Scientific Equipment & Furniture Association
Recommended Practices

SEFA 2 - 2010
Installations

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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 Recommended Practices

SEFA and its committees are active in the development of Recommended Practices having domestic and international applications. Recommended Practices 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 Recommended Practices are developed in and for the public interest. These practices 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 Recommended Practices are periodically updated. The Recommended Practices are numbered to include an annual suffix which reflects the year that they were updated. SEFA encourages architects to specify these Recommended Practices as follows: "SEFA 2-2010"

SEFA Glossary of Terms

SEFA has developed a Glossary of Terms (SEFA 4-2010) 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 Recommended Practice contains definitions which differ from those in the Glossary of Terms, then the definitions in the specific Recommended Practice 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 Recommended Practices 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 Recommended Practices or that any tests conducted under its Recommended Practices will be non-hazardous or free from risk. SEFA encourages the use of third party independent testing where appropriate.

1.0 Scope

These Recommended Practices are 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 Recommended Practices 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.

These Recommended Practices are not intended to override local building codes and may conflict with certain "localized" construction practice.

Note To Manufacturer: 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.

3.0 Definitions

(See also SEFA 4-2010—Glossary of Terms)

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.

Approved – Acceptable to the authority having jurisdiction.

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.

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

Casework – Base and wall cabinets, display fixtures, storage shelves. The generic term for both the "boxes" and special desk, reception counters, nurses station and the like. Generally includes the tops and work surfaces.

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.

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

Flammable/Solvent storage cabinets – Cabinets in which heat ignitable materials are stored to prevent exposure to ignition sources and restrict access to unauthorized personnel.

Grounds/Blocking - Reinforcement within walls to provide adequate anchorage for wall-hung or secured equipment. May be wood (2x or ¾" plywood) or metal (18 ga. Steel or equivalent), or in accordance with local building code requirements.

Hazardous Storage Cabinets – General term for cabinets that 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

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

May - When used indicates an alternate requirement or option.

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

Proper Authorities - The party or parties designated by contract to approve additions, changes or deletions to contracts, plans, or specifications.

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.

Rough-In Point - Individual or common supply or 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.

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

Service Fitting and Fixture - Any device that controls and/or guides the flow of gas, air, vacuum, water, steam, oxygen etc. used in a laboratory. Also know as Laboratory Service Fittings.

Shall - Where used, indicates a mandatory requirement.
Should – Where used indicates recommendation.

Standard 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.

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

4.0 Job Site Conditions

4.1 Site Access

The site roadway shall be of solid base and Shall allow motor vehicle delivery if inside storage or distribution is required, to either the outside hoist, if so required, or the tailgate delivery area. When a hoist or elevator is required, it shall be installed and made available to the SEF supplier at no charge unless otherwise specified. The receiving area in the building and corridors needed for casework and equipment shall be clear of materials of other trades to make reasonable access to elevators and distribution areas free of obstructions.

4.2 Building Finish

Upon delivery of equipment to the job site, it shall be possible to allow 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 furniture, the following degree of building finish shall be completed prior to installation of furniture and equipment:

4.2.1 Floors

Floors shall be level within 1/8" (19mm) of level per 10' run, non-accumulative, when tested with a straight edge in any one direction. Floors that exceed this requirement will cause additional work during casework installation. Unacceptable gaps at floor and tolerances at scribes and fillers, due to this problem, which are detected during

inspection stages, will not be the responsibility of the SEF supplier or installer. Final floor finish shall be completed in those areas where equipment and casework is designated to be installed, or as specified in the bid documents.

4.2.2 Wall Systems

Wall Systems shall be completely installed and be plumb for installation of wall cabinets. Wall system finish shall be complete, but shall include, at a minimum, a prime coat of paint, appropriate with respect to the specifications. Wall systems shall include horizontal bracing 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

The ceiling system shall be in a finished condition.

4.2.4 Branch Electrical Circuits

Branch electrical circuits, including grounding conductors, shall be in place.

4.2.5 Air Conditioning Grilles

Air conditioning grilles, call systems and permanent sprinklers head shall be installed.

