vapor or odors. This device is not a laboratory fume hood, rather is defined as a laboratory exhaust device.

Capture Velocity: Speed of air flowing past the face opening through a fume chamber / laboratory exhaust device at a speed necessary to capture generated fume vapors and/ or

particulates and directed to the exhaust outlet. Measured in feet per minute (fpm) or meter per second (mps).

Casework: Base and wall cabinets, display fixtures, and storage shelves. The generic term for both “boxes” and special desks, reception counters, nurses stations and the like. Generally includes the tops and work surfaces.

Celcon®: An acetyl copolymer used for distilled water. Celcon® is a high strength, crystalline, thermoplastic resin that contains properties to resist chemicals most commonly used in laboratories, and producing low leachate levels.

Centerset Fitting: An exposed combination supply fitting for assembly through the top or deck of a fixture.

Chase (Plumbing Area): Space located behind the back of the base cabinet or in a vertical enclosure used to house plumbing or electric lines.

Char Resistance: The ability of a top to withstand surface deterioration due to elevated temperatures.

Check Valve: A valve that permits flow in one direction, but that closes automatically to retard or obstruct the flow of fluid in a reverse direction.

Cold Rolled Steel: Sometimes referred to as Cold Drawn. Cold Drawn is the process of cold forming steel parts wherein plastic flow occurs over a curved axis.

Cold Water: For test purposes, water at a temperature of 40 degrees F. to 70 degrees F. (5 degrees C. to 21 degrees C.)

Composition Core: A core material using particleboard.

Combination Faucet: A supply fitting with more than one supply inlet delivering a mixture of hot and cold water through a single spout.

Combination Hood: A fume hood assembly containing a bench hood section and a walk-in section.

Combination Sash: A fume hood sash with a framed member that moves, vertically housing two or more horizontal sliding transparent viewing panels.

Combination Unit: A base unit of the type that has both doors(s) and drawer(s)

Combination Fitting or Faucet: A supply fitting with more than one supply inlet delivering a mixture of hot and cold water through a single spout. May also be referred to as a “mixing faucet.”

Concealed Fittings: A fitting with body mounted beneath or behind the fixture or table top.

Corrosion Resistant Finishes: Corrosion resistant finishes are organic coated finishes applied to all exposed surfaces of laboratory products such as service fitting, either colored or clear. The finish can be epoxy, epoxy/polyester hybrid, or polyester.

Counter Mounted Cabinet: A counter mounted cabinet is a wall cabinet [usually with a height of approximately 48” (1,219.2mm)] and is typically mounted on the work surface or shelf, as in a reagent shelf)

Countertop: Work surface resting on a base cabinet normally 36” (91.4cm) high for standing, 34” (86.4cm) for ADA or 30” (76.2cm) for seated height.

Critical Level: The level at which polluted water, entering through an outlet from the supply fitting, will flow back to the supply lines by gravity and/or any negative pressure in the supply line when the water control valve is wide or fully open.

Cross Drafts: Air draft that flows parallel to or across the face opening of the fume hood.

Cupboard (Door Unit): The portion of the cabinet with no drawer(s) and may be enclosed by door(s).

Customer: Can be any one or combination of these listed: Architect, Buyers, Contractors, Engineers, End Users, Specifying Engineers, Purchasers, Construction Managers or Owners.

Damper: Device installed in a duct to control air flow volume.

Delivered and Installed: The Laboratory Furniture and Equipment Contractor shall be responsible for coordinating the shipment and shall file freight damage claims as necessary. Materials may be shipped FOB origin factory or FOB destination, please refer to proposal or contract for details.

Demonstration Hood: A vented enclosure used for student demonstrations that has visibility on at least two sides, used primarily in schools. This device is not a laboratory fume hood, but is considered to be a laboratory exhaust device.

Density: The weight of one cubic inch of finished material (or gr per cc).

Dilution Tank: Tank basins in which highly concentrated wastes are mixed with wastes from other laboratory areas to produce diluted solutions.

Distillation Hoods: A laboratory fume hood that provides a work surface approximately 18 inches (45.7 cm) (0.457 m) above the room floor, to accommodate tall apparatus.

Double Ledge Faucet: Single shank water faucet which supplies hot and cold water to a sink or other location where required.

Double Panel Flange: Similar to single panel flange but with two outlets.

Drain Line: The pipe or tubing used to connect the sink tail piece or trap to the building / plumbing waste line.

Drawer: A sliding storage box or receptacle opened by pulling out and closed by pushing in.

Dual Entry Hood: A bench type fume hood that has two sash openings, usually on opposite sides.

Duct: Round, square, oval or rectangular tube used to enclose moving air.

Duct Velocity: Speed of air moving in a duct, usually expressed in feet per minute (fpm) or

meters per seconds (mps)

Elbow: A fitting that forms an angular bend.

Electrical Service Fixture: Outlet or other electrical device directly attached to the laboratory furniture and equipment.

Emergency Spray Unit: A flexible hose type device used for flushing the face or clothing of person who accidentally comes into contact with acid or similar dangerous substances.

Exhaust Collar: Connection point between duct and fume hood through which all exhaust air passes.

Exposed Fitting: A fitting where the body is mounted on or above the finished surface.

Face: Front access or sash opening of laboratory fume hood. Face opening measured in width and height. See sash or access opening.

Face Velocity: Average speed of air flowing perpendicular to the face opening and into the fume chamber of the fume hood and expressed in feet per minute (fpm), measured at the plane of the face or sash opening.

Fan: Air moving device, usually called a blower, consisting of a motor, impeller and housing.

Faucet: A valve device designed to control and/or guide the flow of water.

Filler Panel: A panel used to close an open area between a unit and a wall or between two units.

Filter: Device to remove particles from air.

Fitting: See Service Fitting

Fixture: A sink or receptacle that receives water or water-borne waste and discharges into a drainage system. Note: The term fixture has long been used in the laboratory field to describe a service fitting. (See: Service Fitting.)

Flame Resistance: The ability of the material to withstand flame spread.

Flammable/Solvent storage cabinets:

Cabinets in which heat ignitable materials are stored to resist exposure to ignition sources and restrict access to unauthorized personnel if lockable.

Flange-Faucet: A faucet flared out as in a flange shape so as to cover over edges of mounting holes or to provide a support.

Flood Level Rim: The flood level rim is the top edge of a receptacle over which water would overflow.

Foot Valve: A water control device operated by one's foot. (Also see: Pedal Valve.)

Free on Board Destination: F.O.B. destination, freight prepaid. The laboratory Furniture and Equipment Contractor shall pay freight costs. Customer accepts title and equipment at F.O.B point of the job site and laboratory supplier is responsible for filing and collecting freight claims.

