LAVALLEE | BRENSINGER ARCHITECTS

Greenlaw Building Renovation - Addendum No. 3

Date: May 24, 2019

To: Bidders and all others to whom bidding documents have been issued

All items in this addendum shall supersede or clarify the bidding documents as originally issued. The cost of the work of all trades affected by the changes in this addendum shall be included in the base bid or alternates, on the proposal form, as applicable. Failure to do so may subject the bidder to disqualification. This addendum forms a part of the contract documents. It supplements and/or modifies them as follow:

General:

Item No. 001 bid date:

Question: *Please consider pushing the bid submission date by one or two days to allow for the subs to have time after the holiday weekend to coordinate with the general contractors on scope and pricing.*

State of Maine's response: *The bid date will be modified to Thursday, 30 May at 2:00.*

Item No.002 Road closure:

Question: *Will we be able to close off part of Independence Drive during construction? From Blossom Lane to 54 Independence Drive?*

State of Maine's response: The State will allow the closure of the section of Independence Drive adjacent to the building from the intersection with Blossom Lane to the beginning of the existing parking spaces to the south of Greenlaw. Access from the south intersection with Arsenal Street shall be maintained to the existing parking spaces between the Stone Building and Greenlaw. Safe pedestrian access shall be safely maintained at all times to allow people to access work locations and parking lots on both sides of the closure. The contractor shall submit a detour and pedestrian path plan for review and submittal.

Item No. 003 Interior finishes @ Penthouse:

Question #1: *Please clarify the interior finishes required for the penthouse and the stair leading to the penthouse.*
Question #2: *Please clarify the interior finishes required for the alternate 2 Incinerator Covered Walk.*

LBA's response #1: P-1 on walls and ceiling. Contrasting grit tape to be installed on existing stair nosing.
LBA's response #2: EPF-1 to continue as flooring. P-1 on walls.

Item No. 004 ADD #1:

Question: *Are we to include all the alternates as part of our lump sum bid for 5/21/19? It's clear that we would include all listed allowances.*

LBA's response: Alternate amounts get provided on the bid form, but they aren't part of the base bid.

Item No. 005 ADD #2 – Item No. 006:

Question: *It was suggested we itemize the shoring cost. Will we receive a revised bid form?*

LBA's response: The design team is requesting the general contractor to provide a line item for shoring under the general condition division within the estimate.

Item No. 006 epoxy flooring:

Question: *Does an epoxy flooring specification exist? I can't seem to locate it under Volume 1*

LBA's response: Dura-Flex Accelera HC in the Color Shale.

Item No. 007 Contractor's general liability policies:

Question: *Many contractor's General Liability policies exclude coverage for facilities that are vacant, and in the care, custody and control of others. Please confirm the value of the existing vacant building shell for the purpose of insuring this through the builder's risk policy.*

State of Maine's response: The shell of the building is valued at $5,000,000

Item No. 008 Graphic standard (5-star or basic):

Question: *What Graphics Standard (5-Star or Basic) is being requested by the SOM for the Greenlaw building? This question applies to both the ATC and Fire Alarm & Security Bids. By way of comparison, the SOM Deering job had 5-Star Graphics integrated.*

LBA's response: Provide a 5-star graphics standard.

Item No. 009 ATC sequence of operation

Question: *Based on the ATC sequence of operation for the VAV's and the enhanced controls – the TSI manufacturer cannot meet the specified sequence of operation with the specified controllers and the use of the specified AVC modules. Please provide an updated & approved specification to meet the desired operation for bidding purposes. Please see correspondence below: "The manufacturer reviewed this application. Both the TSI 8681 or 8682 and the LRC units will not meet the requirements however the ANTEC (Price Industries) control system will. The ANTEC system will include their VFX valves with PACE controllers, actuators, and thermostats. So, you will not need the Accutrol valves. This will be a complete system with all BTL listed devices on the BACnet loop. Also, wherever the schedule indicates a supply/exhaust valve will require room offset control per the engineer so there are more than 25 areas to be served. The only areas on the schedule we will not quote is where "VAV Box" is scheduled."*

Allied Engineering's response: Refer to Addendum #2 Item No. 20 for changes to the Lab Room Controller specifications.

Item No. 010 exterior wall assembly:

Question: *Do the exterior walls contain asbestos?*

It has come to our attention that within the building envelope there is a layer of tarpaper that may contain asbestos. Please confirm this location and provide direction to include pricing for abatement wherever this asbestos tarpaper is exposed by selective demo or masonry work.

LBA's response: We suspect that the black air vapor barrier within the exterior cavity wall contains asbestos. Testing will be required to confirm.

Item No. 011 acceptable manufacturers:

A.T. Villa has contacted us and wishes to be added to the names of acceptable manufacturers for sections:
Question #1: *11 53 13 Laboratory Fume Hoods and Exhaust Devices*

Question #2: *12 31 00 Flexible Laboratory Furniture System*
Question #3: *12 35 53 Metal Laboratory Casework*

LBA's response #1: If AT Villa fume hood and exhaust devises meet the specifications and are approved by State EHS, they can submit a substitution request
LBA's response #2: No surface mounted raceways will be acceptable, must match BoD product, otherwise they can submit a substitution request
LBA's response #3: Match BoD product, otherwise they can submit a substitution request

Item No. 012 roof deck attachment:

Question: *Can new roof deck be installed with powder actuated or pneumatic fasteners?*

Becker Engineering's response: Per specification 05 30 00, the roof deck is intended to be welded. Power actuated, or pneumatic fasteners will be considered if submitted as a substitution procedure at submittal time. As part of the substitution request, include documentations showing that the power actuated, or pneumatic fasteners meet or exceed the capacity of the welds.

Item No. 013 Allowable work hours:

Question: *Please provide the allowable work hours during each day. Please indicate if there are any restrictions on what days of the week are allowed for construction activities to be performed for the project.*

State of Maine's response: The state of Maine has no restrictions for this building

Item No. 014 Construction activities:

Question: *How long after the apparent low bidder has been identified would the Notice of Award be issued? Adequate procurement time is critical to begin construction activities on August 1st, 2019.*

State of Maine's response: Within the 45-date time period of bid.

Item No. 015 Construction schedule:

Question: *Upon completion of a detailed construction schedule and understanding constraints on the structural modifications, shoring and upgrades, it has become apparent that a contract completion date is not achievable by February 1st, 2021 with a proposed start date of August 1st, 2019. We would like to request an additional 5 months of time to complete the project. It seems that the original duration indicated in the documents prior to addendum #1 had the realistic time for completion. Please revise the contract duration to the original (23) twenty-three months to allow the contractors a reasonable amount of time to complete the work responsibly.*

State of Maine's response: The State of Maine has no objections extending the construction schedule to 24 months for a completion date of July 1, 2021.

Item No. 016 design load information for floors:

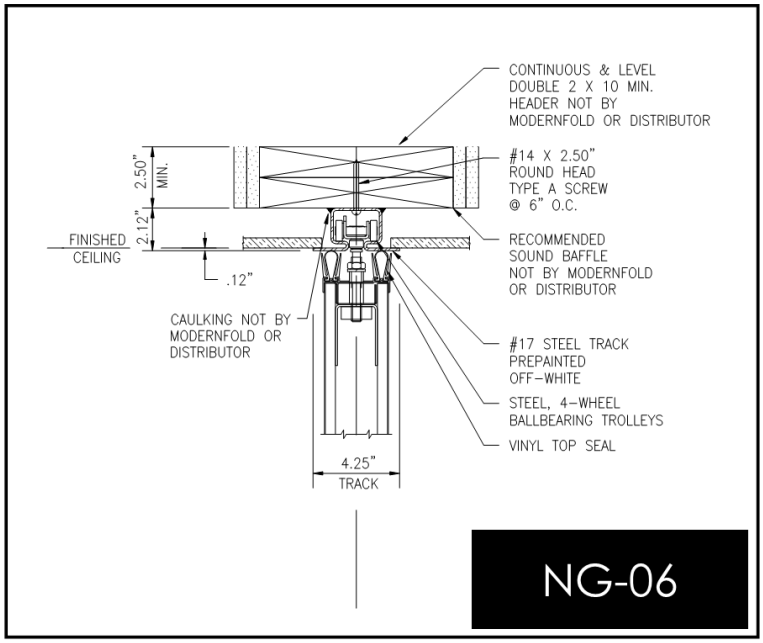
Question: *With the extensive shoring system and construction equipment required to perform the structural modifications and installation of the mechanical equipment required, are the slab on grade and existing supported slab decks designed to account for this additional loading? If not, please provide the design load information for all floor levels of the building.*

Becker Engineering's response: The slab on grade and elevated slabs are designed to support the loads listed in the design load section on S1.0 once construction is complete. Per General note 4 on S0.1, "it is the contractor's sole responsibility to determine erection procedures and sequence to ensure the safety of the building and its components during erection. This includes the addition of necessary shoring, sheeting, temporary bracing, guys or tiedowns."

Item No. 017 Add alternate 8:

Question: *Alternate 8 adds an operable wall to divide rooms 212 and 214. Please provide details of the installation of this operable wall.*

LBA's response: Refer to sheet S1.3 for steel beam size/note, specification section 10 22 26 folding panel partitions and typical mfg.'s. detail below. Provide a 12" wide metal stud/gypsum soffit centered on folding partition 7'-11" above finish floor.



Item No. 018 Plumbing and HVAC penetrations:

Question: *Division 22 and 23 specifications define how plumbing and HVAC contractors shall seal their penetrations in the BSL3 lab suite. There is no specification in division 26. Do electrical penetrations require special sealing at the BSL3 labs?*

Allied Engineering's response: Utilize EYS type conduit fitting on any conduits leaving or entering the BSL3 lab space. The EYS fitting shall be installed on the BSL3 lab side of the respective penetration. Utilize appropriated UL listed assemblies for sealing around respective electrical conduit penetrations at wall, floor, ceiling or roof penetrations as described or detailed in architectural plans and specifications.

Item No. 019 ADD No. 002 – Item No. 008 Fume hoods:

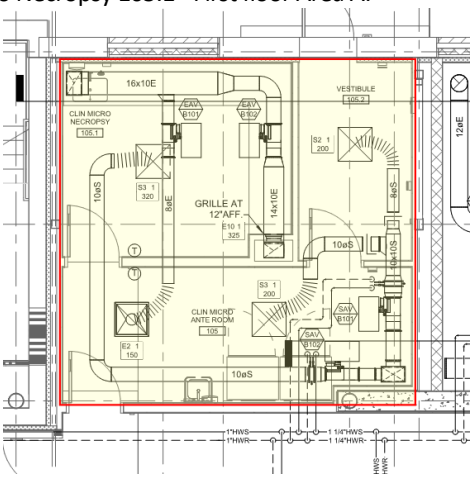
Question #1: *Please see below regarding questions on the FH-2 and FH-7 fume hoods listed in the fume hood schedule on Sheet A4.01. The plumbing drawings are consistent with the question that is raised—there is no water or drain piping serving these fume hoods. Please clarify specific hood type and piped services requirements for these two hoods.*

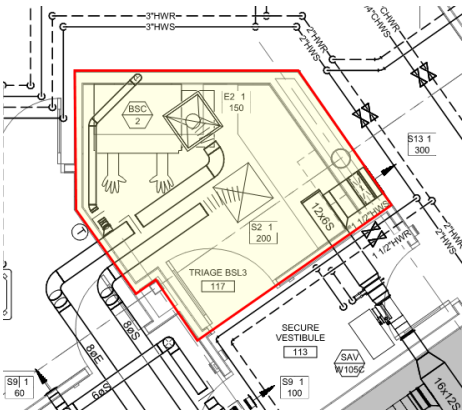
LBA's response #1: *Cup sink locations for each hood type are noted bottom left adjacent to FH type tag and on the Fume Hood Schedule on drawing A4.01. The illustration identifies a potential location for each cup sink if indicated by the note for each fume hood under the size. Water type for each fume hood is identified in the Fume Hood Schedule on A4.01 for sinks with cup sinks (CW or RO).*
Modification: ADD the following to the above LBA's response #1: *FH-2 and FH-7 should not have cup sinks per the schedule and are correctly identified on plumbing drawings (no cup sink indicated).*

Item No. 020 BSL3 suite locations:

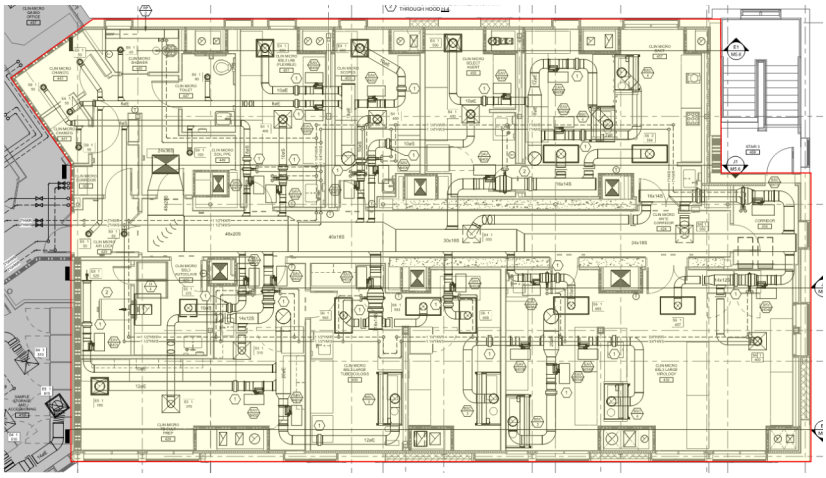
Question: *Where are the BSL3 Suites?*

Allied Engineering's response: There are three locations

1. Clin Micro Necropsy 105.1 - First floor Area A:
   a. 

2. Triage BSL3 117 – First floor Area A:
   a. 

3. BSL3 Suite – Fourth floor Area B:

a. 

Project manual:

Item No. 021 bid form article #1:

Question: *Bid Form: Article 1 of the revised bid form issued under addendum 1 indicates "alternate bids are included on this project" and lists the various alternates: there are 13 of them. However, no spaces are provided to enter the costs associated with each. The phrase "are included" suggests the bid amount written in words and numerals above article 1 must include the cost of all the alternates and, as no spaces are provided on the bid form, the costs associated with the alternates are not to be listed individually.*

Contrary to this, specification section 01 23 00 Alternates, in describing the alternates uses the same phrase for each of them: "state the amount to be added to the base bid." This would suggest the base bid should not include any alternates but then, it would seem, that pricing for each alternate must be entered on the bid form. Please clarify how base bid and the alternates ought to be presented.

LBA's response: A line has been added to each alternate to provide individual dollar amounts. See the attached modified specification section 00 41 13 Contractor bid form.

Item No. 022 section 00 21 13 Instructions to bidders – 3.2:

State of Maine's modification: MODIFY 30 days to 45 days.

Item No. 023 section 00 72 13 General Conditions – 37.5:

Question: *General Conditions Section 00 72 13 paragraph 37.5 describes liquidated damages for the project. We would like to request adding the following language: "These Liquidated Damages shall be in lieu of any other actual direct, indirect, or consequential damages resulting from delay or disruption."*

State of Maine's response: The requested change is rejected.

Item No. 024 section 01 00 11 General requirements for laboratories – 1.02.6F

Question: *Specification section 01 00 11 - 1.02.6.f states that prior to Substantial Completion and project commissioning the contractor is to provide a thorough cleaning, performed three times. Does the requirement to perform three cleanings apply to interior of the entire building, or just within the BSL3?*

LBA's response: All laboratory areas are required to be cleaned thoroughly prior to turnover. Cleaning 3X is specific to BSL3 requirements.

Item No. 025 section 01 57 21 Indoor air quality controls – 3.01B

Specification Section 01 57 21.3.01.B, says to begin construction ventilation when building is substantially closed.
Question #1: *What defines substantially closed?*
Question #2: *Does the entire building require construction ventilation, or just the BSL3?*

LBA's response #1: The building's envelope to be weather tight.
LBA's response #2: All laboratories will require ventilation.

Item No. 026 section 02 85 50 Lead-based paint removal and disposal – 3.16 Laboratory analytical report:

Question #1: Can the laboratory analytical report for paint chip samples be issued for review?
Question #2: *Does information exist on the lead concentration levels on the steel beams?*

LBA's response #1: A laboratory analytical report has not been perform at this time.
LBA's response #2: There has been no official testing of the paint on the existing steel beam but we suspect that the orange paint is lead.

Item No. 027 section 03 35 13 Concrete flooring finish:

Question: *Specs list SC1 & SC2. Finish schedule shows only SC1. Is there a SC2 required?*

LBA's response: On Sheet AI1.1 in the center elevator core there is SC-2. The SC-2's scope is limited to the Sealed Concrete Control Joints indicated on the same sheet.

Item No. 028 section 03 54 00 Cast Underlayment:

Question: *Regarding Specification Section 03 54 00 Cast Underlayment, please clarify the locations and extent of application of the Ardex leveling compound. If this is intended to be poured as a topping slab, there will be elevation busts at existing doorways and stair risers. Please provide details on these transitions and any other locations the Ardex ties into existing structures.*

LBA's response: The Ardex system is intended to provide a smooth continuous floor finish for the entire 2nd, 3rd & 4th floor and will require feathering at doors and stairs to maintain ADA requirements.

Item No. 029 section 04 20 00 Masonry:

Question: *Considering that the CMU is not exposed to view after construction and considering that the existing CMU is most likely reinforced in areas (such as opening jambs), please clarify if new CMU construction is to be toothed into the existing CMU construction. Brickwork would be toothed in regardless.*

LBA's response: It is not required to tooth in cmu when it is concealed but if the new cmu wall is exposed then it should be toothed in.