4.2.6 Overhead Electrical Fixtures

Overhead electrical fixtures shall be installed and connected. Adequate lighting shall be available.

4.2.7 Overhead Mechanical Lines

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 at the appropriate rough in point.

4.2.8 Service Lines

Service lines for water, steam, gas and special gases shall be flushed clean of dirt and chips, 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.

4.2.9 Environmental Conditions

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, acoustical ceiling, insulation, etc. is 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.

4.2.10 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.

5.0 Receiving, Distribution, Storage and Security

5.1 Delay of Installation

If Installation cannot commence in a timely manner due to conditions beyond the SEF suppliers' control, casework and equipment shall be placed in temperature and humidity controlled

storage. Additionally, costs for handling, shipping and storage shall be borne by others.

5.2 Distribution/Storage of Equipment

Distribution of the equipment shall be possible at the time of delivery. 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.

In the case of high value items, such as service fittings, that may be shipped to the job site on larger projects and used over the course of several months of installation, a secure locked storage area shall be available to the SEF for his use to safeguard this equipment at the job site prior to distribution to the proper trades for installation.

Additional cost associated with storage, multiple handling necessitated by jobsite conditions shall be borne by the customer.

5.3 Security

Project/jobsite security and protection shall be the responsibility of the general contractor and/or the customer.

6.0 General Conformance to Building Specifications

It is intended that the work involved will be in conformance with the project specifications. When variation or conflict occurs regarding installation of equipment, the supplier shall bring the issue to the attention of the proper authorities for immediate resolution.

7.0 Continuity and Cooperation With Other Trades

7.1 Scientific Equipment and Furniture Supplier (SEF Supplier)

It shall be the responsibility of the SEF supplier or installer to cooperate with other trades. It is the responsibility of the customer to coordinate with other trades. Casework, as installed, is considered to be finished equipment and shall be respected by all trades. 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.

7.2 Mechanical and Electrical Trades

Where access is required through items of laboratory equipment, 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 and the mechanical trades shall cooperate in order to maintain job continuity.

7.3 Protection of Finished Surfaces

At no time shall installed work be used by tradesmen as a workbench, scaffolding, tool storage, etc. It will be the responsibility of the other trades, (including final wall finishing), to perform minor wall touch-up and to adequately protect installed casework, especially the laboratory work surface from debris, paint and damage in the course of their operation and at their expense. 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 laboratory until punch list process is complete.

8.0 Installation Procedures

8.1 Installer Qualification

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

8.2 Safety

SEFA recommends that the installer use the safety equipment provided for their protection. Unsafe conditions or practices shall be reported to the supervisor immediately. Any injury, regardless of how slight, must likewise be reported to the supervisor immediately.

It is also strongly recommended that if there is any uncertainty as to the proper work procedures, the installer shall ask the assigned on site and off site installation supervisors for clarification. Guessing may endanger the installer and/or others on the job.

8.3 Casework

8.3.1 Base Cabinets

Establish the high point of the floor. From that point the first cabinets are set and made level, plumbed in relation to the high point. If conditions of the job site indicate more than the ¾-inch (19 mm) of leveling requirements between the bottom of the cabinets and the low point of the floor, an immediate notification shall be made to the proper authorities at the job site indicating this condition. Appropriate action shall be initiated promptly for correction of the discrepancy, at no cost to the SEF supplier/installer.

The cabinets shall be secured to building structure –floor/walls/ceiling in a manner to preclude inadvertent movement and be ready to receive the work surfaces as called out in the project specification. Each modular unit shall have secure contact with the floor during the leveling process by the appropriate leveling device.

8.3.2 Wall Cabinets

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 appropriate weight loads. The structural wall system, (including grounds/blocking), shall be capable of supporting the appropriate loads.

8.3.3 Tall Cabinets

Tall units shall be appropriately leveled with respect to the floor and secured to the wall in order to prevent tipping.

8.4 Hazardous Storage Cabinets and Flammable/Solvent Storage Cabinets

An experienced laboratory equipment installer shall perform installation. Metal cabinets used for flammable storage shall be securely installed and grounded by appropriate trade when necessary; if chemicals are being dispensed directly from a cabinet then the container must also be grounded.