Free on Board Origin: F.O.B. origin, freight prepaid and added to invoice. The laboratory Furniture and Equipment Contractor shall prepay freight cost and include it as a separate invoice item. Customer accepts title and equipment at F.O.B point loaded onboard transportation vehicle. Customer is responsible for filing and collecting freight claims.

Free Standing: Requiring no support or fastening to other structures.

Front Load Valve: Valves usually installed in the walls of fume hoods for controlling gases or water, with the handle and cartridge having access from the face of the hood, without the need to remove the entire valve from the hood.

Fuel Gas: A gas used to supply heat.

Fume Chamber: The interior of the fume hood measured in width, depth, and height constructed of material suitable for intended use.

Fume Removal System: A fume hood exhaust engineered device to effectively move air and fumes consistently through laboratory exhaust device, duct and exhaust blower.

Note: Room air, make-up air, auxiliary air (if used) and pollution-abating devices (if used) are integral parts of a properly functioning system and should be considered when designing a fume removal system.

Furnish: Supply to contractors; not installed by Laboratory Furniture Equipment Manufacturer or local representative.

Gas Cock: A ground key or ball type shutoff valve used to control the flow of gas services, low pressure air or vacuum.

Glove Box: Total enclosure used to confine and contain hazardous materials with operator access by means of gloved portals or other limited openings; this device is not a laboratory lab exhaust device or fume hood.

Gooseneck: A piece of pipe or tubing the shape of which conforms to the letter "U", is part of a faucet or fixture, and whose function is to direct the flow of water and other laboratory services to a certain point. It may be of the rigid or swivel type.

Grounds/Blocking : Reinforcement within walls to provide adequate anchorage for wall-hung or secured equipment. Specific material to be determined by the structural designer.

Ha Test: This is an abrasion resistance test in which an abrasive wheel with uniform predetermined weight is applied against the surface for a predetermined time to establish the depth of penetration.

Hand Tools: Tools, such as a screwdriver, key wrench, flat-jawed wrench, strap wrench and pliers, which are normally carried by tradesmen for installation and maintenance.

Hardness: A measure of resistance of the surface and body of the material to denting or scratching, determined by the diameter (or depth) of a spherical (or other) point pressed against the surface with known load or the width of a groove produced by a tool of known contour.

Hardware: Manufactured articles used in producing and installing cabinets. Such articles

include items such as screws, pulls, hinges, and drawer slides.

Hazardous Storage Cabinets: General term for cabinets that control and restrict access to chemicals that might be harmful or dangerous to students or other personnel not qualified to have access. These chemicals may include but are not limited to Corrosives, Acids, Bases and other chemicals found in the Laboratory

Heat Resistance: The temperature that a top can withstand heat without deteriorating.

High Density Shielding: A barrier made of lead.

High Pressure Laminate: Laminated thermosetting decorative sheets for lamination to a selected core for panel, shelf and top constructions.

Hose Cock: A ground key, needle type or ball type shutoff valve used to control the flow of air, vacuum or gas services.

Imbalance: Condition in which ratio of quantities of supply air is greater or lesser than the exhaust air.

Impact Resistance: A measure of toughness that is determined by the energy absorbed in causing a fracture under an impact blow.

Index Button: An indicator of the services being supplied by the fitting to which it is attached. Normally color coded.

Integral Vacuum Breakers: A vacuum breaker which is formed as a unit with the faucet gooseneck. (Check application for local codes.)

Job Site: Physical location or building site where laboratory furniture is to be installed.

Joinery: The junction of two pieces of material intended to be permanently connected.

Knee Space Panel: A panel used to close the area under an apron, to enclose the plumbing space, or to shield the knee space area.

Laboratory Furniture: Furniture designed, manufactured and tested for installation and used in a laboratory.

Laboratory Furniture and Equipment: The casework, fume hoods, work surfaces, sinks, fixtures, shelves, and associated hardware as detailed.

Laboratory work area – The main area of the laboratory used during experiments, testing or teaching.

Laminate: A product made by bonding together two or more layers (laminations) of material or materials.

Laminar Flow Cabinets: Name applied to clean bench or biological enclosures. This device is not a laboratory exhaust device.

Latch: A piece of hardware designed to hold a door or drawer closed.

Leveling Screws (Levelers): Threaded components designed to allow adjustment of the cabinet vertically as needed for leveling.

Liner: Interior lining used for side, back and top enclosure panels, exhaust plenum and baffle system of a laboratory fume hood or chemical resistant cabinet.

Make-Up Air: Air needed to replace the air taken from the room by laboratory fume hood(s) and other air exhausting devices.

Manifold: A fitting or pipe with many outlets or connections relatively close together.

Manometer: Device used to measure air pressure differential, usually calibrated in inches of water.

May: When used indicates an alternate requirement or option.

Medium Density Fiberwood (MDF): Wood particles reduced to fibers in a moderate pressure steam vessel combined with a resin and bonded together under heat and pressure.

Mixing Valve: A valve or faucet designed to mix liquids by means of automatic or manual regulation.

Monel: An alloy of approximately 67% nickel, 28% copper and 5% other elements that is made by direct reduction from ore in which the constituent metals occur in these proportions.

Needle Hose Cock: A control device in which the opening, consisting of a small hole, is opened or closed by a needle or cone that is thrust into or is withdrawn from the hole. Normally used for fine control and/or high pressure gases.

Negative Air Pressure: Air pressure lower than ambient.

Neutralization Tank: Tanks that can be charged with marble or limestone chips with a high, (90%+), calcium carbonate content. As wastes are discharged into the unit, chips will react with the acid to form less corrosive materials.

Nipple: A short piece of threaded pipe.

Nominal Dimensions: Not all cabinet manufactures produce product to the identical dimensions. All dimensions given in this document are accurate to within five percent, which is considered nominal.

Nozzle: The outlet from a faucet or hose so designed so that the issuing stream of water is thrown in a shape or size different from the diameter of the pipe.

Panel Flange: A type of mounting unit used where the back panel is constructed at a 90 degree angle to the table top.

Particleboard: A generic term for a panel manufactured from lignocellulosic material—commonly wood—essentially in the form of particles (as distinct from fibers) These materials are bonded together with synthetic resin or other suitable binder, under heat and pressure, by a process wherein the inter-particle bonds are created wholly by added binder.

Particulate Matter: Small, light-weight particles that will be airborne in low velocity air

[approximately 50 fpm (.25 m/s)].

Pedal Valve: A device used to operate valves by means of the foot, may be either single or double, floor, ledge or wall mounted.

Pedestal: See Turret.

Permanent Damage: Destruction to material or joinery that would require repair in order to return to its original state.

Permanent Deformation: Deflection that has exceeded the limits of the product, thus changing the original shape of the product.

Permanent Deterioration: Erosion or corrosion of material such that the components will never return to the original shape of the material or product.