Item No. 030 section 07 53 00 Elastomeric membrane roofing:

Question #1: *Specification Section 075300 EPDM Roofing- 2.01 Manufacturers- Roofing Basis of Design- Sure-Seal EPDM-Self Adhered. 2.03 Roofing Membrane and Associated Materials- A. Membrane- EPDM Non- Reinforced. Can you clarify if you would like to use a self-adhered membrane or non-reinforced EPDM for this project?*

Question #2: *Specification Section 075300 EPDM Roofing- 2.04 Deck Boards- A. Roof Deck Board- Thickness for Cover board- ¼ ". B. Cover board (contractors' option to roof deck board which contributes to roof insulation level) ½ "100 PSI. Can you clarify that either A or B can be used as acceptable products for the cover board? Roof deck board usually refers to a substrate board. Is a substrate board required on this project? The roof assembly in the drawings does not show a substrate board.*

LBA's response #1: Section 2.03 A is for all roof transitions. Provide a non-reinforced EPDM membrane as specified.
LBA's response #2: Yes, A or B can be used.

Item No. 031 section 07 62 00 Sheet metal flashing and trim:

Question: *Specification Section 076200 Sheet Metal Flashing & Trim- 2.01 Materials- pre-finished aluminum. .040 aluminum fluoropolymer coating- color as selected by the manufacturer's standard colors. 2.07 Schedule states different gauges of metal fascia, cleats, scuppers, base flashing, coping, cap, parapet, sill, ledge flashings. Can you clarify that all of the flashings related to the EPDM roofing scope of work are to be .040 pre-finished aluminum?*

LBA's response: Refer to specification section 2.07 schedule for thicknesses and applications

Item No. 032 section 07 90 05 Joint sealers:

Section G indicates that the interior sealant/caulking to be used for BSL3 laboratory spaces is A-1010 by Arcoplast. The sole manufacturer for this product believes this product will only be necessary around windows in the BSL3 Lab (not in every application as details in installation section F) and another product could be used within the lab space.
Question #1: *Please confirm whether this product is required to seal all listed locations in section F or if it is required only around windows.*
Question #2: If the product is only required at glazed areas, please provide an additional specification for caulking the remainder of the BSL3 lab.

LBA's response #1: Sealant G is for all location.
LBA's response #2: No comment to above question.
LBA's clarification: Sealant product type J is 100% Silicone ASTM C920, aluminum finish sealant at stainless steel equipment.

Item No. 033 section 08 33 23 Coiling counter doors – 2.02B:

Question: *What kind of finish will be required for Door 207B?*

LBA's response: As noted in the specifications, the door will be factory painted.

Item No. 034 section 08 33 24 High performance overhead coiling doors

Question: *I do not see any type HDS doors on the door schedule which are referenced in specifications 083324. Can this be confirmed?*

LBA's response: There is some fire sprinkler information scattered across the plumbing drawings and there is a division 21 specification.

Item No. 035 section 08 36 13 Overhead sectional doors:

Question: *Door # 109A on drawings indicates an operator but the specs do not reference one. Please confirm operator or manual.*

LBA's response: Modify the specification as follows: Section 08 36 13 - 1.01.A: Delete reference to manually operated. Door shall be electrically operated, complete with motor, controls and safety device. ADD: 2.05 ELECTRIC OPERATION

A. Operator, Controls, Actuators, and Safeties: Conform to UL 325; provide products listed by ITS, UL, or testing agency acceptable to authorities having jurisdiction.
   1. Provide interlock switches on motor operated units.

B. Electric Operators:
   1. Mounting: Center or side mounted on cross head shaft.
   2. Motor Enclosure: NEMA MG 1, Type 4; open drip proof.
   3. Motor Rating: 1/3 hp; continuous duty.
   4. Motor Voltage: 120 volts, single phase, 60 Hz.
   5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
   6. Controller Enclosure: NEMA 250, Type 1.
   7. Opening Speed: 12 inches per second.
   8. Brake: Adjustable friction clutch type, activated by motor controller.
   9. Manual override in case of power failure.

C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated; enclose terminal lugs in terminal box sized to conform to NFPA 70.

D. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator conforming to UL 325.
   1. 24 volt circuit.
   2. Recessed mounted, at interior door jamb.
   3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms conforming to UL 325.
      a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.
      b. Secondary Device: Provide electric sensing edge with wireless edge kit or non-monitored safety edge as an option along with continuous-constant control device

Allied Engineering's response: Power requirements are included in the bid package; refer to sheet EY1.1A.

Item No. 036 section 08 54 13 Fiberglass windows:

Question: *Window Type N and Window Type NA appear to be the same window whereas Type L is 3" taller than Type LA. Is the intent to have Type NA be 3" shorter than Type N?*

LBA's response: Window types NA and LA are 3" shorter than the base bid windows due to metal panel detail.

Item No. 037 Shelving clarification:

Question: *Shelving is shown in some rooms identified as CFCI (see for example D7/A4.10.2 and D1/A4.10.3). However, we do not find a specification for the product desired. Please provide.*

LBA's response: Add this to 12 35 53 metal Lab casework and Lab Accessories section scope. Storage Shelving: Units shall be all standard construction Type 304 stainless steel wire shelves and tubular stainless-steel uprights with capped tops, adjustable feet, and 1" shelf height adjustment capability with Corner Release System. Each unit shall

include four posts with capped tops. Provide removable PVC shelf liners.
Unit Size: 12" W x 36" L x 84" H with 5 adjustable shelf units for each unit.
See floor plans for the number of units required.
Products: Metro Super Erecta by Metro and Quad-Adjusta Wire Shelving by Eagle Group.

Item No. 038 section 08 80 00 Glazing:

Question #1: *Please clarify the type of glass to be used for window types A-A and B-B in Security Desk room 119.*
Question #2: *Specification section 08 80 00 Glazing article 2.05 describes a decorative plastic film. Please indicate where this material is to be used.*

LBA's response #1: Provide type S-1 glazing for window types A-A and B-B.
LBA's response #2: Decorative Plastic Film was eliminated from LBA scope. It was not removed from finish legend.

Items No. 039 section 10 21 23 Cubicles:

Question: *The spec book has a cubicle curtain section, but I have not found any shown on the drawings. Where?*

LBA's response: Provide a curtain in CLIN MICRO Shower 445

Item No. 040 section 11 52 13 Projection Screens – 1.01A:

Questions: *The specifications include section 11 52 13 Projection Screens with article 1.01.A of that section indicating they are for a meeting room and the controls are to be integrated with the Owner's audio/video system. However, we do not see which room or rooms are to receive projection screens, their sizes or information regarding control integration. Please provide this information as well as a detail of their installation in ceilings.*

LBA's response: There are no projection screens within this project. Omit specification 11 52 13 Projection screens.

Item No. 041 section 11 53 13 Laboratory Fume Hoods and Exhaust Devices:

The following questions were asked by Labconoco, the basis of design for laboratory hoods specified in section 11 53 13. The questions are specific to the PVC fume hoods tagged FH-2 and FH-7 listed on the Fume Hood Schedule on drawing A4.01:
Question #1: *Vendor informs us they make two types of PVC hoods: An Acid Digestion and a Perchloric Acid version. However, the specification does not specifically indicate which one is desired. Please indicate the type desired for FH-2 and FH-7.*
Question #2: *As additional information, vendor points out that both types of the PVC hoods they make include a washdown and a drain trough as standard. However, neither the fume hood table on A4.01 nor the plumbing drawings show water or drain connections to FH-2 and FH-7. Please confirm water and drain connections are not required for FH-2 and FH-7*

LBA's response: For both questions: PVC hood specified for hood liner only. These were specified as Protector PVC for the PVC liner only per end user discussions, full acid digestion hood requirements were not desired or required for use, just the liner to resist the acid environment. At these locations, no washdown feature is specified or required. Use of hoods is for acid digestion, Nitric and Hydrochloric acids.

Item No. 042 section 12 24 00 Window Shade Systems:

Question #1: *It's clear that Room's 147 & 149 receive the Dual Shades and have jamb tracks and sill tracks. What windows receive the sheer shades?*
Question #2: *Do the sheer shades receive side/sill channels?*

LBA's response #1: A black-out window shade is required at EP-Inorganic Chlorophyll Lab 226. This shade will receive the jamb & sill track. There are no sheer shades required on the project. Omit references.
LBA's response #2: There are no sheer shade at this time.

Item No. 043 section 12 31 13 Flexible laboratory furniture system – 2.02 A3:

Question: *Please take a look at the attached specification pages (Volume 1 – Pages 567 through 570, Section 12 31 00, 2.02 #3 A & B. I believe the numbers shown in inches might be hose assemblies. I would still confirm w/ Allied Engineering to be sure. If yes, we need to get more detail on what type of "quick connect" fitting they are looking for, etc. Also, I'm not sure what the "coiled hose for each bench section" and "straight" hoses for all remaining means in relation to the project:*

a. At benches with gasses, provide (1) coiled hose for each bench section and straight hoses for all remaining gasses per bench.

LBA's response: Refer to basis of design product options for hoses. Coiled hose is self-explanatory in the product documentation. Quick connect fittings as specified for ceiling panels, see also basis of design product information. See attached Mott Altus bench (part of Mott Optima line, both altus and optima attached here)

Item No. 044 section 12 35 53 Metal Laboratory Casework and Laboratory Accessories:

Question #1: *2.02C - Will magnetic catches be required on laboratory casework?*
Question #2: *2.04A - Indicates sheet steel as "hot-dipped galvanized". Is painted steel casework required to be galvanized?*
Question #3: *2.04E - Appears to indicate that shelf standards are required within cabinets with shelves. Please confirm that cabinet interior punching for zinc plated shelf clips (standard) for fully adjustable shelves are acceptable.*
Question #4: *2.04E - Shows B.O.D. for casework pulls as Sugatsune 27 Series #27096, stainless steel, matt finish. Please confirm that 4" stainless steel wire pulls are acceptable.*
Question #5: *2.04F - Section 12 35 53, page 5, paragraph 2.04F references plumbing fixtures. Drawing A4.00 also shows a Laboratory Sink and Fixture Schedule. Section 224000 states the plumbing fixtures are to be supplied by Division 22. The plumbing fixture schedule on drawing P6.1 states the sinks at the laboratory casework are to be furnished by the laboratory casework supplier and the fixtures are to be supplied by Division 22. Please verify the laboratory casework bidder is to include the sinks at the laboratory casework and that the fixtures will be supplied by Division 22.*

LBA's response #1: Yes
LBA's response #2: Yes
LBA's response #3: Yes
LBA's response #4: Pulls as specified – no wire pulls
LBA's response #5: Lab fittings and lab sinks as scheduled in lab plumbing/fitting schedule on A4.00, as specified in div 22. Supply must be coordinated with casework/fume hoods, preferably supplied by casework vendor but can be by plumber noting that coordination is essential.

Item No. 045 section 14 20 10 Passenger Elevator:

Spec section 14 20 10 Passenger Elevator does not provide any indication that a specific elevator manufacturer or vendor is required for this scope.

Question #1: *Please confirm that this specification section is open to all manufacturers, provided the Manufacturer Qualifications and Installer Qualifications are met.*
Question #2: *Please provide the manufacturer and/or model information of the existing elevator.*

LBA's response #1: The specification is open to all manufacturers that meet the specification requirements.
LBA's response #2: We do not have this information.

Item No. 046 section 21 10 00 Fire suppression:

Division 21 clarification: There is significant cost impact to both the fire protection and electrical scope of work if a fire pump is needed.
Question #1: *Is flow test information available to confirm if a pump is required?*
Question #2: *If flow test information is unavailable, can you tell us if the existing building contained a fire pump prior to the demo.*
Question #3: 2.03C calls for high temperature sprinkler heads at Autoclave Rooms and other 'hot spaces. Please identity what rooms will be classified as 'hot spaces.

Allied Engineering's response #1: Refer to specifications section 211000-1.03-B-1: "The existing static pressure at the existing sprinkler entrance is 75 PSIG (from existing inspection sticker)."
Allied Engineering's response #2: The existing building did not have a fir pump.
Allied Engineering's response #3: Mechanical Rooms.

Item No. 047 section 22 05 16 Braided expansion loops/fittings and 23 05 16 Braided expansion loops/fittings:

Allied Engineering's clarification: All Plumbing and Mechanical expansion loops shall be pre-manufactured

Item No. 048 section 23 07 00 Mechanical insulation:

Allied Engineering's modification: Paragraph 3.10.E - Modify the following:

BSL3: Exposed insulation within the BSL3 Suites shall be provided with a non-porous impact resistant PVC jacket that is readily cleanable with sealed joints.

Item No. 049 section 23 09 00 Instrumentation and control for HVAC:

1.5 indicates the frontend system interface to the State of Maine system shall be as manufactured, installed, and serviced by Honeywell only. There are additional qualified bidders for system controllers and unitary controllers. Those bidders must provide complete integration to the Honeywell front end via a stated communication protocol.
Question #1: Who is going to contract Honeywell to perform the integration, create graphics, direct to owner?
Question #2: Is this scope part of the division 23 contract or is this separate contract, direct to owner?

Allied Engineering's response #1: The general contractor is responsible to hire Honeywell
Allied Engineering's response #2: It is part of division 23.

Item No. 050 section 23 09 23 Flow Instruments:

Question: *Spec section 23 09 23: If Siemens can demonstrate that it can meet or exceed the performance criteria and specifications, will it be an approved supplier for the following materials: Items 2.01, 2.02, 2.03 and 2.04?*

Allied Engineering's response: Siemens may be added as an acceptable manufacturer if they meet all the criteria set forth in the contract documents.

Item No. 051 section 23 64 23 Air-cooled scroll water chillers:

Allied Engineering's modification #1: Delete Paragraph 1.04.B Seismic Certificate requirements.
Allied Engineering's modifications #2: Delete Paragraph 2.01.A Zero Tolerance requirements.

Item No. 052 section 23 82 19 Fan coil units:

Allied Engineering's modification: See the attached specification

Item No. 053 section 23 52 16 Condensing boilers substitution:

Question: *Would Lavallee Brensinger Architects, Inc. consider sending the attached Substitution Request Form and the attachments to the HVAC engineers for consideration on this project.*

Allied Engineering's response: The Riello boilers listed in the substitution request are acceptable. The Contractor is responsible for verifying they meet ALL the required criteria including dimensional as the Penthouse is a very tightly designed space. The Contractor shall also provide ALL required changes in design/system configuration due to the specific boiler manufacturers requirements.

Item No. 054 section 26 00 00 Basic Electrical Requirements:

Question #1: *The contractor list calls for a pad mount but the drawing indicates this is to be procured from the utility – can you confirm this is NOT required – or it is an item you will be providing to your contractor?*
Question #2: *The drawings call out some existing Square D panels to be "reused" in new boxes – is there any additional info on these units available?*
Question #3: *The panel spec calls for meters to be install on panels MDPA and MDPB – but I don't see those panels on the one line*.

Allied Engineering's response #1: The pad mounted transformer shall not be required to be procured from the utility company (CMP) as stated in key note No.2 on sheet EP5.0. The customer owned pad mounted transformer shall be procured by Division 26 and shall satisfy specification section 26.12.13 (Liquid Filled Medium Voltage Transformers).
Allied Engineering's response #2: The equipment has been removed by a demolition contractor and safely stored in a location directed by the owner. Please coordinate with the owner to schedule a time to inspect equipment if necessary. There is no additional information available at this time about the removed panelboards.
Allied Engineering's response #3: Delete "MDPA and MDPB" and replace with "MSB4 and ESB4".

Item No. 055 section 26 08 00 Commissioning of Electrical Systems:

Question: *The above specification section references section 01 91 13 General Commissioning Requirements. Please provide spec.*

LBA's response: The owner will hire the commissioning agent. The General Contractor is to participate in the process. See the attached specification for additional information.

Item No. 056 section 26 09 23 Lighting control devices or 26 41 13 Lighting protection for structures:

Question: *With the lightning protection system, the specs call for all copper where possible, but due to the extensive amount of equipment on the roof we will be required to use a high percentage of aluminum materials to protect the equipment. Would the owner accept the use of aluminum materials exclusively on the roof, with all of the grounding components copper? That would create a clearer separation of materials and would save many bi-metallic transitions on the roof. It would also lower the system cost somewhat on the roof level. Please confirm if we can provide all class II aluminum components on the roof for the lightning protection system.*

Allied Engineering's response: Yes, the proposed suggestion of aluminum material on the roof with copper downleads and copper ground ring is acceptable.

Item No. 057 section 27 Communication:

Question: *There are rooms shown as office space that do not show data drops, i.e. 321, 323, 421, 423, 425, 431, 433, 435 and 437. Please indicate what telecom and power devices are required at offices.*

Allied Engineering's response: The power plans for each of these rooms (in the bid package) identify a communication and power junction box for connection to the respective pre-wired (data and power) furniture partition systems; the contractor shall need to refer to the approved furniture shop drawings to confirm the number of power circuit (phase, neutral, ground wire quantities) and communication drops (data and tel per workstation) that are needed for tying in each whip at each respective junction box. The communication drops, and the power receptacles shall be provided by the furniture vendor and integral to the pre-wired partitions. The electrical contractor shall only need to make up the whip connection to the furniture. For bidding purposes, we recommend carrying (2) drops per shown chair in the areas with pre-wired furniture systems.