8.5 Cabinet Venting

8.5.1 Venting Flammable/Solvent Storage Cabinets

Although venting of flammable/solvent storage cabinets has not been demonstrated to be necessary for fire protection purposes, venting is recommended to exhaust noxious fumes that may build-up in an enclosed cabinet, and cause discomfort and/or compromise the respiratory health of laboratory personnel. For flammable storage cabinets NFPA 30 recommends the use of metal piping if the cabinet is to be vented.

When a plastic product for venting of hazardous 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.

The cabinet should be vented from the bottom or the top depending on the reagents stored, lighter than air chemicals need vents located at the top of the cabinet. – See SEFA 11 (Liquid Chemical Storage) ¶ 4.1.3 and ¶ 4.2.3 for more specifics on cabinet venting.

8.6 Fume Hoods

8.6.1 Prior to setting a fume hood

The necessary coordination shall be accomplished between the mechanical, electrical and H.V.A.C trades to assure access is available for their work.

8.6.2 Installation

Supporting cabinets shall be set in the same manner as the base cabinets. Counter tops shall be securely fastened to the understructure, as recommended by the fume hood manufacture, and leveled. After the fume hood superstructure is set and secured, the understructure shall be checked to ensure that the leveling device remains in firm contact with the floor and the superstructure shall be checked for proper sash operation.

8.6.3 Balancing

Laboratory fume hood exhaust shall be balanced after installation by the parties designated by the contract and scope of work. - Upon completion of the hood installation see SEFA 1 for any additional information on installation and testing.

8.7 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 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.

8.7.1 Mechanically Fastened Joints

Joints in plastic laminate, wood 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.

8.7.2 Grouted Butt Joints

Joints in butted slab type work surfaces, (epoxy, stone, stainless 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).

8.7.3 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.

8.8 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.

8.9 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.

8.10 Traps and Dilution/ Neutralization Tanks

Traps shall be carefully inspected 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 & 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 with-in 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 over tightened, over tightening can cause the fittings to leak.

8.11 Related Equipment

Related equipment shall be installed according to the respective manufacture'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 recommended practices for the item being installed for any suggested protection methods.

9.0 Site Clean up

It shall be the responsibility of the SEF supplier or installer to remove the packaging debris and other waste resulting from the installation. 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.

10.0 Inspection Cycle

10.1 Notification

Prior to requesting an inspection, it is recommended to perform a punch list to verify the installation is complete. It shall be the responsibility of the SEF supplier or his installer to notify the proper authorities when certain areas, by floor or room, are ready for inspection; and within five (5) working days of the SEF Supplier's notification, the owners designated representative shall make inspection. Completed areas shall be secured and access strictly limited to essential personnel only until final acceptance.

10.2 Final Acceptance

It shall be the responsibility of the SEF supplier to remedy deficiencies, if any, and request a final acceptance of the laboratory furniture and equipment.

10.3 Warranties

Manufacturer's warranties apply to the equipment as installed. A defect found after acceptance shall be remedied as part of the warranty provisions of the manufacturer, if applicable; and after repair or replacement, and required mechanical or electrical disconnections and reconnection will be the owner's responsibility. If items of equipment are separately warranted by other than the SEF supplier, the warranty documentation shall be provided to the proper authorities for the owner's protection and used in obtaining service, if required.

11.0 References

ASTM (American Society for Testing and Materials) F 1412 - "Standard Specification for Polyolefin Pipe and Fittings for Corrosive Waste Drainage Systems"

SEFA 1-2010 – Recommended Practices for Laboratory Fume Hoods.

SEFA 2-2010 – Recommended Practices for Installations.

SEFA 3-2010 – Recommended Practices for Laboratory Work Surfaces.

SEFA 4-2010 – Glossary of Terms for Recommended Practices.

SEFA 7-2010 – Recommended Practices for Laboratory Fixtures.

SEFA 8-2010 – Recommended Practices for Casework, (Wood, Metal, Plastic Laminate, Polypropylene and Phenolic).

SEFA 11-2010 – Recommended Practices for Liquid Chemical Storage

NFPA 30 - National Fire Protection Agency, 2003