Permanent Failure: See “permanent damage”

Pipe Support: A rack of framework located in the service chase way used to support the service lines.

Pitot Tube: Device used to measure air pressure differential, usually calibrated in inches of water.

Plenum Chamber: Chamber used to equalize air flow.

Polyethylene: A plastic polymer of ethylene used chiefly for containers, fittings, sinks and interior fume hood liner.

Polypropylene: Material is a polyolefin which is generally high in chemical resistance. Material should conform to ASTM D-2146. This material is commonly used for acid waste piping as well as for deionized water.

Polyvinyl Chloride (PVC): A water insoluble, thermoplastic resin derived by the polymerization of vinyl chloride used chiefly for containers, fittings and piping.

Polyvinylidene Fluoride (PVDF): Material is a strong and abrasion resistant fluoropolymer. It is chemically resistant to most acids, bases and organic solvents, and is the preferred material for

pipng and faucets for ultra-pure water. Pure PVDF is an opaque white resin that is resistant to UV radiation, and is superior for non-contaminating applications.

Positive Air Pressure: Air pressure higher than ambient.

Potable Water: Water which is satisfactory for drinking, culinary and domestic purpose, and meets the requirements of the Health Authority having jurisdiction.

Pressure Gauge: Instrument for measuring the pressure of fluids, gases or air.

Pressure Regulator: Any device by means of which pressure may be regulated.

Primary Outlet: The outlet from the fitting on the discharge side of the valve.

Proper Authorities: The party(ies) designated by contract to approve additions, changes, or deletions to contracts, plans or specifications.

Pulls: Articles used to grasp the door or drawer (see also hardware).

Quick Connect: A device used in place of the serrated tip where quick connect and disconnect requirements are needed for water, air and non-corrosive gases.

Rack Resistance: The ability of a desk product to resist stresses that tend to make the product distort and the drawers become misaligned.

Rail: A bar extending from one side of a cabinet to the other.

Reagent: A substance used because of its chemical or biological activity.

Reagent Rack: A shelf, or shelves, provided at the back of wall assembly, or down the middle of center tables, island or peninsulas to provide storage for reagent bottles, with provision made for the support of mechanical or electrical service lines and service fittings as needed.

Reasonably: When used indicates using fair, and sensible methods within accepted industry standards and guidelines.

Related Equipment - Items not generally manufactured by the Scientific Equipment and Furniture Supplier, (SEF supplier), but furnished and/or installed as part of the SEF supplier's contract. These may consist of but are not limited to: instrumentation, environmental rooms, refrigeration systems, laboratory apparatus, etc.

Remote Control Valves: Valves usually installed in the service chase area of fume hoods with the control handles normally on the face of the hood which regulates and controls the flow of the services to the outlets in the interior of the fume hood.

Removable Back: A panel located on the inside back of the base cabinet which is removable in order to gain access to the service chase area.

Renewable Seat: A seat in a valve which can be removed and replaced with a tool.

Replaceable Interior Unit: A cartridge type assembly containing all the working parts of a valve.

Room Air: That portion of the exhaust air taken from the room.

Rough-Ins: The location for the point of connection for plumbing, electrical, or mechanical services within the casework service tunnel/ chase shall be located within fifteen feet (15') or as stated by local codes, whichever is less, of the final fixture location.

Rough-In Point: Individual or common supply of mechanical, electrical and heating, ventilating and air conditioning through wall, floor or ceiling, located within the equipment chase.

RTV Silicone Sealant: Silicone is an organic silicon compound highly resistant to heat, water, etc. Sealant hardens when exposed to air. RTV means, "room temperature vulcanizing" and will harden or cure without a heat gun or other heat source. Will form a permanent elastic watertight

and weatherproof bond to many surfaces, such as glass, ceramic, metals, painted surfaces and plastics.

Sash: Moveable panel at the access opening of a laboratory fume hood.

Scientific Equipment and Furniture Supplier (SEF Supplier): Manufacturer, dealer, distributor or agents who provide laboratory furniture, equipment and fume hoods.

Shall: Where used, indicates a mandatory requirement.

Should: Where used indicates recommendation.

Sink Outlet: A flanged fitting that is recessed and sealed into the sink bottom to provide means of connecting sink to drainage system.

Scribe: A strip of matching material that is fitted to the wall on one edge and fastened to the casework on the other to make a tight enclosure to the structure next to it when casework abuts the walls, column, etc.

Scrubber, Fume: A device used to remove contaminants from fume hood exhaust.

Seat Disc: A disc or washer which when compressed against the seat makes a water tight joint.

Seat Faucet: The surface around or within the orifice in the faucet through which water or other liquid flows and against which the closing member, such as stem washer, is pressed or seated to terminate the flow.

Secondary Outlet: Any outlet from the fitting other than primary outlet, on the discharge side of the valve through which water may be discharged.

Self-Closing Faucet: A faucet which closes automatically when the faucet handle is released.

Serrated Tip (Nozzle): An outlet straight or angled, of graduated serrations which will accommodate laboratory hoses used in experimentation.

Service: The supplying of utilities or commodities such as water, air, gas, vacuum, and steam as required in hospital or laboratory functions.

Service Fittings and Fixtures: Service fittings include oxygen, gas, air, vacuum, and steam cocks, turrets, hot, cold and distilled water faucets, remote controlled valves, filter pumps, vacuum breakers, eye washers, shower heads, steam cones and steam baths, sinks, cup sinks, traps and plaster traps. Service fixtures include electrical convenience outlet boxes, electrical pedestals, "C" type conduits, single or duplex A.C. or D.C. receptacles, switches, variable voltage units and fluorescent tubes.

Service Fixture: Item of laboratory plumbing mounted on or fastened to laboratory fume hood.

Service Line: Pipe or tubing used to convey the service, gas or liquid, from the building service line to the service fitting on the laboratory furniture or equipment.

Service Strip: A rack or framework used to support the service line.

Service Tunnel or Service Chase: Area in back of or between the backs of base cabinets, under the working surface or within vertical voids provided to allow room for several lines.

Service Turret: An enclosure that projects above the table top to provide room for the service line to be brought up through the table top or be connected to the service fittings that are mounted on the outside of the enclosure.

Service Umbilical: A fully enclosed chase containing service lines extending from the ceiling area above the laboratory bench into the service tunnel of the same laboratory bench.

Shall: Where used indicates a mandatory feature.

Significant Surface: A finished exposed surface which if marred would spoil the appearance of the fitting.

Single Control Mixing Valve: A fitting with a single control which shall serve to turn water on

and off and to regulate volume and temperate flow.

Sink Outlet: A flanged fitting that is recessed and sealed into the sink bottom to provide means of connecting sink to drainage system.