Item No. 058 section 31 63 33 Drilled-in Mini-Piles:

Question #1: *Specification section 31 63 33, is it possible to perform the load tests outside the footprint of the building?*
Question #2: *Specification section 31 63 33, will a load test for each pile size be required?*

Becker Engineering's response #1: Yes, it is acceptable to locate the test pile outside the building footprint. The test locations should be located to avoid utilities and be in the general proximity of where the new piles will go (i.e. near the building's wings). Submit locations for final approval. Testing to be review by SW Cole.
Becker Engineering's response #2: Yes, a test is required per code for each size of pile. Testing to be review by SW Cole.

Drawings:

Item No. 059 sheet C5 – Utility Plan:

Question: *The Utility Notes are covering a note that is pointing to the underground electric. Please clarify the note.*

Sebago's response: *The note reads: "INSTALL (8) 4" ELECTRIC CONDUITS, COORDINATE WITH ELECTRICAL DRAWINGS, CONTRACTOR IS RESPONSIBLE FOR ADJUSTING DEPTH TO AVOID CONFLICTS WITH OTHER UNDERGROUND UTILITIES". This work shall be coordinated with the electrical drawings.*

Item No. 060 sheet S1.1A – Foundation and tunnel plans:

Question: *Looking at the pile layout along the perimeter walls, there are 3 PC3-a pile caps and 3 PC-3b pile caps that are laid out in such a way that there are 2 interior piles and 1 exterior pile. Since it appears these piles are located to support a column in the center of the cap, could the pile caps be flipped to allow the majority of the piles to be drilled on the outside of the building rather than the inside? This would be particularly helpful at the pile caps at the lower level along B.3 and C.1.*

Becker Engineering's response: No, the PC3a and b pile groups need to be installed as shown. Due to the existing geometry, more of the loads is to the inside of the wall which is why the 2 piles are needed there.

Item No. 061 sheets S1.2 – S1.5 Columns within shear wall:

On Drawings S1.2, S1.3, S1.4, and S1.5, HSS columns are shown inside Shear Walls #2 and #3 at all floor and roof levels.

Question #1: *Please confirm these HSS columns will be embedded inside shear walls #2 and #3.*

Question #2: *Please provide anchorage and connection details if required.*

Becker Engineering's response #1: Per the plan legend, the square symbol indicates (E) beam re-supported at the shear wall (not HSS columns). Please see detail on S3.2. Note there are existing round columns that will be embedded in shear walls 1 and 4.

Becker Engineering's response #2: N/A see detail on S3.2

Item No. 062 sheet S1.5 – Roof framing plan:

Question: *Drawing S1.5 Roof framing plan, "New Bridging lines" are called for at the new 18KCS4 Joists and Note 6 on the Plan Legend is referenced although only Note 9 refers to bridging. Please clarify if "New bridging" is required at both existing joists and new joists.*

Becker Engineering's response: yes, new bridging is required at both new and existing joists. It is shown on plan as the dash line symbol and explained in the legend note 9. Note 6 called out on plan references the plan notes (located below the title).

Item No. 063 sheet S3.1 Typical framing sections & details

Question: *Please clarify where "TYP JOIST REINF DETAIL" on Drawing S3.1 applies on the floor plans.*

Becker Engineering's response: The typical joist reinforcement detail on S3.1 applies at locations where a load equal or greater than 150lbs is hanged from a joist more than 4" from its panel point. Contractor to coordinate locations.

Item No. 064 sheet S3.2 Typical framing details:

Question: *At floor opening and beam support details shown on Drawing S3.2 and other locations. New steel angle, plate, beams, channel, etc. may not be able to sit flush to the bottom of the existing slab due to pillowing of the concrete. How shall the contractor address these areas of conflict?*

Becker Engineering's response: Provide steel shims to ensure full bearing.

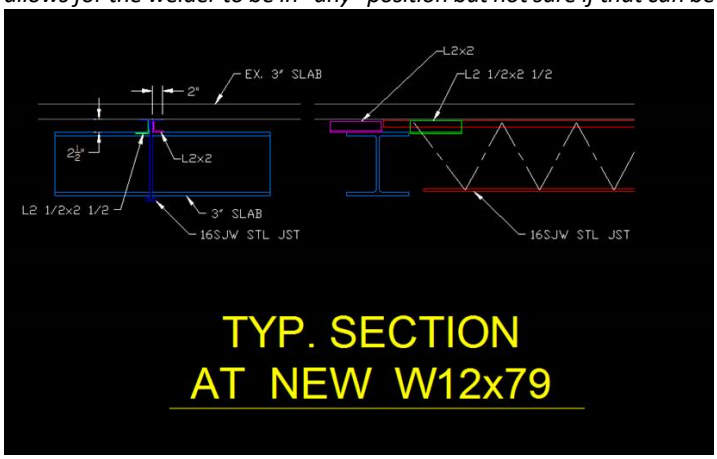
Item No. 065 sheet S4.1 Braced frame elevations:

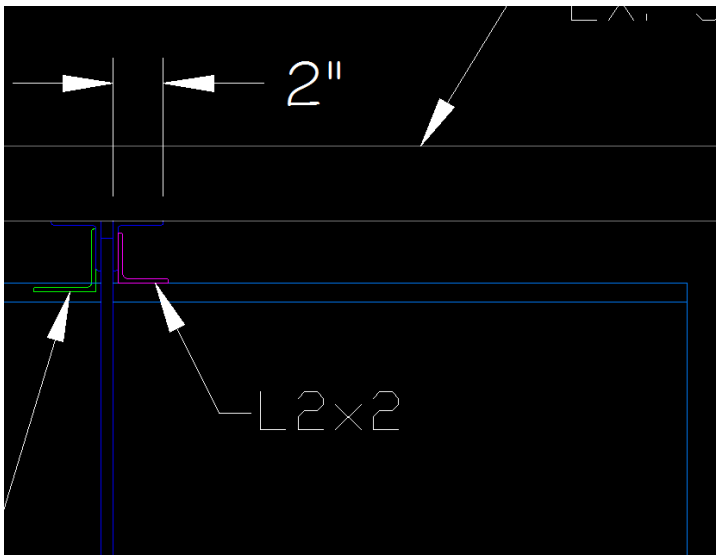
Question: *Drawing S4.1 Section 1 shows the slab saw-cut above a new W beam with weld studs at 12" OC and then formed and infilled to bear on the top flange on the new beam. Please confirm this detail applies at all new W beams.*

Becker Engineering's response: Detail 1 on S4.1 is specific to the brace frame and happen at new brace frame beams (except at the roof). See details on S5.2 and SKS-001a&b for new W beam re-supporting existing joists.

Item No. 066 sheet S5.2 Joist reinforcement details:

Question: *Typical (E) Re-supported at New Beam and Typical (E) Re-supported at Shearwall - The New Angle (L2.5x2.5) will not fit in the Space provided. An L2X2 can but I question if the Welder can physically access the Joint to be welded with the Slab in the Way and obtain a Pre-Qualified Weld. I believe using SMAW (stick) welding AWS allows for the welder to be in "any" position but not sure if that can be achieved.*





Becker Engineering's response: See attached SKS-001a & b for updates to the details. The updates are intended to make the welding easier.

The installation approach is at the discretion of the contractor but note that the detail is now showing shims so that the L2 1/2x2 1/2 can be installed before the new W beams are installed.

Item No. 067 sheet S5.2 – Joint reinforcing details:

Question: *A Transvers cross section through the building indicates that six different conditions at three locations occur when Cutting and Rebuilding the existing Floor & Roof joists takes place. This is a result of the joist web locations relative to the New Beams/Shear Wall locations being arbitrary. The "TYP (E) JOIST RESUPPORT" details show a ¼" +/- gap between a remaining web member to the Toe of a ¼"x4"x? Bent Plate where the tension force in the new web member is delivered to the joist panel point through bending in the (2) round bottom chord bars. Given these different situations at the bottom Chord, and considering the neutral axis of the new member is not aligned with the joist panel point, how flexible is the ¼" to grow in distance so allowable bending stresses are not exceeded in the joist bottom chord (i.e. distance from BC Panel Point to heel of bent plate)? This would allow a one size fits all approach when ordering material for the joist rebuilding. Also, what is the length of the ¼" bent Plate?*

Becker's response: See attached SKS-001a & b for updates/clarifications to the details.

Item No. 068 sheet A0.1 Legends, symbols, notes, partition types:

Drawing A0.1, Note 1 indicates that 07 81 00 Spray-Applied Fireproofing is not required on the Fourth Floor.
Question #1: *Please confirm that the existing roof beams, joists and columns (as well as new roof deck) do not require any Spray-Applied Fireproofing.*
Question #2: *Please confirm that all bar joists are to be 1-hour rated, even in 2-hour rated spaces for beams and floor decks*.

LBA's response #1: The roof framing and metal deck do not require spray fire-proofing.
LBA's response #2: The open web bar joists are required to be 1 hour rated as listed on sheet A0.2C – First, second & third floor rated plans.

Item No. 069 sheet AD.1 – AD.4 Demolition plans:

Question #1: *The 3D demolition isometric view on drawings AD.1, AD.2 and AD.3 notes the tunnels are existing to remain, but this is not consistent with the demolition plan.*
Question #2: *Keynote F3 is shown on plan AD.1 and AD.4, but is not listed in the demolition notes*

LBA's response #1: Disregard the note "Existing tunnel to remain" on demolition isometric drawings. Refer to the demolition plans for removal extent.
LBA's response #2: DELETE keynote F3 from First & Second floor demolition plan.

Item No. 070 sheet AA2.0 Add Alternate 2 – Incinerator canopy enclosure:

Question: *Please provide a door, frame and hardware schedule for the alternate 2 doors tagged 105E, 105F and 105G appearing on drawing AA2.0.*

LBA's response:
105E: Provide a 36" x 84" insulated metal "N" type door, painted hollow metal frame, 70-8204-LNL-26D, closer and weather strip.
105F: Provide a 36" x 84" insulated metal "N" type door, painted hollow metal frame, 70-8204-LNL-26D, closer and weather strip.
105G: Provide a 46" x 84" insulated metal "N" type door, painted hollow metal frame, 70-8204-LNL-26D, closer and weather strip.

Provide power as required for equipment

Item No. 071 sheet AA7.0 Add Alternate 7 – High density storage system:

Question #1: *The base bids calls for a high-density storage system in room 205 and plan A4.20.0 shows this room with one row of storage cabinets and two rails on the floor. Add alternate 7 calls for a high-density storage system to be added to room 106. However, 106 is a much deeper room than 205 and plan A4.10.0, which shows the base bid arrangement for 106, seems to show three rails on the floor. Does room 106 add alternate 7 receive the same as room 205 or are the storage cabinets for 106 larger than those in room 205?*
Question #2: *Alternate 7, which adds high-density storage cabinets to room 106 notes bidders are to include "related structural work." Please provide details of the structural work required.*

LBA's response #1: The high-density storage systems in 106 and 205 are similar in cabinet styles but different in size and rail design. See attached sketch ADD 3.5 for clarifications.
LBA's response #2: Refer to specification 10 56 26 – 1.04E & F Design data.

Item No. 072 sheet A0.2C First, Second and Third floor rated floor plans:

Question: *07 81 23 Intumescent Fireproofing (Column) is not consistently identified on Details J1, J6 and J10. Some columns to receive the fireproofing are marked with a description while others are identified with a circle. Please provide additional clarification.*

LBA's response:

- **First floor rated ceiling plan (J10):** All columns circled on this plan are to receive 07 81 23 – Intumescent fireproofing (column) and should have a 2-hour rated assembly.
- **Second floor rated ceiling plan (J6):** All columns circled on this plan are to receive 07 81 23 – Intumescent fireproofing (column) and should have a 2-hour rated assembly.
- **Third floor rated ceiling plan (J1):** All columns circled on this plan are to receive 07 81 23 – Intumescent fireproofing (column) and should have a 2-hour rated assembly.

LBA's clarification: The metal lath material can be fastened to the existing bar joist top cord with a Hilti X-U fastener or be attached directly to the bottom side concrete deck with tapcons.

Item No. 073 sheet A0.4C Window details:

Drawing C1/A0.4C indicates 07 25 00 Weather Barrier System is applied behind brick infill.
Question #1: *No other details are shown. Please provide additional information.*
Question #2: *Please confirm if 07 25 00 Weather Barrier is required behind all brick infill locations.*

LBA's response #1: The new weather barrier is provided so that the building's weather barrier remains continuous. New weather barrier to lap over existing weather barrier.
LBA's response #2: New weather barrier membrane is required at all areas of improvements.

Item No. 074 sheet A0.5 – Door schedule, frames and types:

Question #1: *Drawing A0.5 – Door Schedule, Frames and Types, indicated that door 109C is an Overhead Door but no additional detail is provided. Please confirm if this door is the 08 33 24 High Performance Overhead Coiling Door as indicated in the specifications.*

The doors to the small rooms allowing access to the back of the Autoclaves do not have tag numbers and are not listed among the doors on door schedule A0.5.
Question #2: *Please indicate the types of doors required for the laboratory rooms having autoclaves listed below. Please note these small rooms do not have room numbers so the room numbers listed below are for the main laboratory rooms which contain them – 224, 402 & 426.*

Question #3: *Mechanical drawing M1.2B calls for the door associated with lab room 224 to have a door transfer grille. This call-out does not appear on the doors at rooms 402 or 426. Please clarify if all three doors referenced above are to include door transfer grilles.*

LBA's response #1: Door 109C is the high performance overhead coiling door within specification section 08 33 24.
LBA's response #2: Door included as part of a stainless-steel barrier system. See attached information for further details.
Allied Engineering's response #3: Yes, all doors are required to have a transfer grill.

Item No. 075 sheet A1.0 Tunnel level floor plan and exterior utility courtyard:

Question: *Drawing A1.0/F8 indicates that 07 14 00 Fluid-Applied Waterproofing and Drainage Board is to be applied on all four walls of the electrical room. The dashed line trails past column line 3 to the East, past the walls of Electrical Room 004. Does this indicate that 07 14 00 Fluid-Applied Waterproofing is required along the length of the foundation wall? Please clarify.*

LBA's response: Extend water-proofing system 5'-0" pass column line E.

Item No. 076 sheet A1.5C – Roof details:

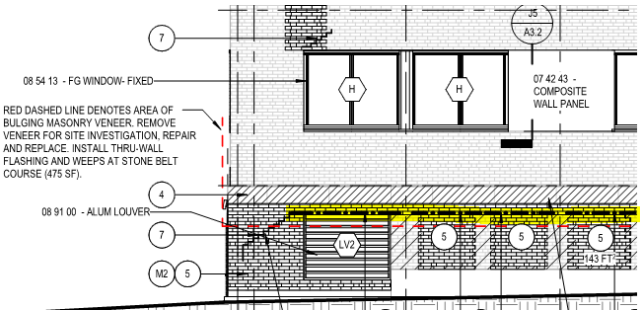
Question #1: *Mechanical Duct Enclosures (Parapet): Drawing A1.5C/J6 details a continuous enclosure for mechanical duct penetrations at the roof. Will access to this space be required for future work and/or maintenance? If so, should an access panel be included? If this is intended, please provide a specification.*
Question #2: *Detail J6 on sheet A1.5C shows membrane flashing covering the new steel angle & channel and stopping at the break. Is the intent to have membrane flashing several inches above or should it continue up to the roof deck elevation?*

Allied Engineering's response #1: No access is required
LBA's response #2: The membrane is intended to tie back into the existing weather barrier as required.

Item No. 077 sheet A2.1 – A2.6 Exterior elevations:

Question #1: *Circled Note 7 for "Visible masonry/cast stone crack, see additional notes below". There are no notes below. Please provide direction of the method to repair masonry/cast stone cracks.*
Question #2: *Where is Photo #1 shown in B1/A2.1 taken?*
Question #3: *The red dashed line indicates "area of bulging masonry veneer…". What is the upper limit of the area? Are we correct to assume a horizontal line across the tops of the vertical boundaries at approximately elevation 109'?*

LBA's response #1: At the two locations where note "7" is used a majority of the existing brick is scheduled to be removed. Refer to general notes for additional information
LBA'S response #2: Photo B1/A2.1 is located at the existing south entry below the glass block.
LBA's response #3: On exterior elevation J4/A2.1 the dark dashed line highlighted below represents new lintel work.



Item No. 078 sheet A4.00 Lab casework types:

Drawing A4.00: The Laboratory Sink and Fixture Schedule does not match the Plumbing Schedule per drawing P6.1 or designations on plumbing plans.

Question #1: *Specification for sinks P-4B, P-4C, P-4E and P-4F says to refer to spec 12 36 00. Please provide specification for sinks provided by Laboratory Casework vendor.*

Question #2: *Cup sinks under lab hoods at Rooms 147, 233, 304 and 306 are not labeled. Please provide specification for cup sink and fixture(s).*

Question #3: *Sinks designated as SK-5 and SK-6 are listed as part of AQA Lab fit-up (ALT 4). Please confirm there are no freestanding utility sinks meeting this description. Freestanding sink P-8 will be relocated and installed as part of ALT 4 per plumbing plan P2.3BA.*

Question #4: *Fixtures MV, EW, RO, FP, SH-1, SH-2, SH-3 and SH-4 listed on drawing A4.00 seem to be duplicates (although tags and model numbers do not match) of fixtures scheduled with plumbing. Please confirm that these fixtures will be provided and installed by the Plumbing contractor per P6.1 Plumbing Schedule. The lab casework vendor will provide integral fixtures only.*

Question #5: *There are no tags or specifications for the last seven items listed in the Laboratory Sink and Fixture Schedule. Please clarify who provides these items.*

LBA's response #1: See schedule on A4.0, indicated by basis of design manufacturer and product, provide substitution request for alternate products and confirm compatibility and size with casework as required with that substitution request. Plumbing schedule should be followed for sink connections only.

LBA's response #2: Cup sinks are provided by hood manufacturer and are installed in the hood work surface as indicated in the fume hood specification. Faucets and fitting by hood manufacturer and listed in lab sink and fixture schedule on A4.0

LBA's response #3: There's (1) existing freestanding sink (SK6) to be relocated in Filter Prep 335 which will be owner furnished and contractor install. The remaining sinks within this suite will be per plumbing drawings.

LBA's response #4: Follow A4.0 for all laboratory fittings and fixtures. All lab fixtures are ideally provided by casework and fume hood supplier for coordination as indicated on A4.0, all products supplied under different contracts must be coordinated and matching.

LBA's response #5: A4.0 calls out the products supplied at locations as indicated with correct product type per general note, and if not noted locate by service and type indicated– i.e. wall mounted needle valve with floating escutcheon by water saver model L4880FT-32 supplied where gas valve (indexed for appropriate gas) is indicated at walls. Scheduled ILO specifications. These can be provided under the plumbing contractor by the laboratory casework vendor, ideally by the laboratory casework and fume hood supplier under one contract. If supplied under separate contracts, all fume hood, casework, and general l lab fittings must be from the same product families as indicated and coordinated to match throughout the lab.

Item No. 079 sheet A4.21.0 Enlarged Second floor plan, Isometric & Schedule – Part B:

Question: *Autoclave ACL-2: The plan A4.21.0 of room 224 calls for the autoclave ACL-2 to be OFCI however, elevation H7/A4.21.3 denotes it CFCI. Please clarify if this item is to be furnished by the owner or by the contractor and, if the latter, please provide a specification.*

LBA's response: OFCI as indicated on schedule.

Item No. 080 sheet A4.40.0 – Enlarged Fourth floor plan & Interior elevations – Part A:

Question: *CLIN MICOR AUTOCLAVE & WASH room 402 indicates equipment tag numbers WS-1 and ACL-1 are OFCI. However, elevation H1/A4.40.3 calls for these items to be CFCI. Please clarify who is to supply these items and, if the contractor, please provide a specification.*

LBA's response: OFCI as indicated on schedule.

Item No. 081 sheet A4.41.0 – Enlarged Fourth floor plan, Isometric & Schedule – Part B:

Question #1: *CLIN MICRO BSL3 AUTOCLAVE room 426 and elevation J7/A4.41.3 both call for item tagged ACL-1 to be CFCI. If the contractor is to supply this item, please provide a specification.*

Question #2: *Plan 4.41.0 calls for built-in benches in rooms 422, 441 and 443. However, an elevation is provided for only one of these rooms: 422. And here B13/A4.41.2 denotes the bench as "By Owner." Please indicate if the benches are by the Owner or, if built-in, please provide a detail of their construction and the materials to be used.*

Question #3: *In some laboratory rooms the countertop covers items of lab cabinetry but then extends past them. See for example drawing A4.41.0 room 428 and the elevations H1, H4, H7 and H11 on A4.41.3. Lab cabinetry BS1-36 is shown. However, the countertop for it extends beyond it and runs around a portion of the room. Is the intent, for the sake of continuity and the matching of colors and materials, that all countertops in laboratories, whether directly over a piece of lab base cabinetry or whether extending beyond them, be supplied by and be the same material as the suppliers of lab furnishings and casework named in sections 12 31 00 and 12 35 53? Please note that, in addition to room 428, this situation also occurs in rooms 110, 117, 207, 402, 408 and 410 (410 is a special case in that the countertop is wall mounted above cabinetry rather than being extensions of countertop over lab cabinets. However, in the case of room 410, if the intent is that the countertop is part of millwork, the finish schedule for that room (drawing AI1.4) does not designate a material type for countertop suggesting it might fall under the supply of lab casework).*

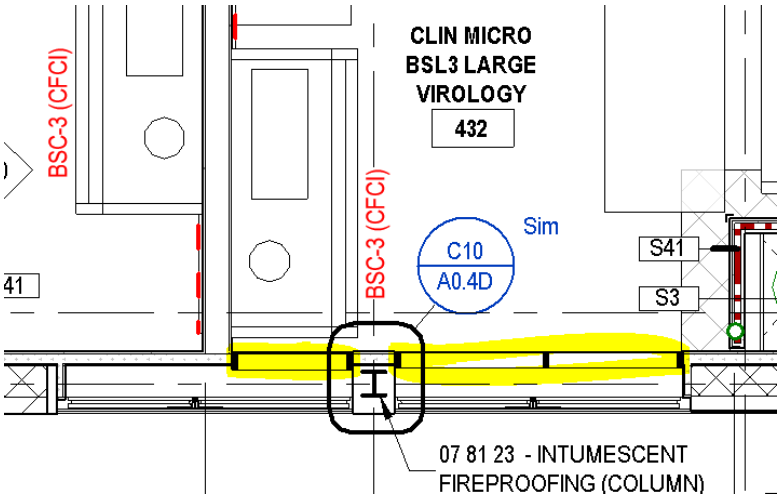
Question #4: *The BSL3 labs get an interior window designated with a double letter tag (e.g., CC, MM, FF, etc.). These windows are mounted inboard of an exterior window and all are shown on plan A4.41.0. However, room 432, one of the rooms that has these special windows, does not label the ones left and right of column E/12 (see below). Scaling the width, the wide one appears to be another EE and the short one appears to be another LL (or possibly a GG – I do not find a GG on the plan so maybe it's this one).*

LBA's response #1: OFCI as indicated on schedule

LBA's response #2: Provide a solid surface bench supported with RAKK brackets.

LBA's response #3: All laboratory benchtops, whether mobile tables or in fixed locations, are epoxy laboratory benchtop except where noted as stainless steel. Room 410 is a laboratory environment with epoxy work surfaces. All other rooms listed in this question are also laboratories with epoxy work surfaces EXCEPT: room 110 as indicated, plastic laminate / millwork.

LBA's response #4: The highlighted specialty aluminum window sizes equal: 2'-6" x 4'-7" and a 6'-0" x 4'-7" (type EE)



Item No. 082 sheet P1.1C – First floor Sanitary Piping Plan – Area C & P1.5 – Roof Plumbing Plan & Plumbing Isometric:

Question: Please provide construction details for the Concrete Inertia Bases.

Allied Engineering's response: Provide pre-manufactured bases where indicated on drawings and as noted in specification section 220548 (& 230548). Provide the concrete per inertia base manufacturer's recommendations.

Item No. 083 sheet P2.1C – First floor Domestic Piping Plan – Area C:

Question: *There are two callouts at J-line between columns N and P for 'F1' and 'F2'. What is being specified?*

Allied Engineering's response: Those are Pipe Riser references (typical throughout all drawings), see details.

Item No. 084 sheet P2.2B – Second floor Domestic Piping Plan – Area B:

Question: *Sink at Room 237 is labeled as P-4B but shows RO water. Please verify that sink should be P-4C.*

Allied Engineering's response: Sink shall be tagged "P-4C"

Item No. 085 sheet P6.1 - Plumbing schedules:

Question #1: *Tag P-3: Schedule says fixture furnished by Div. 22, but lavatory is integral with counter. Please confirm Div. 22 shall provide and install trim only.*
Question #2: *Plumbing spec says P-4D sink is provided by Div. 22. Plumbing schedule says P-4D sink is provided by Div. 12. Please clarify.*

Allied Engineering's response #1: Integral sinks shall be provided by others. Div. 22 shall provide all required trim.
Allied Engineering's response #2: P-4D sink shall be provided by Div. 22.

Item No. 086 sheet M1.4B Fourth floor HVAC plan – Area B:

Allied Engineering's modification: Change the three (3) BSC-4 biosafety cabinets to BSC-3. The six (6) biosafety cabinets (labeled BSC-3) shall have a 70/30 thimble exhaust connection, not hard ducted, coordinate with revised Biosafety Cabinet Schedule.
Allied Engineering's modification: Replace drawing M1.4B with revised M1.4B addressing biosafety cabinet changes.

Item No. 087 sheet M1.6 - Mechanical room plans and M5.3 - Mechanical details:

Drawing M5.3, detail G10 and M1.6, detail E1: Schematic per detail G10 shows a 3" runaround pipe loop between DOAS-B and DOAS-B-HRU. Because these AHUs are not connected and at two different locations on the roof, the interconnecting piping cannot be piped as shown on drawing M1.6, detail E1.

Question #1: *Should this piping be routed on the roof under the mechanical dunnage or in the ceiling space of the 4th floor?*

Question #2: *If the pipe is run on the roof, does it require heat trace?*

Allied Engineering's response #1: Piping between the two units shall be located above the roof.

Allied Engineering's response #2: No, it contains a glycol mixture.

Item No. 088 sheet M6.2 – Mechanical schedules:

Allied Engineering's modification: Delete supply VAV box labeled SAV-B403B and revise the LAB AIRFLOW CONTROL VALVE SCHEDULE as follows highlighted in BLUE:

LAB AIRFLOW CONTROL VALVE SCHEDULE

ROOM(S) SERVED	ENHANCED CONTROL (SEE 230993, 2.05.F)	SUPPLY VALVE						HOT WATER REHEAT COIL								EXHAUST VALVE							
		SUPPLY VAV BOX	INLET SIZE	TYPE	SUPPLY CFM MAX	SUPPLY CFM MINIMUM	PD at Maximum Supply CFM ("WC)	MBH	W"	H"	FACE VEL. FPM	EAT	LAT	EWT	LWT	GPM	EXHAUST VAV BOX	SERVES	MAT'L	INLET SIZE	TYPE	EXHAUST CFM MAX	EXHAUST CFM MINIMUM	PD at Maximum Exhaust CFM (" WC)
CLIN MICRO ANTE ROOM 105 + VEST	YES	**SAV-B101**	10	FAST	520	100	0.07	22,672	14	10	535	55	95	160	135	1.9	**EAV-B101**	GE	ALUM	8	FAST	420	0	0.05
CLIN MICRO NECROPSY 105.1	YES	**SAV-B102**	8	FAST	320	180	0.08	13,952	10	10	461	55	95	160	135	1.2	**EAV-B102**	GE	ALUM	10	FAST	470	280	0.06
TRIAGE BSL3 117	YES	**SAV-B103**	6	FAST	200	200	0.05	8,720	8	6	600	55	95	160	135	0.7	**EAV-B103**	BSC-2	ALUM	8	FAST	350	350	0.04
CLIN MICRO-AUTOCLAVE 426	YES	**SAV-B401**	8	FAST	375	375	0.10	14,306	10	10	540	55	90	160	135	1.2	**EAV-B401**	H-4	ALUM	10	FAST	525	525	0.08
CLIN MICRO-TB CULT PREP 428	YES	**SAV-B402**	10	FAST	680	420	0.06	25,942	14	10	699	55	90	160	135	2.2	**EAV-B402**	GE	ALUM	12	FAST	780	520	0.08
CLIN MICRO-BSL3 LARGE T.B.430	YES	**SAV-B403A**	14	FAST	1,186	1,186	0.09	45,246	22	16	485	55	90	160	135	3.8	**EAV-B403A**	BSC-3	ALUM	10	FAST	600	600	0.08
																	EAV-B403B	BSC-3	ALUM	10	FAST	600	600	0.08
CLIN MICRO-BSL3-LG.VIROLOGY 432	YES	**SAV-B404A**	10	FAST	625	625	0.08	23,844	14	10	643	55	90	160	135	2.0	**EAV-B404A**	BSC-3	ALUM	12	FAST	750	750	0.10
------		**SAV-B404B**	10	FAST	625	625	0.08	23,844	14	10	643	55	90	160	135	2.0	**EAV-B404B**	BSC-3	ALUM	12	FAST	750	750	0.10
CLIN MICRO BACT 457	YES	**SAV-B405**	14	FAST	1,000	1,000	0.17	38,150	22	16	409	55	90	160	135	3.2	**EAV-B405A**	BSC-3	ALUM	10	FAST	600	600	0.08
																	EAV-B405B	BSC-3	ALUM	10	FAST	600	600	0.08
CLIN MICRO SELECT AGENT 455	YES	**SAV-B406**	8	FAST	400	220	0.04	15,260	10	10	576	55	90	160	135	1.3	**EAV-B406**	GE	ALUM	10	FAST	550	370	0.04
CLIN MICRO SCOPES 453	YES	**SAV-B407**	8	FAST	400	220	0.04	15,260	10	10	576	55	90	160	135	1.3	**EAV-B407**	GE	ALUM	10	FAST	550	370	0.04
CLIN MICRO BSL3 LAB FLEXIBLE 451	YES	**SAV-B408**	8	FAST	400	220	0.04	15,260	10	10	576	55	90	160	135	1.3	**EAV-B408**	GE	ALUM	10	FAST	550	370	0.04
CHANGE-SHOWER-AIR LOCK	YES	**SAV-B409**	8	FAST	250	250	0.05	9,538	10	10	360	55	90	160	135	0.8	**EAV-B409**	GE	ALUM	8	FAST	290	290	0.06
CLIN MICRO ANTE CORRIDOR	YES	**SAV-B410**	14	FAST	1,000	1,000	0.09	38,150	22	16	409	55	90	160	135	3.2								
					7,981																	*8,385*		

Item No. 089 sheet M6.4 – Mechanical schedules:

Allied Engineering's modification: Fan schedule: Revise EF-BSC2 CFM from 200 up to 350CFM. This did not change the selection or any other information in the schedule.

Item No. 090 sheet EP5.0 - Power riser diagram:

Question: *Drawing EP5.0: Electrical gear manufacturer needs all dimensional information (height, width, depth) and any nameplate information for the panels shown to be reused so they can price the panel tubs and accessory kits: (9) panels per keyed note 4, (4) panels per keyed note 5, and (2) panels per keyed note 6.*

Allied Engineering's response: We do not have this information. In order to get this information, the contractor will have to coordinate with the owner in order to visit where the removed panels are being stored so that they can acquire the information that they need.

Item No. 091 sheet EP5.2 – Electrical detail (J7):

Question: Drawing states that the e*lectrical contractor is to furnish and install heat trace. Heat trace is specified in plumbing spec section 22 05 33. Please clarify who shall furnish and install heat trace.*

Allied Engineering's response: Delete Detail J7 on sheet EP5.2. However, make power provisions for each heat trace circuit as identified on sheet EP6.1. The heat trace systems shall be furnished, installed and terminate at the respective power kit by Division 22.

Item No. 092 Laboratory modifications:

LBA's modifications: See the attached sketches (ADD 3.1 thru 3.4) modifying laboratory benches and BSC sizes.

Item No. 006

SECTION 09 67 00
FLUID-APPLIED FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fluid-applied flooring, base and accessories.

1.02 RELATED REQUIREMENTS

A. Section 09 05 61 – Common Work Results for Flooring Preparation.

B. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors and surface preparation.

1.03 REFERENCE STANDARDS

A. ASTM D570 - Standard Test Method for Water Absorption of Plastics.

B. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.

C. ASTM D4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.

C. Samples: Submit samples 3 x 3 inch in size illustrating color and pattern for each floor material for each color specified.

D. Certification and Field Reports:
   1. Prior to installation of flooring, submit written certification by each flooring manufacturer that condition of sub-floor is acceptable.
   2. Submit copies of manufacturer's technical representative's field reports for each field visit.

E. Manufacturer's Installation Instructions: Indicate special procedures.

F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum fifteen years documented experience.

B. Applicator Qualifications: Company specializing in performing work of this Section with minimum five years experience, trained and approved by the product manufacturer.

1.06 PRE-INSTALLATION MEETING

A. Convene a pre-installation meeting at least two weeks before starting work of this Section; require attendance by the Contractor, a technical representative from the flooring manufacturer, flooring installer, Architect and Owner, to review slab conditions, surface conditions and preparation requirements, materials, installation procedures and coordination of related work.
   1. A field report summarizing the findings and recommendations from this meeting shall be issued by the technical representative and copied to the Owner and Architect.
   2. Written certification from the flooring manufacturer that condition of sub-floor is acceptable for flooring installation shall be issued and copied to the Owner and Architect.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store resin materials in a dry, secure area.

B. Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.08 FIELD CONDITIONS

A. Maintain minimum temperature in storage area of 55 degrees F.

B. Store materials in area of installation for minimum period of 24 hours prior to installation.

C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

1.09 WARRANTY

A. See Section 01 78 00 - Project Close-out, for additional requirements.

B. Provide manufacturer's product warranty, but in no case less than two years. See product listing for term.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fluid-Applied Flooring: Primer, waterproofing membrane and epoxy resin multi-coat chemical resistant, thermosetting flooring system with troweled epoxy resin base with silica aggregrate, colored quartz aggregate embedded in base coat, and seamless overlay sealer coating. System thickness: 2 mm / 3/16”.
   1. Technical Requirements:
      a. Water Absorption, ASTM D413: 0.1 percent.
      b. Flammability, ASTM E648: Class I.
      c. Coefficient of Friction, ASTM F1679 for Medium Texture: Dry, 0.96; Wet, 0.93.
   2. Waterproofing Membrane: Two-component, liquid applied urethane membrane.
      a. VOC Content, ASTM D2369, Method E: 0.05 lb/gal
      b. Hardness, ASTM D2240, Shore A: 70.
      c. Product: Stoneshield ME7 by Stonhard.
      d. Substitutions: See Section 01 60 00 - Product Requirements.
   3. Flooring System
      a. Products:
         1) Stontec by Stonhard, Inc.
         2) Accelera HC by Dur-A-Flex.
         3) Equal by Dur-A-Quartz.
      a. Primer: Resin epoxy as recommended by the system manufacturer. .
      b. Aggregate: Quartz chips, two colors as selected.
      c. Body Coat: Epoxy resin, as recommended by the system manufacturer.
      d. Top Coat: Epoxy resin, clear, 2-coats, thickness per selected non-slip surface texture selected.
      e. Integral coved base, 4 inches high or as indicated on the Drawings.
      f. Surface Texture: Non-slip, as selected by the Architect from actual flooring surface samples.