Slot Velocity: Speed of air moving through slotted openings in lab exhaust devices such as fume hood baffle openings.
different products.

Smoke Candle: Smoke producing device used to allow visual observation of air flow.

Spot Collector: A small, localized ventilation hood usually connected by a flexible duct to an exhaust fan. This device is not a laboratory fume hood and should be considered a lab exhaust device.

Stainless Steel: Iron based alloys containing more chromium than the 12% necessary to produce passivity (less reactive), but less than 30%.

Static Pressure: Air pressure in laboratory fume hood or duct, usually expressed in inches of water.

Static Pressure Loss: Measurement of resistance created when air moves through a duct or exhaust device usually expressed in inches of water.

Stops: Valves used for the purpose of controlling the flow of water and which are part of the distributive plumbing system except as otherwise determined.

Straight Stops: See Straight Valves.

Straight Valves: Straightway valves used for laboratory services such as gas, air, water and steam which have their inlet and outlet port at a position 180 degrees from each other.

Strength: Known variously as "modulus of rupture" or "flexural strength:" and is an ultimate or breaking strength. Generally measured by supporting a strip of material across two supports and applying a load between these supports. By computation the strength values can be used

to determine the load-carrying ability of the product and may be used to compare strengths of different products.

Submersion: Immersed in water.

Superstructure: The portion of a laboratory fume hood that is supported by the work surface.

Supplemental Air: Supply or auxiliary air delivered to a laboratory fume hood to reduce room air consumption. (Refer to local codes for proper application.)

Supply Nipple & Lock Nut: The threaded connecting units used for deck or panel mounting of laboratory fittings.

Supply Stops: For the purpose of controlling the flow of water and which are a part of the distributive plumbing system immediately adjacent to, or a part of, and preceding a fitting.

Tables: An article of furniture having a flat, horizontal surface supported by one or more support members (legs), and a frame (apron).

Table Top Hood: A small, spot ventilation hood for mounting on table tops. Used primarily in educational laboratories. This device is not a laboratory fume hood but could be considered an exhaust device.

Tall Cabinet (Full Height Unit): A tall cabinet is a storage device that consists of two ends, a back and a face. The face may be open to access the storage area or may be outfitted with one or more drawers and/or door(s). A tall cabinet is always mounted on the floor and is typically 84" (2,133.6mm) high.

Tail Piece: The connecting fitting used to connect the sink outlet to trap or drain line. Tail piece may be an integral part of the sink outlet or a separate piece.

Tank Nipple: See Supply Nipple.

Thermal Anemometer: A device for measuring fume hood velocity utilizing the principle of thermal cooling of a heated element as the detection element.

Thermal Shock: The ability of material to withstand sudden changes in temperature without cracking or spalling.

Threshold Limit Value-Time Weighted Average (TLV-TWA): The time-weighted average concentration for a normal 8-hour workday or 40-hour week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

Titanium Tetrachloride: Chemical that generates white fumes used in testing laboratory fume hoods.

Torsion: The state of being twisted.

Total Pressure: Algebraic sum of velocity pressure and static pressure.

Toxic Resistance: The ability of a top to withstand emission of a toxic substance, if any, during chemical process.

Transport Velocity: Minimum speed of air required to support and carry particles in an air stream.

Turret: Type of mounting which allows the use of (1)-(2)-(3)-(4) hose cocks, needle hose cocks or straight stops, where installation of same are required either on the table top, back, or panel.

Uniformly Distributed: The application of forces such that weight is evenly applied to the subject surface even as the surface deflects.

Unobstructed Entry: A cabinet is deemed to be unobstructed if access to the entire storage area is completely without obstacle.

Upright Position: A cabinet oriented in its intended position.

Vacuum Breaker: A device to prevent the creation of a vacuum by admitting air at atmospheric pressure, used to prevent back siphonage.

Valve: A device by which the flow may be started, stopped, or regulated by a moveable part which opens or obstructs the passage.

Valve Seat: The port or ports against or into which a disc or tapered stem is compressed or inserted to stop flow of fluid or gas.

Velocity Pressure: Pressure caused by moving air in a laboratory fume hood or duct, usually expressed in inches of water.

Vent: Ducting or piping system designed to remove or change the air in an enclosed space like storage cabinets.

Walk-In Hood: A floor-mounted, full-height fume hood, designed to accommodate tall apparatus and permit roll-in of instruments and equipment.

Wall Cabinet: A wall cabinet is a storage device consisting of two ends, a back, a top, bottom, and a face. The face may be open to access the storage areas or may be outfitted with one or more door(s). The wall cabinet usually does not include a drawer. A wall cabinet is always mounted on a vertical surface such as a wall, a divider, panel or some other vertical structure. A wall cabinet is usually less than 48" (1,219.2mm) high.

Water: The liquid that descends from the clouds as rain; forms streams, lakes and seas; issues from the ground in springs, and is a major constituent of all living matter, and when pure, consists of an oxide of hydrogen H₂O, in the proportion of two atoms of hydrogen to one atom of oxygen. It is an odorless, tasteless, very slightly compressible liquid which appears bluish in thick layers. Freezes at 0 degrees C. and boils at 100 degrees C., and has a maximum density of 4 degrees C. and a high specific heat, contains very small equal concentrations of hydrogen ions, reacts neutrally and constitutes a poor conductor of electricity, a good ionizing agent.

Water Absorption: The percentage gain in weight of material immersed in water for a specified time. When the specific gravity of the product is known, water absorption can be used to determine the total void space. The absorption is neither a measure of the rate nor amount of chemical attack.

Water Outlet: A water outlet, as used in

connection with the water distributing system, is the discharge opening for the water.

Weather Cap: Device used at the top of an exhaust stack to prevent rain from entering the stack end.

Work Space (Fume Hood): The part of the fume hood interior where apparatus is set up and fumes are generated. It is normally confined to a space extending from six inches (15.2 cm) (152mm) behind the plane of the sash(es) to the face of the baffle, and extending from the work surface to a place parallel with the top edge of the access opening.

Work Surface: The surface that a laboratory fume hood is located on and supported by a base cabinet. In the fume chamber the surface is recessed to contain spills.

Wrist Action Handle: A means of controlling a valve with the wrist or forearm.

Wye Fitting: Similar to double panel flange, but outlets are at 90 degrees or less.

4.0 Pre-installation Planning and Coordination

Delivery and installation schedule coordination

Upon contract award, it is the responsibility of the general contractor or owner to provide the laboratory casework supplier/installer with a detailed project schedule. It is also the responsibility of the GC or owner to make and communicate regular updates to the project schedule. If a detailed project schedule is not provided by the GC or owner the casework supplier/installer's schedule will dictate the sequence, delivery schedule and installation of work.