2.02 ACCESSORIES

A. Divider Strips: Extruded mill finish aluminum, height to match flooring thickness, with anchoring features.

B. Control Joint Strips: Similar to divider strips, with anchoring features, strip height to suit flooring thickness.

C. Base Caps: Extruded mill finish aluminum.

PART 3 EXECUTION

3.01 EXAMINATION

A. See Section 09 05 51 - Common Work Results for Flooring Preparation.

B. Any conditions that could adversely affect the flooring installation shall be corrected, prior to proceeding with the Work. Commencement of the installation of flooring shall be considered acceptance of the concrete slab as being suitable for the intended application. Any conditions that could adversely affect the flooring installation shall be brought to the Contractor's attention, for resolution, prior to proceeding with the Work.

3.03 PREPARATION

A. See Section 09 05 51 - Common Work Results for Flooring Preparation.

3.03 INSTALLATION - STRIPS

A. Accurately saw cut substrate to install divider strips.

B. Install strips straight and level to locations indicated.

C. Install cant strips at base of walls where flooring is to be extended up wall as base.

D. Install base divider strips to match floor pattern. Install terminating cap strip at top of base; attach securely to wall substrate.

3.04 INSTALLATION - FLOORING

A. Mix and apply in accordance with manufacturer's instructions.
   1. Base shall be screed applied and troweled to a tightly closed finish. Allow to cure.
   2. Lightly grind base surface, then apply undercoat with steel squeegee and looped roller to uniformly distribute and promote surface leveling.
   3. Broadcast aggregate into freshly rolled undercoat evenly. Allow to cure.
   4. Remove loose aggregate and vacuum surface.
   5. Apply sealer to thickness as required for selected surface finish.

B. Apply each coat to minimum thickness required by manufacturer.

C. Finish to smooth level surface, except where flooring slopes to floor drains.

D. Cove at vertical surfaces for integral base installation.

3.05 PROTECTION

A. Prohibit traffic on floor finish for 48 hours after installation.

B. Barricade area to protect flooring until cured.

END OF SECTION

Item No. 011

CONTRACTOR'S SUBSTITUTION REQUEST

To Architect: LAVALLEE | BRENSINGER Date: 4.29.19

From Contractor: A.T. VILLA, INC Number: _____

Specification Section: 11 53 13 Page: _____

Article / Paragraph: ACCEPTABLE MANUFACTURER

1. Product data for proposed substitution to include: Description of product, reference standards, performance, and test data.

   Sample attached: Yes__ No X To be sent if requested by Architect Yes ___ No X

2. Itemized comparison of proposed substitution with product specified is attached.

	ORIGINAL PRODUCT	PROPOSED SUBSTITUTION
Trade Name, Model:	FUMEHOODS	A.T. VILLA STANDARD PRODUCT
Manufacturer:	MOTT,	A.T. VILLA
Installer:	A.T. VILLA CONTRACTED	

   History of proposed substitution: New product __ 2-5 years old __ 5-10 years old__ > 10 years old X

   Significant variations of proposed substitution from original product: MEETS DESIGN INTENT BUT VARYING HARDWARE USED AND AESTHETIC

   Proposed substitution affects other parts of the Work: No X Yes, explain _____

   Similar installations within 150 miles: Provide project name, address, architect, install date: SEE ATTACHED PARTIAL LIST OF REFERENCES

   Reason for not providing specified item: WE ARE A COMPETITIVE MANUFACTURER TO MOTT

3. Unit costs, if applicable: State if cost is materials only ___ or materials installed ___.

   Original product $ _____ per _____ Substitution $ _____ per TO BE DETERMINED AT BID

   Savings to Owner for accepting substitution: TBD $_____

   Proposed substitution changes Contract Time: No ___ Yes __ Add/Deduct _____ days.

   The Undersigned certifies: 8-10 WEEK PRODUCTION LEADTIME

- Proposed substitution has been fully investigated and determined to be equal or superior to the specified product.
- Same warranty will be furnished for proposed substitution as for the specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated herein is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions, functional clearances or design appearance.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: DEREK MATSON, A.T. VILLA

Attachments: FUMEHOOD SPECIFICATIONS

CONTRACTOR'S SUBSTITUTION REQUEST

To Architect: LAVALLEE | BRENSINGER Date: 4.29.19

From Contractor: A.T. VILLA, INC Number: _____

Specification Section: 12 35 53, 12 31 00 Page: _____

Article / Paragraph: ACCEPTABLE MANUFACTURER

1. Product data for proposed substitution to include: Description of product, reference standards, performance, and test data.

   Sample attached: Yes__ No X To be sent if requested by Architect Yes ___ No X

2. Itemized comparison of proposed substitution with product specified is attached.

	ORIGINAL PRODUCT	PROPOSED SUBSTITUTION
Trade Name, Model:	METAL/FLEXIBLE CASEWORK	A.T. VILLA STANDARD PRODUCT
Manufacturer:	MOTT,	A.T. VILLA
Installer:	A.T. VILLA CONTRACTED	

   History of proposed substitution: New product __ 2-5 years old __ 5-10 years old__ > 10 years old X

   Significant variations of proposed substitution from original product: MEETS DESIGN INTENT BUT VARYING HARDWARE USED AND AESTHETIC

   Proposed substitution affects other parts of the Work: No X Yes, explain _____

   Similar installations within 150 miles: Provide project name, address, architect, install date: SEE ATTACHED PARTIAL LIST OF REFERENCES

   Reason for not providing specified item: WE ARE A COMPETITIVE MANUFACTURER TO MOTT

3. Unit costs, if applicable: State if cost is materials only ___ or materials installed ___.

   Original product $ _____ per _____ Substitution $ _____ per TO BE DETERMINED AT BID

   Savings to Owner for accepting substitution: TBD $_____

   Proposed substitution changes Contract Time: No ___ Yes __ Add/Deduct _____ days.

   The Undersigned certifies: 8-10 WEEK PRODUCTION LEADTIME

- Proposed substitution has been fully investigated and determined to be equal or superior to the specified product.
- Same warranty will be furnished for proposed substitution as for the specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated herein is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions, functional clearances or design appearance.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: DEREK MATSON, A.T. VILLA

Attachments: FORTE, BASIC, SPECIFICATIONS, BROCHURES

LBA 15-074-00

SECTION 12 35 53 – LABORATORY CASEWORK

PART 1 - GENERAL

1.00 SUMMARY

A. Section Includes:
   1. Fixed Inset Steel Casework
   2. Work-Surfaces
   3. Sinks
   4. Plumbing Fixtures
   5. Accessory Equipment

1.01 FIXED INSET STEEL CASEWORK DESIGN REQUIREMENTS

A. Flush face design: Doors, drawers and panels are inset into the cabinet carcass and flush with the face plane of the carcass. Front edge of carcass must have a smooth face edge with no side, top bottom or rail elements overlapping.

B. Front edge styling: Front width of end panels 3/4" and front height of top and bottom members 1".

C. Self-supporting units: Completely welded shell assembly so that cases can be used interchangeably or as a single, stand-alone unit. Acceptable to have remove-able back panels to access plumbing. Removable bottom trays are acceptable.

D. Interior of case units: Easily cleanable, flush interior. Base cabinets, 30" and wider, with double swinging doors shall provide full access to complete interior without center vertical post.

E. Drawers: Designed to be easily removable in field without the use of special tools.

F. Drawers and Doors: Drawer and door pulls must be extruded aluminum material with steel metal closed end or PVC end caps. Molded integral plastic pulls are unacceptable.

G. Case openings: Rabbeted joints all four sides of case opening for hinged doors and two sides for sliding doors in order to provide dust resistant case.

H. Framed glazed doors: Identical in construction, hardware and installation to solid

panel doors. Design frame glazed doors to be removable for glass replacement.

I. Finishes: Epoxy Powder Coat, RAL 9002 unless specified as other per project.

1.02 CASEWORK PERFORMANCE REQUIREMENTS

A. Structural performance requirements: Casework components shall withstand the following minimum loads without damage or permanent deformation to the component or to the casework operation:
   1. Steel base unit load capacity: 500 lbs. per lineal foot.
   2. Suspended units: 300 lbs.
   3. Drawers in a cabinet: 100 lbs.
   4. Hanging wall cases: 300 lbs.
   5. Load capacity for shelves of base units, wall cases and tall cases: 40 lbs. per square foot, up to 200 lbs.

B. Metal Finish Performance Requirements:
   1. Abrasion resistance: Tabor abrasion tester CS 10 wheel 14 mg. weight loss per 100 cycles.
   2. Hardness: Surface hardness equivalent to 4H pencil.
   3. Humidity resistance: Withstand 288 hour exposure in saturated humidity with no loss of adhesion or blistering. (ASTM D2247)
   4. Moisture resistance:
      a. No visible effect to surface finish after boiling water trickled over test panel inclined at 45°F for five minutes.
      b. No visible effect to surface finish following 100 hour continuous application of a water soaked cellulose sponge, maintained in a wet condition throughout the test period.
   5. Adhesion: Score finish surface of test panel with razor blade into 100 squares, 1/16" x 1/16", cutting completely through the finish but with minimum penetration of the substrate, and brush away particles with soft brush. Minimum 90 squares shall maintain their finish.
   6. Salt spray: Withstand minimum 144 hour salt spray test. (ASTM B117-64)

C. Chemical Resistance Finish Performance Requirements:

1.03 WORK SURFACE PERFORMANCE REQUIREMENTS

C. Material: Phenolic Resin Panels; 25mm (1") thickness. Must have the perform to the following characteristics:
   1. Self supporting from 1" in thickness and have a high load bearing ability.
   2. Impervious to most materials used in biochemical and medical laboratories: radio-isotopes, human tissue and blood samples or bacteria.
   3. Impermeable to most bacteria, molds or microorganisms.
   4. Resistant to dyes and organic solvents, water-resistant and remain easy to clean or disinfect.
   5. Must be GREENGUARD Indoor Air Quality Certified® and achieve GREENGUARD Children & Schools^{SM} Certification.

1.04 QUALITY ASSURANCE

A. Single source responsibility: Casework, work surfaces, equipment and accessories shall be manufactured or furnished by a single laboratory furniture company.

B. **All casework construction and performance characteristics shall be in full compliance with SEFA 8 standards.** At the owner's request, independent, third party testing must be submitted validating compliance and adheres to the architectural specifications.

C. Manufacturer's qualifications: Modern plant with proper tools, dies, fixtures and skilled workmen to produce high quality laboratory casework and equipment, and shall meet the following minimum requirements:
   1. Ten years or more experience in manufacture of laboratory casework and equipment of type specified.
   2. Five installations of equal or larger size and requirements.
   3. Case work fabrication, production and assembly must be within the United States of America.

D. Installer's qualifications: Factory trained and/or certified by the manufacturer.

E. Cabinet identification: Cabinets are identified on drawings by manufacturer's catalog numbers. Unless otherwise modified on drawings or in specifications, catalog description constitutes specific requirements for each type of cabinet.

1.05 SUBMITTALS

Include number of each type of submittal required if this information is not covered in Division 1 or elsewhere.

A. Shop Drawings: Provide 3/4" = 1'-0" scale elevations of individual and battery of casework units, cross sections, rough-in and anchor placements, tolerances and clearances. Indicate relation of units to surrounding walls, windows, doors and other building components. Provide 1/4" = 1'-0" rough-in plan drawings for coordination with trades. Rough-in shall show free area.

B. Product Data: Submit manufacturer's data for each component and item of laboratory equipment specified. Include component dimensions, configurations, construction details, joint details, and attachments, utility and service requirements and locations.

C. Product Samples Upon Request: Submit for approval:
   1. Top sample.
   2. Finish sample (3" X 5" painted steel).

D. Finish Samples: Submit [3 x 5] [__x__] inch samples of each color of finish for casework, work surfaces and for other prefinished equipment and accessories for selection by [Architect] [Owner].

E. Test Reports: When requested by [Architect] [Owner], submit independent, third party, laboratory certified test reports verifying conformance to test performance specified.

1.06 REFERENCE STANDARDS

1. All casework, worksurface and service fixture construction and performance characteristics shall be in full compliance with SEFA (Scientific Equipment and Furniture Association) standards. At the owner's request, independent, third party testing must be submitted validating compliance and adheres to the architectural specifications.
    1. SEFA 1.2 – Laboratory Fume Hoods
    2. SEFA 2.3 – Installation of Scientific Laboratory Furniture and Equipment
    3. SEFA 3 – Work Surfaces
    4. SEFA 7 – Laboratory and Hospital Fixtures
    5. SEFA 8 – Laboratory Furniture

1.07 DELIVERY, STORAGE AND HANDLING

A. Schedule delivery of casework and equipment so that spaces are sufficiently complete and material can be installed immediately following delivery.

B. Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film or other protective coating.

C. Protect all work surfaces throughout construction period with 1/4" corrugated cardboard completely covering the top and securely taped to edges. Mark cardboard in large lettering "No Standing."

1.08 PROJECT CONDITIONS

A. Do not deliver or install equipment until the following conditions have been met:

1. Windows and doors are installed; and the building is secure and weather tight.
2. Ceiling, overhead ductwork and lighting are installed.
3. All painting is completed and floor tile is installed.

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. Design, materials, construction and finish of casework specified are the minimum acceptable standard of quality for inset steel laboratory casework. The basis of this product specification is A.T. Villa USA Inc, 1233 Mayfair Rd. Ste. 302 Milwaukee, WI 53226

2.02 CASEWORK MATERIALS

B. All materials shall be of the highest quality, whether they be finished parts used in assembly, raw material, or materials and workmanship furnished by others, as part of the completed product.

C. All steel used in the manufacture of metal casework shall be cold rolled, prime grade, or better. Steel shall be inspected prior to fabrication and certified to be free of rust, pits, scratches, or any other defects(s) which prevent parts from being made to blueprint specifications.

D. Gauges:
   1. Gauge specifications for individual steel parts shall be as follows:
      a. Aprons - 18 Ga.
      b. Back Panels - 20 Ga.
      c. Bottom Panels - 18 Ga.
      d. Door & Drawer Outer Pan - 20 Ga.
      e. Door & Drawer Inner Pan - 20 Ga.

f. Drawer Bodies - 20 Ga.
g. Legs, 2" Square Tube - 18 Ga.
h. Shelves - 18 Ga.
i. Side Panels - 18 Ga.
j. Table Frames - 18 Ga.
k. Shelf Support Brackets - 14 Ga.

2.03 CASEWORK FABRICATION

A. Cabinets:
1. Cabinets shall be constructed of prime 18 gauge steel for the sides, backs, and toe space.
2. 1" X 18 gauge steel tubing shall be used for the top front and back rails.
3. Each front joint is to be welded and ground flush to provide a smooth surface.
4. A 4' high X 3' deep toe space shall be standard.
5. Four corners are to be fitted with a stamped and welded 14 gauge leveling gusset plate, and a plated leveling screw.
6. Leveling screws are provided with a slot for easy adjustment, and non marking nylon glides.
7. Removable back panels shall be furnished on all cabinets.
8. Cabinet bottom will be panned up to contain spills and removable for easy cleaning and maintenance.

B. Doors - Base Cabinet Doors:
1. Doors shall be double pan construction, with insulating material fastened to the inside for sound deadening, and strength, to prevent panning and bending.
2. Hinges are five knuckle gauge stainless steel, fastened to both the door and cabinet frame with zinc plated steel screws.
3. Door catches plated, friction roller type.
4. Door closes onto nylon bumpers for noise dampening, and over nylon spacers for alignment.
5. Pulls are to be recessed, aluminum extruded profiles with clear matt finish.

C. Drawers:
   1. Drawer bodies shall be one piece 20 gauge construction, fully coved on all four sides horizontally and formed out of one sheet of steel.
   2. Pulls are to be recessed, aluminum extruded profiles with clear matt finish.

D. Drawer Suspension:
   1. Drawers shall operate on full extension, ball bearing, zinc plated, drawer suspension rated to withstand 10,000 cycles at 100 lbs.

E. Shelves:
   1. Shelves shall be constructed of 18 gauge steel, with channels formed on both the front and back edges. K & V shelf clips are made from 14 gauge steel, and are to be adjustable vertically in 1" increments. Sliding shelves shall use the same ball bearing slides as drawer units.

F. Fabricated Accessories
   1. All accessories required for specific installations shall be fabricated and finished to the same material and quality standards as the base units they will be made to compliment.

G. Wall Cabinets:
   1. Wall cabinets shall be made to the same quality standards as base units. Material used, as noted above. Shelve hangers are to be constructed of 14 gauge steel, and to easily adjust vertically in one inch increments.

   2. Shelves are to be constructed with channel type fronts and backs, as well as flanged ends with nylon button glides. Wall units to have open fronts, sliding glass, framed glass sliding and swinging, or sliding and swinging steel doors as specified. Glass is plate, ground on all exposed edges.