4.1 Site Access

The customer shall provide the SEF supplier and installer with a site logistics plan. The logistics plan shall identify the requirements and limitations for products being delivered to the site and moved through the building to its final location. Examples

of topics covered in the logistics plan include the availability of a loading dock at the project site, limitations of truck size, elevator or lift size restrictions, and door or turn radius restrictions within the building, maximum crate or package size, etc.

4.2 Building Finish

Upon delivery of equipment to the job site, it shall be possible for complete distribution and commencement of the physical installation in the rooms where the equipment is designated to be installed. In order to ensure an orderly installation and to avoid damage to finished products, the following degree of building finish shall be completed prior to installation of furniture and equipment:

4.2.1 Floors

Floors within the area of casework installation are to be broom clean and free of obstruction. It is the responsibility of the general contractor or owner, to provide adequate pathways and work areas that allow for distribution of the laboratory casework in an efficient manner, to facilitate a quality installation. It is recommended that laboratory furniture and equipment is installed on finished flooring. The levelness and flatness of the floor is a critical factor in the fit and finish of the laboratory base cabinets and countertops. Prior to the start of the installation, the customer should verify the F-numbers for the floor flatness meet the project requirements but are no less than an FF 25 as defined by the American Concrete Institute ACI 117. The laboratory floor shall be level to within 1/8" in 10 feet in any direction. Any required corrections to the floor condition shall be by others and not the responsibility of SEF supplier.

4.2.2 Wall Systems –

It is the responsibility of the general contractor to provide and install proper wall blocking in the proper locations to support the laboratory casework system. Prior to the start of the installation of laboratory furniture and equipment, it is recommended that wall systems shall be completely installed and be plumb for installation of lab furniture and equipment. Wall system finish

shall be complete, but shall include, at a minimum, a prime coat of paint, appropriate with respect to the specifications. Sheetrock walls, modular steel wall systems or other hollow walls shall include horizontal bracing (in-wall blocking) supplied and installed by others for support of wall cases, and equipment shelving as shown in submitted drawings or required by local code.

4.2.3 Ceiling System

Prior to the start of the installation of laboratory furniture and equipment, it is recommended that the ceiling system shall be in a finished condition. For suspended ceiling systems, at a minimum it is recommended that the support ceiling grid is installed prior to the start of the installation of laboratory furniture and equipment. It is also recommended that air conditioning grilles, call systems and permanent sprinkler heads shall be installed.

4.2.4 Branch Electrical Circuits

Prior to the start of the installation of laboratory furniture and equipment, it is recommended that branch electrical circuits, including grounding conductors, shall be in place.

4.2.5 Overhead Electrical Fixtures

Prior to the start of the installation of laboratory furniture and equipment, it is recommended that overhead electrical fixtures shall be installed and connected. The customer shall be responsible for ensuring that adequate lighting is provided for areas where the installation of laboratory furniture and equipment shall take place.

4.2.6 Overhead Mechanical Lines

Prior to the start of the installation of laboratory furniture and equipment, it is recommended that overhead mechanical lines shall be tested for leaks before finished furniture is installed in any area. Where mechanical, electrical and H.V.A.C. service lines will be behind, above or under furniture installed in designated locations, service access or stubs shall be installed and tested at the appropriate rough-in point.

4.2.7 Service Lines

Service lines for water, steam, gas and special gases shall be flushed clean of contaminants, capped and tested for leaks prior to the connection of service fittings. It is recommended that water be available in or near the rooms where counter tops are designated to be installed.

4.2.8 Environmental Conditions

Prior to the start of the installation of laboratory furniture and equipment, it is recommended that the building shall be secure and watertight. Exterior glazing and doors shall be installed providing protection from the elements and security for finished equipment and furniture. General conditions indicating readiness for delivery and installation include: Overhead ceiling work, ductwork, lighting, insulation, etc. are complete, air handling and control systems are functioning and relatively constant temperature and humidity conditions are being maintained through owner acceptance. Temperature and humidity ranges of 65-80° F (18-27° C) and 30-50% r.h. are recommended.

4.2.9 Power Requirements

The general contractor and/or owner shall provide, at no charge to the SEF supplier; necessary electrical service and lighting for normal installation procedures. It is recommended that electrical power be available in the rooms where equipment is designated to be installed. If temporary service must be used, service extensions shall not exceed 100 feet (30 meters) in length. Power service shall conform to OSHA requirements.

4.2.10 Project Site Verification

The SEF supplier shall inspect the project site during the course of the project. The SEF supplier shall take any field measurements required to ensure the proper placement and fit of finished product at the project site. If final field dimensions are not available due to lack of final framing, the general contractor shall agree to "hold to" dimensions to allow for timely final ordering

of laboratory furniture, equipment and related material. If any field conditions or measurements vary more than 3" from the construction documents or SEF shop drawings, or any other conditions are discovered that would lead to a significant change in the finished product, the SEF supplier shall notify the customer and work together to determine the appropriate resolution. At the conclusion of the project, the SEF supplier shall provide "as-built" drawings reflecting all changes made to the products to accommodate field conditions.

4.2.11 Sustainability

SEFA is committed to sustainability; to that end it is recommended that minimization of waste to reduce disposal problems be a priority. Some ways of doing this is by minimizing packaging, blanket wrapping of product is one method as is utilization of returnable skids and pallets. Use of recyclable products will also reduce on items going to local landfills.

5.0 Receiving, Distribution, Storage and Security

5.1 Delivery Schedule and Project Site Conditions

At the start of the project, the SEF supplier shall work with the customer to develop a delivery schedule and logistics plan. The delivery schedule shall be updated as needed during the course of the project to reflect changes due to approval of shop drawings, unforeseen site conditions, or any other condition that would negatively impact timely delivery.

5.2 Delivery

All deliveries shall be scheduled and confirmed by the SEF supplier 24 hours prior to shipment. The receiving party, whether it is the SEF Supplier, his representative or the customer, shall inspect the products upon their arrival. Any damaged product or damaged containers/packaging that may contain concealed damaged products shall be noted on the bill of lading and the SEF supplier shall be informed within 48 hours, preferably with

photographic documentation, showing that the damage occurred during transit and not at the project site.

5.3 Delay of Delivery or Installation

The customer and the SEF supplier shall endeavor to coordinate the delivery schedule to the mutual benefit of both parties. Either party shall provide as much advance notice to the other in the event conditions dictate changes to the delivery schedule. If the project site is not ready to accept the products as scheduled, or if the delivery or installation of the products cannot commence in a timely manner due to conditions beyond the SEF supplier's control, casework and equipment shall be placed in an appropriate storage location. Additionally, unless otherwise agreed to, the costs for extra handling, additional shipping and unforeseen storage shall be borne by the customer. Unless otherwise agreed to, the SEF supplier shall bill the customer for the value of the completed products once they have entered the storage location. If the SEF supplier cannot deliver products to the site in accordance with the delivery schedule, the SEF supplier shall work with the customer to develop a recovery plan to bring the project back on or close to the previously agreed upon delivery schedule. If there is additional installation expense due to a compressed or accelerated schedule the additional expense shall be paid to the SEF supplier / installer by the owner or general contractor.

5.4 Distribution/Storage of Equipment

The general contractor or owner shall plan for and allow for the safe and effective distribution of the laboratory equipment. This includes consideration of proper vertical transportation above and below the unload level. Any modification to the building to allow for oversized materials shall be the responsibility of the general contractor or owner.

Distribution of the equipment within the project site, same building & same floor and in the vicinity of the products' final installation location shall be possible at the time of delivery, in accordance with the delivery schedule. If, upon mutual agreement, earlier shipment is made and the casework is

placed in temporary storage, it is to be secure from the elements, secure against damage by other trades and secure against loss. Additional cost associated with storage, multiple handling necessitated by jobsite conditions shall be borne by the customer. For products that are furnished by the SEF supplier which are to be turned over to others at the project site, the SEF supplier and the customer shall coordinate the availability of the receiving party to take receipt and ownership of products immediately upon their arrival at the project site. In the event the receiving party is not able or available to take receipt of products, the customer shall immediately take receipt of the turnover products and shall be responsible for the distribution of said products to the appropriate party.

5.5 Security

Project/jobsite security and protection shall be the responsibility of the general contractor and/or the customer. The SEF supplier shall take all reasonable precautions to ensure their products and tools are secured and protected for the duration of the project.

6.0 Installation Sequence Coordination with other Trades

The SEF supplier shall inspect the project site during the course of the project. The SEF supplier shall take any field measurements required to ensure the proper placement and fit of finished product at the project site. If any field conditions or measurements vary more than 3" from the construction documents or SEF shop drawings, or any other conditions are discovered that would lead to a significant change in the finished product, the SEF supplier shall notify the customer and work together to determine the appropriate resolution. At the conclusion of the project, the SEF supplier shall provide "as-built" drawings reflecting all changes made to the products to accommodate field conditions.

6.1 Scientific Equipment and Furniture Supplier (SEF Supplier)

The installation of Scientific Equipment and Furniture is primarily a carpentry trade. The specific scope of work for which the SEF Supplier shall be responsible for is dictated by the customer and project requirements and shall be outlined and agreed to prior to the placement of an order. In the course of a typical project, the SEF supplier may be required to cooperate and coordinate activities with the customer, the design team, the owner/occupant, contractors and with other trades. The SEF supplier shall endeavor to work harmoniously with all other parties at the project site. It is ultimately the responsibility of the customer to coordinate and mediate any conflicts among all of the trades at the project site, in accordance with the project requirements.

6.2 Mechanical and Electrical Trades

Where access is required through installed or partially installed laboratory furniture and equipment, unless otherwise agreed to, it shall be the service trades responsibility to remove said access panels/drawers, etc., where they occur, and properly replace such access panels/drawers at their own expense. The SEF supplier shall provide guidance and training, if required, to help ensure the access attained by others through the SEF supplier's products at the project site does not compromise the functionality, finish or performance of the SEF supplier's products nor does it impact the warranty coverage. The SEF supplier and the mechanical trades shall cooperate in order to maintain job continuity.

6.3 Protection of Finished Surfaces

Casework, including tables and mobile or movable cabinets and benches are considered to be finished products and shall be respected by all trades. The SEF supplier shall protect the products during the course of the project as dictated by the project requirements. The SEF supplier's products shall not be utilized by anyone at the project site as, or in lieu of, ladders, scaffolding, saw horses, storage containers, tool boxes, work tables, cutting surfaces, etc.

At no time shall the work surfaces be walked on. The general contractor is responsible for security and protection of the completed portions of the project site until the space is turned over to the owner/occupant. Liability for damage shall be borne by the damaging party. If it is indeterminable who caused the damage, it shall be the responsibility of the customer.

7.0 Installation Procedures

7.1 Installer Qualification

The installer shall have at least five years of continuous experience installing laboratory equipment using professional and accepted trade practices and be familiar with SEFA's Standards. The installer may also be certified by a Scientific Equipment and Furniture Association Member (manufacturer or dealer) that hires the installer to perform the required scope of work.

7.2 Safety

The SEF supplier shall make the safety of its personnel the first priority at the project site. The SEF supplier shall ensure that all personnel employed by or representing the SEF supplier obey all site safety requirements and utilize appropriate personal protection equipment at all times. If the SEF supplier observes unsafe conditions or practices at the project site, it shall stop work and report these to the customer immediately.

7.3 Casework

7.3.1 Base Cabinets

The flatness of the floor is a critical factor in the fit and finish of the laboratory base cabinets and countertops. Prior to the start of the installation, the customer should verify the F-numbers for the floor flatness meet the project requirements but are no less than an FF 25 as defined by the American Concrete Institute ACI 117. The first step in setting floor mounted base cabinets, tables and lab benches is to establish the high point of the floor in a given space. Using the high point in the floor as a datum, the first cabinets

are set and made level and plumb. Each modular unit shall have secure contact with the floor during the leveling process by the appropriate leveling device. The installer shall ensure he is following the instructions and guidelines of the manufacturer of the products, as well as the project construction documents. In the event the installer cannot install the products in accordance with these requirements for any reason, he shall contact the SEF supplier who shall work with the customer to determine an appropriate resolution. Upon completion of the base cabinet installation, the installer shall verify the function of all doors and drawers and other movable elements and related hardware, and make adjustments and corrections if required.

7.3.2 Wall Cabinets and Wall Shelving

The structural wall system, (including grounds/blocking), shall be capable of supporting the specified loads. Prior to installing wall mounted products, the installer shall verify that concealed blocking is installed in the correct location. If errors or omissions are found in the required blocking, the SEF supplier and the customer shall be notified in writing immediately. Establish the high point of the wall, and anchor the first cabinet at this point. If the wall surface varies more than 3/8-inch (10 mm) an immediate notification shall be made to the proper authorities at the job site pointing out this condition. Appropriate action shall be initiated promptly for correction of the discrepancy, at no cost to the SEF supplier/installer. Acceptable methods of fastening wall cabinets shall be as directed by the project specifications, or as standard and customary in order to provide a secure wall hung case capable of supporting specified weight loads. The cabinets shall be installed level and plumb and the faces of adjacent cabinets shall be aligned. Slotted shelf standards shall be installed level and parallel to ensure the shelves are hung level.