   3. Sliding door units to be furnished with extruded top and bottom channels as well as ball bearing rollers. All wall units are to be furnished with hanger brackets for ease of installation.

H. Floor Units:
   1. Floor units shall be made to the same quality standards as base units. Material used, as noted above.

   2. Shelves and shelf hanger construction, same as wall units.

3. Floor unites to be furnished with the same front and door configurations as the above described wall units.

2.05 METAL FINISH

A. Metal Finish:
   1. Preparation: Spray clean metal with a heated cleaner/phosphate solution, pre-treat with iron phosphate spray, water rinse, and neutral final seal. Immediately dry in heated ovens, gradually cooled, prior to application of finish.

   2. Application: Electrostatically apply urethane powder coat of selected color and bake in controlled high temperature oven to assure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high grade laboratory furniture quality finish of the following thickness: Liquid, dipped, solvent based finishes are not and will not be acceptable.
      a. Exterior and interior exposed surfaces: 1.5 mil average and 1.2 mil min.
      b. Backs of cabinets and other surfaces not exposed to view: 1.2 mil average.

B. Cabinet Surface Finish Tests:
   All casework construction and performance characteristics shall be in full compliance with SEFA 8 standards. At the owner's request, independent, third party performance testing must be submitted validating compliance and adheres to the finish specifications.
   1. Chemical Spot Test
      a. Purpose of Test
         - The purpose of the chemical spot test is to evaluate the resistance a finish has to chemical spills.
           Note: Many organic solvents are suspected carcinogens, toxic and/or flammable. Great care should be exercised to protect personnel and the environment from exposure to harmful levels of these materials.
      b. Test Procedure
         - Obtain one sample panel measuring 14" x 24" (355.6mm x 609.6mm). The received sample to be tested for chemical resistance as described herein.
         - Place panel on a flat surface, clean with soap and water and blot dry. Condition the panel for 48-hours at 73±3°F / 23±2°C and 50±5% relative

humidity. Test the panel for chemical resistance using forty-nine different chemical reagents by one of the following methods:

- Method A – Test volatile chemicals by placing a cotton ball saturated with reagent in the mouth of a one-ounce (29.574cc) bottle and inverting the bottle on the surface of the panel.
- Method B – Test volatile chemicals by placing five drops of the reagent on the surface of the panel and covering with a 24mm watch glass, convex side down.
- For both of the above methods, leave the reagents on the panel for a period of one hour. Wash off the panel with water, clean with detergent and naphtha, and rinse with deionized water. Dry with a towel and evaluate after 24-hours at 73±3°F / 23°±2°C and 50±5% relative humidity using the following rating system:
  - **Level 0:** No detectable change.
  - **Level 1:** Slight change in color or gloss.
  - **Level 2:** Slight surface etching or severe staining.
  - **Level 3:** Pitting, cratering, swelling, or erosion of coating. Obvious and significant deterioration.

Test #	Chemical Reagent	Test Method
1.	Acetate, Amyl	A
2.	Acetate, Ethyl	A
3.	Acetic Acid, 98%	B
4.	Acetone	A
5.	Acid Dichromate, 5%	B
6.	Alcohol, Butyl	A
7.	Alcohol, Ethyl	A
8.	Alcohol, Methyl	A
9.	Ammonium Hydroxide, 28%	B
10.	Benzene	A
11.	Carbon Tetrachloride	A
12.	Chloroform	A
13.	Chromic Acid, 60%	B
14.	Cresol	A
15.	Dichlor Acetic Acid	A
16.	Dimethylformanide	A
17.	Dioxane	A
18.	Ethyl Ether	A
19.	Formaldehyde, 37%	A
20.	Formic Acid, 90%	B
21.	Furfural	A
22.	Gasoline	A
23.	Hydrochloric Acid, 37%	B
24.	Hydrochloric Acid, 48%	B
25.	Hydrogen Peroxide, 3%	B
26.	Iodine, Tincture of	B
27.	Methyl Ethyl Ketone	A
28.	Methylene Chloride	A
29.	Mono Chlorobenzene	A
30.	Naphthalene	A
31.	Nitric Acid, 20%	B
32.	Nitric Acid, 30%	B
33.	Nitric Acid, 70%	B
34.	Phenol, 90%	A
35.	Phosphoric Acid, 85%	B
36.	Silver Nitrate, Saturated	B
37.	Sodium Hydroxide, 10%	B
38.	Sodium Hydroxide, 20%	B
39.	Sodium Hydroxide, 40%	B
40.	Sodium Hydroxide, Flake	B
41.	Sodium Hydroxide, Saturated	B
42.	Sulfuric Acid, 33%	B
43.	Sulfuric Acid, 77%	B
44.	Sulfuric Acid, 96%	B
45.	Sulfuric Acid, 77% and Nitric Acid, 70% equal parts	B
46.	Toluene	A
47.	Trichloroethylene	A
48.	Xylene	A
49.	Zinc Chloride, Saturated	B

c. Acceptance Level
Results will vary from manufacturer to manufacturer. Laboratory grade finishes should result in no more than four Level 3 conditions. Suitability for a given application is dependent upon the chemicals used in a given laboratory.

2. Hot Water Test
   a. Purpose of Test
   The purpose of this test is to insure the coating is resistant to hot water.
   b. Test Procedure
   Hot water, 190°F to 205°F (88°C to 96°C), shall be allowed to trickle (with a steady stream and at a rate of not less than 6 ounces (177.44 cc) per minute on the surface, which shall be set at an angle of 45° for a period of five minutes.
   c. Acceptance Level
   After cooling and wiping dry, the finish shall show no visible effect from the hot water.

3. Impact Test
   a. Purpose of Test
   The purpose of this test is to evaluate the ductility of the coating.
   b. Test Procedure
   A one-pound ball approximately 2" (50.8mm) in diameter shall be dropped form a distance of 12" (304.8mm) onto a flat horizontal surface, coated to manufacturer’s standard manufacturing method.
   c. Acceptance Level
   There shall be no visible evidence to the naked eye of cracks or checks in the finish due to impact.

4. Paint Adhesion on Steel Test
   a. Purpose of Test
   The paint adhesion test is used to determine the bond of the coating to steel. This does not apply to non-steel products.
   b. Test Procedure
   This test is based on ASTM D2197-86 “Standard Method of Test for Adhesion of Organic Coating”. Two sets of eleven parallel lines 1/16" (1.587mm) apart shall be cut with a razor blade to intersect at right angles thus forming a grid of 100 squares. The cuts shall be made just deep enough to go through the coating, but not into the substrate. They shall then be brushed lightly with a soft brush for one minute. Examine under 100-foot candles of illumination.

c. Acceptance Level
Ninety or more of the squares shall show finish intact.

5. Paint Hardness on Steel Test
   a. Purpose of Test
   The paint hardness test is used to determine the resistance of the coatings to scratches.
   b. Test Procedure
      Pencils, regardless of their brand, are valued in this way: 8-H is the hardest, and next 11 order of diminishing hardness are 7-H, 6-H, 5-H, 4-H, 3-H, 2-H, H, F, HB, B (soft), 2-B, 3-B, 4-B, 5-B (which are softest). The pencils shall be sharpened on emery paper to a wide sharp edge. Pencils of increasing hardness shall be pushed across the paint film in a chisel-like manner until one is found that will cut or scratch the film. The pencil used before that one, that is the hardest pencil that will not rupture the film, is then used to express or designate the hardness.
   c. Acceptance Level
   The paint shall have a hardness of 4-H minimum with no visible puncture of the finish surface.

2.06 WORK SURFACES

A. Manufacturers :
   1. Acceptable Manufacturer: Trespa North America, Ltd., 12267 Crosthwaite Cir. Poway, CA 92064
   2. Substitutions: Not permitted.

B. Work Surface Series:
   1. TRESPA TOPLAB PLUS Solid Phenolic Laboratory Tops
      a. Material: Solid phenolic panel.
      b. Modulus of Elasticity: 1,305,000 psi (9,000 N/sqmm) minimum.
      c. Tensile Strength: 10,150 psi (70 N/sqmm) minimum.
      d. Flexural Strength: 14,500 psi (100 N/sqmm) minimum.
      e. Porosity: Nonporous surface and edges.
      f. Microbial Characteristics: Will not support microorganic growth.
      g. Chemical Resistance: Provide solid phenolic panel providing minimum performance when tested for chemical resistance in accordance with SEFA 8 (Laboratory Casework).

C. Dimensions:
   1. Panel Thickness: 1 inch (25 mm).

D. Finish:
   1. Color: White T03.0.0.

E. Accessories
   1. Laboratory Shelving: Provide solid phenolic laboratory shelving where indicated on the Contract Drawings.
   2. Installation Materials: Provide solid phenolic laboratory top manufacturer's joint adhesive, panel adhesive and sealants as required to suit project conditions.

F. Fabrication
   1. Fabricate solid phenolic laboratory tops and accessory items in accordance with manufacturer's recommendations, approved submittals and SEFA 8 - (Laboratory Casework)
      a. Comply with requirements of AWI Custom grade.
      b. Comply with requirements of AWI Premium grade.

G. Edge Treatment:
   1. Type: Standard edge (chamfer) or radius 1/16 inch (2mm).
   2. Ease all top edges and vertical corners to 1/4 inch (6 mm) radius and sand smooth.

H. Joints
   1. Type: As indicated on the Contract Drawings.
   2. It is recommended that the joint between two benches should be level. As a rule joints should be located away from sink areas and over or near supports.

I. Sink cut outs
   1. Type: As indicated on the Contract Drawings.
   2. Type: Routed for drop in sink
   3. It is recommended that an adequate gap should be provided between sink lid and sink hole.

J. Examination
   1. Do not begin installation until substrates have been properly prepared.
   2. Confirm surfaces are plumb and level, with no deflection greater than 1/4 inch (6mm) in 20 feet (6096mm).

3. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

K. Preparation
   1. Clean surfaces thoroughly prior to installation.
   2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

L. Installation
   1. Install in accordance with manufacturer's instructions.
   2. Laboratory Top Installation: Install laboratory tops plumb and level. Scribe to adjacent surfaces in accordance with manufacturer's recommendations.
      a. Fasten laboratory tops to supporting casework with fasteners and adhesive appropriate for use with adjoining construction as indicated on drawings and as recommended by manufacturer.
      b. Form field joints using manufacturer's recommended adhesive. Form inconspicuous and nonporous joints. Seal flexible joints using manufacturer's recommended adhesive.

M. Accessory Items: Install laboratory shelving, and racks with fasteners and adhesive appropriate for use with adjoining construction as indicated on Contract Drawings and as recommended by manufacturer.

N. Field Quality Requirements
   1. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

O. Protection
   1. Protect installed products until completion of project. Remove all protective foil and labels immediately after installation.
   2. Touch-up, repair or replace damaged products before Substantial Completion.

2.07 SINKS, DRAINS AND TRAPS

Data needed to complete: Manufacturer: Just Manufacturing

2.08 LABORATORY FITTINGS

Data needed to complete: Manufacturer: WaterSaver Faucet Co.

Finish: Polished chrome on brass body unless specified otherwise.
Equip valve handles with color coded plastic index buttons as follows:

Service	Indexing	Button Color	Lettering Color
Cold Water	CW	Green	White
Hot Water	HW	Red	White
Air	AIR	Blue	White
Gas	GAS	Orange	White
Vacuum	VAC	Yellow	White
Distilled Water	DW	White	Black
Steam	Steam	Black	White
Oxygen	OXY	Lt. Green	White
Nitrogen	N2	Gray or Brown	Black or White

2.09 ACCESSORY EQUIPMENT

specification for selected accessory equipment from Appendix D.

PART 1 GENERAL

1.00 SUMMARY

A. Section Includes:
   1. Tables
   2. Framing Structure
   3. Shelving
   4. Base and Overhead Cabinets
   5. Ceiling Service Panels

B. Related Sections:
   1. Section 11610 – Laboratory Fume Hoods are a part of this section.
   2. Section _____ - _____ : Furnishing and installation of plumbing utilities and final connections.
   3. Section _____ - _____ : Furnishing and installation of exhaust ductwork and equipment, and final connection to fume hood(s).
   4. Section _____ - _____ : Furnishing and installation of electrical utilities and final connections.

1.01 ALTERNATE PROPOSALS

Acceptable proposals from alternative manufacturers are allowed only if they meet with the minimum design bases of the proposed furniture system.

1.02 SYSTEM DESIGN REQUIREMENTS

A. Modular steel tube and weldment assembly structures with integrated and independent tabling systems allowing the addition of suspended base cabinets, overhead cabinets, mobile cabinets, shelving, electrical services, gas services, data services and common laboratory accessories.

B. Frames: Tubular and steel weldment structures for tables, shelves and service chase for gas services, electrical and data cables.
   1. Modular units shall be suitable for wall, peninsula and island configurations.
   2. Framing system supported with tables system.
   3. Framing system must be adaptable to host gas services, electrical and data services. Services shall not be limited to initial installation configuration. Services must be interchangeable and system should allow the user to remove or add services throughout the life of the product.
   4. Framing system shall not be UL listed in a manner that restricts the re-configuring of the system. Framing system should allow the use of UL Listed components, allowing the flexibility to change these services of the framing system.

C. Table Frames: Modular table system in configurations designed to attach to upright framing system, free standing and/or designed for perimeter installations.
   1. Adjustable height tables using mechanical fasteners to secure system.
   2. System shall be available in fixed height configurations in addition to adjustable height tables.
   3. Levelers are included on framing system, attached tables, freestanding tables and perimeter tables.

D. System Requirements:
   1. The system shall consist of mechanically fastened components allowing for re-configuration. The system shall use uprights that use mechanically fastened supports for cabinets, shelves, services and accessories.
   2. Structural components shall be self-supporting and independent of the building structure.
   3. The framing system must support service fixtures, electrical and data modules and host supply lines in the uprights and top horizontal support structure.
   4. The vertical height of table work surfaces and shelves shall be adjustable in 1” increments.

5. All services shall allow for the connection to the ceiling service panels directly and uninterrupted from the fixtures using quick connect devices. All gas services shall be interchangeable to allow field re-configurations of gas types and quantities.
6. All framing systems shall be gang-able and have ability to be attached to the building structure.
7. Table and framing system shall be design to allow for full off-site assembly and be designed for a complete knock down assembly and disassembly allowing for onsite assembly, disassembly and complete re-configurations of the table and framing system.

1.03 SUBMITTALS

Include number of each type of submittal required if this information is not covered in Division 1 or elsewhere.

A. Shop Drawings: Provide 3/4"=1'-0" scale elevations of all components, cross sections, rough-in and anchor placements, tolerances and clearances. Provide 1/4"= 1'-0" rough-in plan drawings for coordination with trades. Rough-in shall show free area.

1.04 QUALITY ASSURANCE

A. Single source responsibility: Laboratory furniture system, casework, work surfaces, laboratory equipment, chemical fume hoods and accessories shall be manufactured or furnished by a single laboratory furniture manufacturer.

B. Manufacturer's qualifications: Modern plant with proper tools, dies, fixtures and skilled workmen to produced high quality laboratory casework and equipment, and shall meet the following minimum requirements:
   1. Five years or more experience in manufacture of laboratory casework and equipment of similar product type specified.

C. Laboratory furniture systems shall not be UL Listed in a manner that restricts the re-configuration of services after initial installation. System shall be able to host components that are UL submitted, approved and listed. Products must bear the UL Mark and shall be identified to those products that were evaluated by UL and found to comply with UL's requirements.

1.05 DELIVERY, STORAGE AND HANDLING

A. Schedule delivery of laboratory furniture system so that spaces are sufficiently complete that material can be installed immediately following delivery.

B. Protect finished surfaces from soiling or damage during handling and installation.

1.06 PROJECT CONDITIONS

A. Do not deliver or install equipment until the following conditions have been met:
   1. Windows and doors are installed and the building is secure and weather tight.
   2. Ceiling, overhead ductwork and lighting are installed.
   3. Ceiling grid installed prior to install of Ceiling Service Panels if applicable.
   4. All painting is completed and floor tile is installed.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Design, materials, construction and finish of laboratory furniture specified is the minimum acceptable standard of quality for adaptable laboratory casework. The basis of this specification is A.T. Villa, Inc., 1233 N. Mayfair Road, Suite 302, Milwaukee, WI 53226 1-800-554-9259.

2.02 WORKSURFACE TABLES FRAMES

A. General requirements for table frames:
   1. All table types (tables attached to rear framing structure, free-standing and perimeter) shall have a uniform 1,500 pound weight load capacity.
   2. Shall be height adjustable from 29” - 36” in 1” increments.
   3. Shall be available in fixed height versions.
   4. Allow for knock down assembly and disassembly.
   5. Allow for off sight assembly and transport to project facility fully assembled.
   6. Assemble with common tools and fasteners.

B. Worksurface rear frame supported table frame:
   1. Nominal table frame dimensions:
      a. Width: [36"] [48"] [60"] [72"] [84”] [96"]
      b. Depth: [30"] (27" projecting in front of the uprights and .5" behind the upright)
      c. Adjustable Height: [29" to 36"] A.F.F. including .75" thick top.
   2. Leg structure support: 2.5” square tubing, 12 gauge hot rolled steel with 2.25” inner telescoping 12 gauge leg. Telescoping tubing shall be corner welded by high-frequency resistant welding and externally scarfed to agree with corner radii. Levelers are 3/8” – 16 NC x 2” long.
   3. Side leg weldments that attach to the frame structure must include gussets to stabilize forward movement.
   4. Front and side aprons: 3” x 1” cold rolled electric welded 14 gauge steel tubing. All welds seams of tubing to be oriented to the internal portion of the framing.
   5. Rear work surface support:
      a. Steel weldment of 14 gauge HRPO steel with height adjustability.
      b. Minimum 12” high on single sided tables.
      c. Minimum 12” high shared on double sided tables with additional 6” back support.
      d. Shall be mechanically fastened between opposing uprights to prevent frame racking.
   6. Table frame structure shall allow the option to add cabinet stop feature for mobile cabinets.
   7. Table frame structure shall provide the ability to mechanically suspend base cabinets from the table frame.
   8. Table frames shall be able to support sinks, sink fixtures and sink cabinets.