7.3.3 Tall Cabinets

Tall units shall be appropriately leveled with respect to the floor and secured to the wall in order to prevent tipping. Prior to installing wall mounted products, the installer shall verify that concealed blocking is installed in the correct location. If errors or omissions are found in the

required blocking, the SEF supplier and the customer shall be notified in writing immediately. The installer shall ensure he is following the instructions and guidelines of the manufacturer of the products, as well as the project construction documents. In the event the installer cannot install the products in accordance with these requirements for any reason, he shall contact the SEF supplier who shall work with the customer to determine an appropriate resolution. Upon completion of the base cabinet installation, the installer shall verify the function of all doors and drawers and other movable elements and related hardware, and make adjustments and corrections if required.

7.3.4 Tables

Tables shall be installed and set at the location and height shown on the approved shop drawing set provided by the SEF supplier.

7.3.5 Laboratory Benches

Laboratory benches that are adjustable in height shall be installed and set at the height shown on the approved shop drawing set provided by the SEF supplier. Unless otherwise agreed to with the customer, where laboratory benches are factory plumbed and/or wired with integrated utility services, the installer shall connect these services to the building feed if these connections do not require the use of tools (e.g. quick connections for hoses, straight blade or twist-lock plugs, etc.).

7.3.6 Mobile/Movable Cabinets

Cabinets that are movable or mobile shall be installed and set in place as shown on the approved shop drawing set provided by the SEF supplier.

7.3.7 Service Utility Distribution Systems

Service utility distribution systems provided by the SEF supplier (including ceiling service tiles, overhead service carriers, vertical service umbilicals, etc.) shall be installed in accordance with the approved shop drawing set and instructions provided by the SEF supplier. The SEF supplier and installer shall coordinate the

connection of the building service feeds by other trades to and through the utility distribution systems.

7.4 Hazardous Storage Cabinets and Flammable/Solvent Storage Cabinets

The installer shall ensure he is following the instructions and guidelines of the manufacturer of the products, as well as the project construction documents. In the event the installer cannot install the products in accordance with these requirements for any reason, he shall contact the SEF supplier who shall work with the customer to determine an appropriate resolution. Upon completion of the base cabinet installation, the installer shall verify the function of all doors and drawers and other movable elements and related hardware, and make adjustments and corrections if required. Often times there is limited access to the area behind these cabinets after they are installed. The installer should coordinate the installation of these products with the customer and other trades. Metal cabinets used for flammable storage shall be securely installed and grounded by appropriate trade when necessary; if flammable chemicals are being dispensed directly from a cabinet then the container must also be grounded.

7.5 Cabinet Venting

7.5.1 Venting Cabinets

The venting of flammable storage cabinets is optional. For flammable storage cabinets NFPA 30 recommends the use of metal piping if the cabinet is to be vented. The venting of corrosive storage cabinets is required to prevent the accumulation of corrosive fumes in the cabinets and to prevent the migration of corrosive fumes out of the cabinet and into the room. When a plastic product for venting of corrosive storage cabinets is specified, it is recommended that polyolefin pipe be used. – See ASTM 1412. - PVC piping is not recommended for venting, as it will burn black if ignited and produce chlorine gas. See SEFA 11 (Liquid Chemical Storage) for more specifics on cabinet venting.

7.6 Fume Hoods

7.6.1 Pre-planning for fume hood installation

The necessary coordination shall be accomplished between the SEF supplier and the, plumbing, electrical and H.V.A.C trades to ensure access is available for its work. Fully assembled fume hoods may be too large to fit through the building to reach the installation location. Prior to the start of the project, the SEF supplier and installer shall plan and coordinate with the customer how the fume hood will reach its installation location. This may include the SEF supplier shipping the hoods knocked down, the installer disassembling and reassembling the fume hoods on site or the customer leaving out or removing building elements (door jambs, windows, etc.) to allow the fume hoods to reach the installation location.

7.6.2 Installation

For bench-mounted fume hoods, the supporting table frame or cabinets shall be set in the same manner as the base cabinets. The counter tops shall be securely fastened to the understructure, as recommended by the fume hood manufacturer, and leveled. Fume hoods are typically large and heavy and it is recommended that a lift table be utilized to raise the fume hood off of the floor and position it to be set in place upon the countertop. After the fume hood superstructure is set square, plumb and secured, the understructure shall be checked to ensure that the leveling devices remains in firm contact with the floor and the superstructure shall be checked for proper sash operation. For floor-mounted fume hoods, the fume hood itself or the work surface that it rests on (if applicable) shall be shimmed and leveled as necessary to ensure the fume hood is square and plumb and the sash operates correctly.

7.6.3 MEP Connections and Air Balancing

Laboratory fume hoods with plumbing and electrical services shall be connected to the building feeds by the appropriate trades. It is critical that the proper airflow volumes through the fume hood are set and maintained to ensure proper fume hood operation. Laboratory fume

hood exhaust systems should be balanced with room exhaust systems and may be used in conjunction with room exhaust to provide the necessary room ventilation. If the laboratory control system provides for proximity sensors at the fume hoods, thereby reducing the face velocity through the open sash when users are not present at the fume hood face, fume control must still be maintained. Sufficient makeup air must be available within the laboratory to permit fume hoods to operate at their specified face velocities. The SEF supplier and installer shall cooperate with the project designated trades responsible for the HVAC connections, air balancing, airflow controls calibration and configuration.

7.6.4 Performance Testing

SEFA recommends the ANSI/ASHRAE 110 Methods of Testing Performance of Laboratory Fume Hoods for "as installed" evaluations of fume hood performance. Testing should be performed only after the airflow balancing has been completed for the fume hoods and the rest of the related HVAC systems. The airflow controls should be calibrated and configured and the room temperature controls should be set and operational prior to the start of fume hood performance testing. The customer shall be responsible for any additional costs for retesting if the hoods are tested prior to the HVAC system being fully operational and properly calibrated. It is recommended that an independent, qualified firm is hired to perform the fume hood testing to eliminate any conflict of interest that could arise from the SEF supplier testing his own products.

7.7 Work Surfaces (Counter Tops)

Laboratory work surfaces shall be leveled and shimmed as necessary. Shims under a work surface shall generally not exceed 1/8 inch, (3 mm). Appropriate fastenings shall be made after the work surface is leveled, per the work surface manufacturer's recommendations.

Connecting sections of the work surface shall be reasonably flush within the manufacturer's tolerances for the material used and respective fabrication process. Work surface shall be installed to achieve a uniform alignment of the front edge of the tops.

Overhang of counter edges, in relation to furniture and cutouts for sinks, service fittings and electrical outlets shall be consistent and as indicated on approved shop drawings and installed accordingly.

Common methods of installing work surfaces and finishing joints involve adhesive “z” clips or other mechanical devices. Slab types, (stone, epoxy, phenolic etc.), are fastened to understructures with appropriate adhesives, (silicone RTV sealant, epoxy cement, etc.). Wood, wood products core or fiber-cement tops are fastened to understructures with screws. Joints in work surfaces are typically grouted butt joints, or mechanically fastened joints. It is recommended that potable water be available in or near the rooms where counter tops are designated to be installed.