C. Worksurface free standing table frame:
   1. Nominal table frame dimensions:
      a. Width: [36"] [48"] [60"] [72"] [84”] [96"]
      b. Depth: [30"]
      c. Adjustable Height: [29" to 36"] A.F.F. including .75" thick top.
   2. Leg structure support: 2.5” square tubing, 12 gauge hot rolled steel with 2.25” inner telescoping 12 gauge leg. Telescoping tubing shall be corner welded by high-frequency resistant welding and externally scarfed to agree with corner radii. Levelers are 3/8” – 16 NC x 2” long.
   3. Leg and side aprons to be fully welded and not require side gussets for stability.
   4. Front, back and side aprons: 3” x 1” cold rolled electric welded 14 gauge steel tubing. All welds seams of tubing to be oriented to the internal portion of the framing.
   5. Rear work surface support:
      a. Steel weldment of 14 gauge HRPO steel with height adjustability.

b. Minimum 8” high.
c. Shall be mechanically fastened between opposing rear legs to prevent frame racking.

6. Table frame structure shall allow the option to add cabinet stop feature for mobile cabinets.
7. Table frame structure shall provide the ability to mechanically suspend base cabinets from the table frame.
8. Table frames shall be able to support sinks, sink fixtures and sink cabinets.

D. Worksurface perimeter table frame:
1. Nominal table frame dimensions:
a. Width: [36"] [48"] [60"] [72"] [84”] [96"]
b. Depth: [30"] (24" nominal frame depth allowing a minimum 4” rear overhang of worksurface to provide a rear service chase area for wall mounted services)
c. Adjustable Height: [29" to 36"] A.F.F. including .75" thick top.
2. Leg structure support: 2.5” square tubing, 12 gauge hot rolled steel with 2.25” inner telescoping 12 gauge leg. Telescoping tubing shall be corner welded by high-frequency resistant welding and externally scarfed to agree with corner radii. Levelers are 3/8” – 16 NC x 2” long.
3. Leg and side aprons to be fully welded and not require side gussets for stability.
4. Front, back and side aprons: 3” x 1” cold rolled electric welded 14 gauge steel tubing. All welds seams of tubing to be oriented to the internal portion of the framing.
5. Rear work surface support:
a. Steel weldment of 14 gauge HRPO steel with height adjustability.
b. Minimum 8” high.
c. Shall be mechanically fastened between opposing rear legs to prevent frame racking.
6. Table frame structure shall allow the option to add cabinet stop feature for mobile cabinets.
7. Table frame structure shall provide the ability to mechanically suspend base cabinets from the table frame.
8. Table frames shall be able to support sinks, sink fixtures and sink cabinets.

2.03 REAR FRAME SUPPORT STRUCTURE

A. General requirements for rear upright support frame structures:
1. System shall be available in single-sided and double-sided structures (shared frame assembly).
2. Frames shall be universal for maximum flexibility (not handed to one side or another).
3. Frames uprights shall allow for plumbing, electrical and data cabling.
4. All plumbing, electrical and data connections must be installed in a modular manner allowing onsite and post installation modifications to these services.
5. Frames shall not be UL Listed as to restrict re-configuration of services but shall utilize UL Listed components within the framing system.
6. System allows for knock down assembly and disassembly.
7. System allows for offsite assembly and transport to project facility fully assembled.
8. System must assemble with common tools and fasteners.
9. Framing system shall be designed to allow shelving, overhead cabinets and accessories to be mechanically fastened to the structure.

B. Nominal dimensions:
1. Widths: [36”] [48”] [60”] [72”] 84”] [96”]
2. Heights: [56”] [77”] [84”]

C. Frame component details:
1. Single sided uprights shall be 12 gauge 2.5” O.D. square tubing.
2. Double sided (shared assembly) uprights shall be a 14 gauge HRPO steel weldment.
3. Levelers are 3/8” – 16 NC x 2” long with a 400 pound load rating per leveler (1 leveler per single upright and 2 levelers per double sided).

4. Uprights shall be able to carry gas services in a modular manner allowing for services to be removed, added or changed onsite during or after original installation.
5. Each upright must be able to carry a minimum of three gas lines.
6. Uprights shall be able to house a minimum of three electrical circuits (two above the worksurface and one below.
7. Uprights shall have holes machined on 1" increments for mechanical fastening of shelves, overhead cabinets and accessories starting at nominal 53" A.F.F. to within 2.5" of the top of the upright.
8. Framing system shall be able to host electrical and data with horizontal modules, allowing for re-configuration through out the life of the product.
9. System shall be able to carry minimum of two circuits in horizontal modules.
10. All gas, electrical and data service shall be interchangeable in system post installation (any upright shall not be dedicated to one service permanently).
11. Horizontal cross supports to connect uprights shall be 11 gauge 2" x 1" steel tube weldment for single sided assemblies and 14 gauge formed steel weldment for double sided assemblies.
12. Attached table back panels shall be installed between upright framing to allow support for the rear of the worksurface and prevent side to side racking of the frame. Back panel shall be a 14 gauge HRPO steel weldment.
13. Gas services must provide a solution similar to the Home Run Solution™, with flexible gas lines running continuously from gas fixture in upright to the quick connect fitting at the ceiling without interruption of mechanical connections.

2.04 PLUMBING FIXTURES

A. General requirements:
   1. The upright frame structure shall house a maximum of three plumbing services per side.
   2. Plumbing lines (non-flammable gases) – 1/2" OD PVC flexible hose connected to brass elbow fitting and into valve fitting at worksurface with male quick disconnect attached to the hose, compatible with mating - female quick connect fitting attached to ceiling service panel. Panel mounted quick connect fitting provided with 3/8" NPT male inlet. No mechanical breaks shall occur in the hose line from the valve fitting to the quick connect fitting at the ceiling. Each half of the quick disconnect (coupler and nipple) are equipped with a valve fitting
   3. Plumbing lines (flammable gases) – 3/8" OD #304 stainless steel braided flexible hose connected to stainless steel elbow fitting and into valve fitting at worksurface with male quick disconnect attached to the hose, compatible with mating - female quick connect fitting attached to ceiling service panel or other gas piping location. Panel mounted quick connect fitting provided with 3/8" NPT male inlet. No mechanical breaks shall occur in the hose line from the valve fitting to the quick connect fitting at the ceiling. Each half of the quick disconnect (coupler and nipple) are equipped with a valve fitting. All fitting shall be stainless steel.
   4. Plumbing lines with the quick disconnects are to be arranged so services cannot be intermixed.
   5. All service valves and quick connects shall be media keyed and color-coded. Keyed media connects cannot be accidentally switched.
   6. All burning gases hoses shall be specified as #304 stainless steel.

2.05 SERVICE CONNECTIONS

A. General requirements:
   1. All services (plumbing, power, phone and data) make a direct and uninterrupted connection at the ceiling manifold system.
   2. All services (plumbing, power, phone and data) shall be installed in a modular manner allowing the system to be altered at anytime after installation.
   3. All services (plumbing, power, phone and data) must be UL Listed components keeping the frame structure non UL Listed.
   4. Power services will have a 20 amp cord plug extending to the ceiling interface panels. Plug end to be twist lock on single frame and double sided (shared) frame.

5. Phone CAT6 line will have a male plug-in extending to the ceiling interface panels. (Connections to the facility to be provided by others.)

   Data CAT6 line will have a male plug-in extending to the ceiling manifold system. (Connections to the facility to be provided by others.)

2.06 CEILING INTERFACE PANELS

A. General requirements
   1. Ceiling Interface Panel (CIP) (*often referred to as ceiling service panels*) shall integrate within most standard-duty T-grid acoustical suspended ceiling systems.
   2. CIP shall provide a means to mount and connect electrical outlets, data outlets and quick connect service fixtures.
   3. CIP shall accommodate single sided and back-to-back table configurations.
   4. CIP will ship with junction boxes factory attached. Electrical outlets, data outlets, cover plates and service fixtures shall be ordered separately and field installed.
   5. CIP shall be a minimum of 18 gauge cold rolled steel with a urethane powder coat finish.
      a. Nominal Dimensions:
      b. Widths: 24" x 24" (12” x 24” optional)
      c. Height (including junction boxes): 3"
   6. CIP system shall be equipped with quick disconnect fitting for service hose connections. Each keyed disconnect shall include nipple and coupler with color-keyed band marking media.
   7. Service lines: polyurethane and/or for non-burning gases and braided stainless steel for burning gases will attach to quick-connects.
   8. ACT grid installer shall provide additional wire support at all four corner locations of the CIP in the grid.

2.07 SHELVES

A. General requirements for shelves:
   1. All shelf supports shall be powder coated cold rolled steel.
   2. Shelf platforms shall be available in steel, phenolic resin or plastic laminate with 3mm wood edge banding.
   3. Shelves shall overhang 1" behind the face of the vertical tubular support.
   4. Shelf brackets: 14 cold rolled powder coated steel.
   5. Vertical shelf adjustment: one-inch increments.
   6. Load capacity: 200 pound uniform load per shelf

B. Outside Shelf:
   1. Nominal dimensions:
      a. Widths: [34] [46] [58] [70] (for full width shelves)
      b. Widths: [25"] [31"] [41"] [47"] (for split shelves on frames 60” – 96”)
      d. Depth: [12"] [15"]
   2. Shelf brackets shall rise above the shelf surface to provide sides.

C. Shelf Types (Specifier Option):
   1. Steel shelf – powder coated:
      a. Steel shelf surfaces shall be 18 gauge cold rolled steel
      b. Shelves shall have front and rear support channels spot welded to underside of shelf assembly.
      c. Front support channel shall be 14 gauge cold rolled steel minimum.
      d. Rear support channel shall be 18 gauge cold rolled steel minimum.
      e. Shelves shall have integrated rear retaining lip
   2. Phenolic resin shelf:
      a. Phenolic resin shelves shall be chemical resistant material fully tested for laboratory use (Trespa TopLab Plus® or equal)
      b. Phenolic resin shelves to be 3/4" thick.

c. Phenolic resin shelves shall have rear steel support (cold rolled and powder coated) that can act as rear retaining lip.

3. Wood shelf:
   a. Wood laminated shelf to be 1" thick with 3mm hardwood banding on front and sides.
   b. Wood laminated shelving shall have .75 thick x 2” tall back retaining lip of solid wood.

D. Shelf Retainer Options (Specifier’s Option):
1. Powder coated steel shelf options:
   a. Retaining components shall be #303 stainless steel.
   b. .25” diameter rods as standard with .375” available option.
   c. Mounts with center turret system.
   d. Ends bend 90 degrees into shelf platform on steel shelves.
   e. Rear retaining lip shall be integral in the shelf design.
2. Wood and phenolic resin shelf options:
   a. Retaining components shall be #303 stainless steel.
   b. .25” diameter rods as standard with .375” available option.
   c. Mounts with center and end turret system.
   d. Rear retaining lip shall be integral in the shelf design of solid hardwood.

2.08 WORK SURFACES AND SPLASH GUARDS

A. General requirements for worksurfaces:
1. All work surface table frames supports and backsplash support hardware shall be powder coated cold rolled steel.
2. Shall be supported on all front, rear and sides by table assemblies.
3. Load capacity: Load ratings are dependent on the tables frame system (2.02).

B. Work surfaces:
1. Nominal dimensions:
   a. Widths: [36"] [48"] [60"] [72"] [84] [96"]
   b. Depth: [30"]
   c. Thickness: .75” standard

C. Work surface Types - Material Options (Specifier Option):
1. Phenolic resin – .75" thick (1” thick option) Trespa TopLab Plus® or equal.
2. Epoxy resin – .75" thick (1” thick option).
3. Laminate – 1.25” thick
4. Stainless Steel - .75” thick

D. Side and Back Splashes:
1. Nominal dimensions:
   a. Heights: 4”

E. Side and Back Splashes Types - Material Options (Specifier Option):
1. Phenolic resin – .75" thick
2. Epoxy resin – .75" thick
3. Laminate - .75” thick
4. Stainless Steel – Integral - .75” thick

2.09 BASE CABINETS

A. Design requirements, performance requirements, materials, fabrication and hardware are based on modular steel laminate and wood casework specifications as manufactured and cataloged. The basis of this product specification is A.T. Villa, Inc., 1233 N. Mayfair Road, Suite 302, Milwaukee, WI 53226 1-800-554-9259.

B. Base cabinets construction materials (Specifier Option).
1. Steel base cabinets with steel door and drawer faces.

2. Steel base cabinets with wood door and drawer faces.
3. Laminate with laminate doors and drawers

C. Base cabinets shall be offered as mobile (with casters) and suspended (hung from table frames).

D. Cabinets with casters shall be constructed without toe spaces. The cabinet shall be constructed with a reinforced base capable of supporting a 4" high caster assembly in each corner. Casters shall be swivel locking type in front and non-locking in the rear of cabinet. Casters shall have a combined load rating of 660 pounds minimum. Cabinets with casters shall be completely finished on four sides and top since surfaces are considered visible.

E. The entire cabinet assembly shall be reinforced to permit mobility without twisting and achieve a height of 30" including the flush 1" counter top.

F. Suspended base cabinets shall be constructed with reinforcements at the top of cabinet to allow cabinets to be suspended from table frames without cabinet top deflection.

G. Suspended base cabinets shall be designed to allow them to be suspended at any location between the legs of the tables.

H. Base cabinets shall, except as noted, incorporate a flush overlay design in which the cabinet body is completely concealed.

I. Mobile base cabinets with multiple drawers shall be equipped with an anti-tipping device to allow only one drawer to open at a time.

J. Steel cabinets shall be constructed as follows:
   1. Nominal dimensions:
      a. Mobile base cabinets shall be nominally 29" high with casters
      b. Suspended base cabinets shall be nominally 25” high.
      c. Widths: [18”] [24”] [30”] [36”] (mobile and suspended)
      d. Depths: 22” (mobile and suspended)
   2. Cabinet carcass wall thickness shall be .75” in appearance from the front face of the cabinets.
   3. Cabinet exterior walls shall be 20 gauge cold rolled steel.
   4. Cabinet sides shall have two interior hat channels per side of 18 gauge cold rolled steel, spot welded to shell panel.
   5. Cabinet tops shall have two interior hat channels per side of 18 gauge cold rolled steel, spot welded to shell panel with structure integrity to allow cabinets to be suspended from the laboratory table frame system.
   6. Cabinet bottoms shall have two exterior hat channels per side of 18 gauge cold rolled steel, spot welded to shell panel.
   7. Shelving height adjustment at 1.25” increments.
   8. Doors and drawers shall have closing bumpers applied to them at installation.
   9. Hinges:
      a. Shall be institutional grade three knuckle hinges with an opening angle of 270°.
      b. Shall be height and depth adjustable to allow for field adjustment.
      c. Shall have a self-closing mechanism built into them.
      d. Shall have a quick release device to easily remove and replace door.
   10. Slides:
      a. Shall be full extension ball bearing slides.
      b. Shall have a 100 pound load rating.
      c. Shall be compatible with an anti-tipping device.

K. Laminate cabinets shall be constructed as follows:
   1. Nominal dimensions:
      a. Mobile base cabinets shall be nominally 29" high with casters.
      b. Suspended base cabinets shall be nominally 25” high.
      c. Widths: [18”] [24”] [30”] [36”] (mobile and suspended).
      d. Depths: 22” (mobile and suspended).
   2. Cabinet carcass top, sides, bottoms, drawer and door panels shall be .75” thick.
   3. Cabinet carcass panels shall have all edges banded with .5mm PVC edge banding.

4. Cabinet doors and drawers shall have all edges banded with 3mm PVC edge banding with a .125” radius on all edges.
5. Suspended laminate cabinets shall be equipped with steel internal bracing to secure cabinets to system table frames.
6. Shelving height adjustment at 1.25” increments.
7. Doors and drawers shall have closing bumpers applied to them at installation.
8. Hinges:
    a. Shall be institutional grade three knuckle hinges with an opening angle of 270°.
    b. Shall be height and depth adjustable to allow for field adjustment.
    c. Shall have a self-closing mechanism built into them.
    d. Shall have a quick release device to easily remove and replace door.
9. Slides:
    a. Shall be 3/4 extension roller slides.
    b. Shall have a 50 pound load rating.
    c. Shall be compatible with an anti-tipping device.

2.10 OVERHEAD CABINETS

A. Design requirements, performance requirements, materials, fabrication and hardware are based on modular steel laminate and wood casework specifications as manufactured and cataloged. The basis of this product specification is A.T. Villa, Inc., 1233 N. Mayfair Road, Suite 302, Milwaukee, WI 53226.

B. Overhead cabinets construction materials (Specifier Option).
    1. Steel or laminate overhead cabinets with sliding glass doors.
        a. Cabinets shall have an aluminum extruded dual channel track installed on the top and bottom of the cabinet for the glass panels. Extruded channel shall be finished in a clear matt anodized color.
        b. Glass shall be .25” thick, tempered and have a polished edge.
        c. Finger pulls shall be provided in matching aluminum to the track system
    2. Overhead cabinets secure to uprights of the furniture system.