7.7.1 Mechanically Fastened Joints

Joints in plastic laminate, wood, stainless steel and similar tops shall be drawn tight and held in alignment by appropriate clamping devices such as tight joint fasteners. Appropriate sealant shall be applied to the joint surface to provide moisture, chemical resistance, and adhesive fastening. Alignment tolerances shall be +/- 0.010-inch (0.25 mm) in height of adjacent surfaces and 1/32-inch (0.8 mm) or less joint width.

7.7.2 Grouted Butt Joints

Joints in butted slab type work surfaces, (epoxy, stone, butted, phenolic etc.) shall be set to allow 1/8-inch +/- 1/16-inch (1.5 mm) joint width with adjacent surfaces aligned +/- 1/16-inch (1.5 mm) along length of joint. Joints shall be grouted with appropriate sealant, dressed neatly and smoothly. “Washout” of grout in joints shall not exceed 1/16-inch (1.5 mm).

7.7.3 Field Welded Stainless Steel Joints

Where stainless steel tops are specified to be field welded, the field joints shall be continuously welded, ground and polished to the same finish as the top. The resulting joint shall blend evenly with no buckling or discoloration.

7.8 Sink Bowls and Troughs

Appropriate sealant as specified or recommended by the SEF supplier shall be used at the joint between the work surface and sink bowls, typically silicone RTV sealant, or epoxy cement.

Under counter installations of epoxy, polyolefin or other sink bowls shall include supportive means other than the sealant as recommended by the SEF supplier.

When installing sinks at ADA locations consideration should be given to sink outlet (drain) location. Using a sink with a corner drain often facilitates ease of trap installation, as opposed to the center drain type, and keeps the plumbing out of the way of the user.

7.9 Installation of Laboratory Service Fittings

The installer responsible for the installation of laboratory service fittings shall follow good plumbing practice. Installers shall, in particular: Thoroughly clean and flush supply lines prior to installing fittings, as pipe shavings, scale and other debris can be carried through a pipe and into a faucet or valve when the plumbing system is activated. Such foreign matter can damage valve components and interfere with the proper operation of the fitting.

Secure the fitting to a counter top or wall using the locknut and lock washer provided by the manufacturer. Tighten the locknut sufficiently to secure the fitting to the counter or wall, but care shall be taken not to over-tighten.

Observe the manufacturer’s recommended test and working pressures for fittings. Testing or using a fitting at pressure for which it is not designed can result in leakage or failure.

Clean fittings using a soft cloth and soapy water. Use of abrasives, detergents or other cleaners can damage the finish on a fitting. Solvents shall not be used in or near a fitting, as solvents can dissolve lubricants used in the valve mechanism of a fitting.

Care must be used when installing the fixtures so as not to scratch the surface finish of faucets or valves. Refer to the manufacturer with regards to proper tools to remove serrated tips, aerators and aspirators with a corrosion resistant finish.

7.10 Traps and Dilution/ Neutralization Tanks

The installer responsible for installing the traps shall carefully inspect them prior to installation for all gaskets and o-rings, which may be inserted loose inside the trap to prevent these small parts from becoming lost in shipment. Connect traps to minimum 1-1/2 acid waste piping which conforms to ASTM 1412 standard.

Dilution and Neutralization tanks shall be placed on flat surfaces of sufficient strength to support the weight of a full tank. They shall never be suspended from the plumbing.

Neutralization tanks shall be placed in position, filled with water then the neutralization media added. The media shall be loaded into the tank in such a manner as to not damage the tank, the tank top, inlet and outlet connections, dip pipe, or the vent. The water added for this procedure is intended to slow down the impact of the limestone chips, but it is not necessary for the neutralization process. This neutralization material should fill the tank from its bottom to within one inch below the bottom of the outlet, and have a high, (90%+), calcium carbonate content.

Fittings marked with connections designed to be tightened by hand shall not be installed using tools or be over-tightened, as over-tightening can cause the fittings to leak.

7.11 Related Equipment

Related equipment shall be installed according to the respective manufacturer's recommended installation procedure. Care shall be exercised to protect the surfaces of all equipment, (casework- SEFA 8, tops - SEFA 3 etc.), being installed. Reference the specific SEFA Standard for the item being installed for any suggested protection methods.

8.0 Project Completion and Close-out

It shall be the responsibility of the SEF supplier or installer to remove the packaging debris and other waste resulting from its work. The area shall be, where possible, left in a "broom clean" condition. This debris shall be placed in acceptable containers, either for recycling or general disposal. Recyclable products shall be in appropriate containers by material type and not be mixed with other debris. The container or dumpster will be provided by the owner/contractor at no cost to the SEF supplier. The SEF supplier or his installer shall not be expected to clean up the debris of other trades.

8.1 Inspection Cycle

It is the responsibility of the GC or owner to provide a detailed project inspection and project punch list schedule to the laboratory casework supplier/installer within a reasonable time after installation is complete. The project inspection should not be scheduled until the laboratory casework and equipment installation has been completed.

8.2 Inspection and Punch List

Upon substantial completion of the SEF supplier's work, the customer and/or the design team shall perform an inspection of the work and create a punch list identifying any deficiencies in the work that require correction before final acceptance. The customer and design team shall make every effort to capture all deficiencies on the first punch list. Multiple revisions and piecemeal additions to the punch list can result in a delayed completion and an inefficient prosecution of corrective action. The customer shall ensure that completed areas shall be secured and access strictly limited to essential personnel only until final acceptance. Upon receipt of the punch list, the SEF supplier shall acknowledge receipt and commence with corrective action. If the SEF supplier disagrees with any of the items identified on the punch list, he shall provide a written response addressing such items to the customer, within three (3) business days of receipt of the punch list. As the installer completes items listed on the punch list

he shall secure confirmation from the customer at the project site that the punch list item has been addressed.

8.3 Final Acceptance

Once all of the open punch list items related to the SEF supplier's work are completed and confirmed by the customer, the SEF supplier shall submit the completed punch list to the customer and request final acceptance of the finished work. The customer shall issue the final acceptance to the SEF supplier in writing.

8.4 Warranties

Manufacturer's warranties apply to the equipment as installed. Unless otherwise agreed

to, the warranty term shall commence upon the occupancy of the space by the owner or the customer's final acceptance of the work, whichever occurs first. A covered defect found after final acceptance of the work, within the warranty term, shall be remedied as part of the warranty provisions of the manufacturer, as applicable. If items of equipment are separately warranted by other than the SEF supplier, the warranty documentation shall be provided to the customer for the owner's protection and used in obtaining service, if required.