C. Steel overhead cabinets shall be constructed as follows:
    1. Nominal dimensions:
        a. Overhead cabinets shall be nominally 24" high.
        b. Widths: [36”] [48”] [60”] [72”]
        c. Depths: 14”
    2. Cabinet carcass wall thickness shall be .75” in appearance from the front face of the cabinets.
    3. Cabinet exterior walls shall be 20 gauge cold rolled steel.
    4. Cabinet sides shall have two interior hat channels per side of 18 gauge cold rolled steel, spot welded to shell panel.
    5. Cabinet tops shall have two interior hat channels per side of 18 gauge cold rolled steel, spot welded to shell panel with structure integrity to allow cabinets to be suspended from the laboratory table frame system.
    6. Cabinet bottoms shall have two internal hat channels (front and rear) of 18 gauge cold rolled steel, spot welded to shell panel.
    7. Bottom of cabinets must have a flat panel visible surface.
    8. Shelving height adjustment at 1.25” increments.
    9. All sides of steel overhead cabinets shall be considered finish side and be painted accordingly.

D. Laminate cabinets shall be constructed as follows:
    1. Nominal dimensions:
        a. Overhead cabinets shall be nominally 24" high.
        b. Widths: [36”] [48”] [60”] [72”]
        c. Depths: 14”
    2. Cabinet carcass top, sides, bottoms, drawer and door panels shall be .75” thick.

3. Cabinet carcass panels shall have all edges banded with .5mm PVC edge banding.
4. Cabinet doors and drawers shall have all edges banded with 3mm PVC edge banding with a .125” radius on all edges.
5. Suspended laminate cabinets shall be equipped with steel internal bracing to secure cabinets to system table frames.
6. Shelving height adjustment at 1.25” increments.

2.11 FINISHES

A. Metal finish:

1. Preparation: Spray clean metal with a heated cleaner/phosphate solution, pre-treat with iron phosphate spray, water rinse, and neutral final seal. Immediately dry in heated ovens, gradually cooled, prior to application of finish.
2. Application: Electrostatically apply urethane powder coat of selected color and bake in controlled high temperature oven to assure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high grade laboratory furniture quality finish of the following thickness: Liquid, dipped, solvent based finishes are not and will not be acceptable.
   a. Exterior and interior exposed surfaces:
   b. 1.5 mil average and 1.2 mil min.
   c. Backs of cabinets and other surfaces not exposed to view: 1.2 mil average.

B. Cabinet Surface Finish Tests: All casework construction and performance characteristics shall be in full compliance with SEFA 8 standards. At the owner’s request, independent, third party performance testing must be submitted validating compliance and adheres to the finish specifications.

1. Chemical Spot Test

1.1 Purpose of Test

The purpose of the chemical spot test is to evaluate the resistance a finish has to chemical spills. Note: Many organic solvents are suspected carcinogens, toxic and/or flammable. Great care should be exercised to protect personnel and the environment from exposure to harmful levels of these materials.

1.2 Test Procedure

Obtain one sample panel measuring 14" x 24" (355.6mm x 609.6mm). The received sample to be tested for chemical resistance as described herein.
Place panel on a flat surface, clean with soap and water and blot dry. Condition the panel for 48-hours at 73+3F (23+2C) and 50+5% relative humidity. Test the panel for chemical resistance using forty-nine different chemical reagents by one of the following methods:

Method A -Test volatile chemicals by placing a cotton ball saturated with reagent in the mouth of a one-ounce (29.574cc) bottle and inverting the bottle on the surface of the panel.
Method B -Test volatile chemicals by placing five drops of the reagent on the surface of the panel and covering with a 24mm watch glass, convex side down.
For both of the above methods, leave the reagents on the panel for a period of one hour. Wash off the panel with water, clean with detergent and naphtha, and rinse with deionized water. Dry with a towel and evaluate after 24-hours at 73 _+ F (23 _+ C) and 50 _+ 5% relative using the following rating system:

Level 0 – No detectable change.
Level 1 – Slight change in color or gloss.
Level 2 – Slight surface etching or severe staining.
Level 3 – Pitting, cratering, swelling, or erosion of coating. Obvious and significant deterioration.

Test No.	Chemical Reagent	Test Method
1.	Acetate, Amyl	A
2.	Acetate, Ethyl	A
3.	Acetic Acid, 98%	B
4.	Acetone	A
5.	Acid Dichromate, 5%	B
6.	Alcohol, Butyl	A
7.	Alcohol, Ethyl	A
8.	Alcohol, Methyl	A
9.	Ammonium Hydroxide, 28%	B
10.	Benzene	A
11.	Carbon Tetrachloride	A
12.	Chloroform	A
13.	Chromic Acid, 60%	B
14.	Cresol	A
15.	Dichlor Acetic Acid	A
16.	Dimethylformanide	A
17.	Dioxane	A
18.	Ethyl Ether	A
19.	Formaldehyde, 37%	A
20.	Formic Acid, 90%	B
21.	Furfural	A
22.	Gasoline	A
23.	Hydrochloric Acid, 37%	B
24.	Hydrochloric Acid, 48%	B
25.	Hydrogen Peroxide, 3%	B
26.	Iodine, Tincture of	B
27.	Methyl Ethyl Ketone	A
28.	Methylene Chloride	A
29.	Mono Chlorobenzene	A
30.	Naphthalene	A
31.	Nitric Acid, 20%	B
32.	Nitric Acid, 30%	B
33.	Nitric Acid, 70%	B
34.	Phenol, 90%	A
35.	Phosphoric Acid, 85%	B
36.	Silver Nitrate, Saturated	B
37.	Sodium Hydroxide, 10%	B
38.	Sodium Hydroxide, 20%	B
39.	Sodium Hydroxide, 40%	B
40.	Sodium Hydroxide, Flake	B
41.	Sodium Hydroxide, Saturated	B
42.	Sulfuric Acid, 33%	B
43.	Sulfuric Acid, 77%	B
44.	Sulfuric Acid, 96%	B
45.	Sulfuric Acid, 77% and Nitric Acid, 70%, equal parts	B
46.	Toluene	A
47.	Trichloroethylene	A
48.	Xylene	A
49.	Zinc Chloride, Saturated	B

1.3 Acceptance Level

Results will vary from manufacturer to manufacturer. Laboratory grade finishes should result in no more than four Level 3 conditions. Suitability for a given application is dependent upon the chemicals used in a given laboratory.

2. Hot Water Test

2.1 Purpose of Test

The purpose of this test is to insure the coating is resistant to hot water.

2.2 Test Procedure

Hot water, 190oF to 205oF (88oC to 96oC), shall be allowed to trickle (with a steady stream and at a rate of not less than 6 ounces (177.44cc) per minute on the surface, which shall be set at an angle of 45-degrees, for a period of five minutes.

2.3 Acceptance Level

After cooling and wiping dry, the finish shall show no visible effect from the hot water.

3. Impact Test

3.1 Purpose of Test

The purpose of this test is to evaluate the ductility of the coating.

3.2 Test Procedure

A one-pound ball approximately 2" (50.8mm) in diameter shall be dropped form a distance of 12" (304.8mm) onto a flat horizontal surface, coated to manufacturer's standard manufacturing method.

3.3 Acceptance Level

There shall be no visible evidence to the naked eye of cracks or checks in the finish due to impact.

4. Paint Adhesion on Steel Test

4.1 Purpose of Test

The paint adhesion test is used to determine the bond of the coating to steel. This does not apply to non-steel products.

4.2 Test Procedure

This test is based on ASTM D2197-86 "Standard Method of Test for Adhesion of Organic Coating". Two sets of eleven parallel lines 1/16" (1.587mm) apart shall be cut with a razor blade to intersect at right angles thus forming a grid of 100 squares.
The cuts shall be made just deep enough to go through the coating, but not into the substrate. They shall then be brushed lightly with a soft brush for one minute.
Examine under 100-foot candles of illumination.

4.3 Acceptance Level

Ninety or more of the squares shall show finish intact.

5. Paint Hardness on Steel Test

5.1 Purpose of Test

The paint hardness test is used to determine the resistance of the coatings to scratches.

5.2 Test Procedure

Pencils, regardless of their brand, are valued in this way: 8-H is the hardest, and next 11 order of diminishing hardness are 7-H, 6-H, 5-H, 4-H, 3-H, 2-H, H, F, HB, B (soft), 2-B, 3-B, 4-B, 5-B (which are softest). The pencils shall be sharpened on emery paper to a wide sharp edge. Pencils of increasing hardness shall be pushed across the paint film in a chisel-like manner until one is found that will cut or scratch the film. The pencil used

before that one, that is the hardest pencil that will not rupture the film, is then used to express or designate the hardness.

5.3 Acceptance Level

The paint shall have a hardness of 4-H minimum.

2.12 BULLETIN BOARDS

1. General requirements - Bulletin boards are a dyed linoleum material (Forbo bulletin board® or equivalent), framed in powder coated steel frame, color to match structure frame system. Bulletin boards shall be both acoustical and tackable. Refer to drawing details. Bulletin board frame must mount to system frame in an integral manner and shall not mount to the face of the uprights.
2. Nominal dimensions:
   a. Widths: [42"] [48"] [60"] [72"] [96"]
   b. Heights: [24"] [16"]

2.13 MODESTY PANELS

1. General requirements - Steel (powder coated to match frame system) shall mount directly to rear frame. Modesty panel shall be mechanically fastened.
2. Nominal dimensions:
   a. Widths: [36"] [48"] [60"] [72"] [84”] [96"]
   b. Heights: [23"] mounts directly below the worksurface, between the uprights.

2.14 TASK LIGHTS

1. General requirements - Task light shall be a T8HQ type (T5 Specifier Option). Task lights shall be gangable with an integral on/off switch. Switch will turn on/off all lights ganged to it.
2. Task light minimum performance levels shall be as follows: with 40 foot candle room lighting at the work surfaces, the task light shall increase the work surface illumination to 80/100 foot candles.
3. Nominal dimensions:
   a. Widths: [24"] [36"] [48"] [60”] (smaller dimensions may be required for split shelves)

PART 3 EXECUTION

3.01 INSTALLATION

A. Furniture system installation:
   1. Install system in strict accordance with manufacturer’s instructions.
   2. Set system components level on two planes with no distortion. Securely anchored to building structure using concealed shims where necessary in wall mount.

B. Install applications casework, work surfaces and accessory items per Section 12345.

3.02 ADJUSTING

A. Repair or remove and replace defective work, as directed by [Architect] [Owner] upon completion of installation.

3.03 CLEANING

A. Clean shop finished laboratory furniture system surfaces and touch up as required.

3.04 PROTECTION OF FINISHED WORK

A. Provide all necessary protective measures to prevent exposure of laboratory furniture system and attached components from exposure to other construction activity.

B. Advise contractor of procedures and precautions for protection of the installed laboratory furniture system and related components from damage by work of other trades.

ENVIRONMENTAL COMPLIANCE

1. Recycled Steel Content for Laboratory Casework
All steel used in the product fabrication shall comply with the LEED (Leadership in Energy and Environmental Design) Green Building Rating System. The manufacturer must submit documentation (i.e. "Source of Materials", Invoices, Third Party Validation, etc.) for steel purchased for this project providing recycled content. Such documentation shall be submitted to the Owner Representative/Architect for approval prior to award of contract.

A. Sheet Steel: All cold rolled sheet steel used in the fabrication of laboratory cabinets, fume hoods and modular laboratory systems shall have a minimal of 20% recycled steel content.
B. Recycled Steel Content: Of this 20% recycled content, 60% shall be purchased scrap (i.e. old cars, appliances) with the remaining 40% from generated in-house scrap and manufacturing fall-off.
C. Fabricators Scrap: Fabricators shall provide documentation that manufacturing fall-off is recycled to respective steel mills and does not enter the solid waste system and/or become a product of land fill space.

2. Finish for Steel Laboratory Products
All Steel Laboratory Products shall utilize a dry powdercoat paint process by means of electrostatically spray, providing high-transfer efficiency low waste generation. Any liquid-applied coatings shall not be acceptable. Manufacturer shall supply documentation that waste generated during the painting process, is a solid, non-hazardous material.

A. Pretreatment: Finish process shall incorporate a phosphate conversion coating during the pretreatment/ cleaning operation. Electrostatic application of dry powder shall follow. Coated parts shall pass through curing ovens, which shall cause the powder to melt, flow, gel, cure and bond onto the phosphatized steel substrate.
B. Chemically Resistance Finish: Only highly chemically resistant, dry powdercoated finishes will be acceptable.
C. Operator Protection: The application is convenient and easily mastered through robotic application plus manual detailing. The painting process is cleanly contained and has no solvent odor and is performed in an air-conditioned room.
D. Overspray Powder Paint: Shall be captured and resprayed. Efficiency shall be 99% effective in coating usage, reducing waste generation. A closed collection system shall be utilized for overspray that is not reused. Powder overspray, which can not escape the facility, is collected in bulk, eliminating the need for daily replacement/disposal of filter media.
E. VOC Emissions: Powder paint shall be sprayed and baked with a near zero (.29 lbs per gallon maximum) VOC (Volatile Organic Compounds) emissions.
F. Offgasing: After all steel powdercoated parts have cooled from the curing ovens, the coating shall be firm and stable. No further emissions or offgasing/ decomposition vapors shall occur at room temperature.

PART 1 GENERAL

1.00 SUMMARY

A. Related Sections:

1. Section 12345 – Adaptable Laboratory Furniture is a part of this section.
2. Section _____ - _____ : Furnishing and installation of plumbing utilities and final connections.
3. Section _____ - _____ : Furnishing and installation of exhaust ductwork and equipment, and final connection to fume hood(s).
4. Section _____ - _____ : Furnishing and installation of electrical utilities and final connections.

1.01 GENERAL

A. Fume hoods shall be of a "picture frame" airfoil design and construction. Each fume hood superstructure shall provide for safe efficient removal of all fumes, both heavy and light, with the least amount of turbulence as the air enters the hood.

B. Standard airfoil bench hood superstructures shall be tested in accordance with the ASHRAE 110-1995 Test Procedure and perform well within the American Conference of Governmental Industrial Hygienists recommendations.

1.02 MATERIAL

A. Metal: Prime furniture steel, free of scales, buckles, or other defects; ASTM A366.

B. Stainless Steel: Type 304 or 316, as noted, commercial grade, No. 4 Finish, ASTM A167.

C. Safety Glass: 1/4" Laminated; conforming to ANSI 297.1 for 400-foot-pound impact, and to CPSC 16 CFR 1201 for Category II Safety Glazing.

D. PVC: Extruded Polyvinyl Chloride

E. Resin-Chem: White chemical resistant, fiberglass reinforced thermostat resin sheet

1.03 CONSTRUCTION

A. Fume hood superstructures shall have a double wall construction consisting of an outer shell of sheet steel and an inner liner of corrosion resistant material as specified. Attachment of the interior lining material to the steel framing members shall be made with non-metallic fasteners. The double wall shall house and conceal steel framing members, attaching brackets and remote operating service fixture valves.

B. The exterior side panels of the superstructure shall be constructed of 18 gauge steel and shall be removable for access into the interior housing. Access shall also be gained through removable panels in the interior liner. These interior removable panels shall be held in place by a PVC gasket.

C. Each superstructure shall have an internal baffle system of the same material as the interior liner. This baffle system shall provide for safe efficient removal of fumes when the superstructure is connected to a properly installed exhaust system. A manual adjustment shall be provided on the upper part of the baffle to allow the operator to set the hood for heavy or light fumes. All baffles shall be removable for cleaning.

D. Unless specified for use in a variable air volume (VAV) system, the superstructures shall be provided with an air by pass feature. The by-pass, located at the upper front interior of the hood, shall open as the sash is lowered, providing for a relatively constant exhaust volume of the fume hood superstructure.

E. When shown, the upper front exterior panel of the superstructure shall be furnished with louvers. The louvers provide for proper operation of the by-pass feature when the top of the superstructure is closed off to the ceiling. The upper front exterior panel of the superstructure shall also be removable for access.

F. A two tube, rapid start, vapor sealed fluorescent light fixture of maximum length shall be provided on each superstructure. Each fixture shall include two soft white tubes providing 80 candle power at the work surface. Light fixtures shall be re-lamped from the top front of the superstructure.

G. Exhaust outlets shall be rectangular, 18 gauge type 304 stainless steel. Galvanized or painted outlets are not acceptable.

H. Fume hoods shall have a full view, vertical rising, laminated safety glass sash framed with a solid black, PVC extrusion. The sash shall have a full width extruded PVC finger lift. The finger lift shall have a 16 gauge steel tube inserted the full width of the finger lift and shall be fully enclosed by PVC. Sashes with stainless steel or coated steel finger lifts are not acceptable. The sash shall not required the use of a center mullion. Sash guides shall be extruded, black PVC.

I. The sash shall be counter balanced with a single weight located in the center rear of the superstructure. Two 1/8" diameter stainless steel cables shall connect the sash to the weight. The use of two cables shall act as a safety mechanism keeping the sash from falling in the event that one cable would fail. The cables shall ride on 2" diameter nylon ball bearing pulleys. The cable/pulley assembly shall have an adjustment located on the top of the superstructure for proper alignment of the sash. A cable keeper clip shall be installed on each pulley to prevent the cable from coming off the pulley.

J. A lower airfoil of 14 gauge steel, coated with a black baked on chemical resistant finish, shall act as the sash stop. In addition, the airfoil shall provide a 1" space between the bottom of the sash, in the closed position, and the work surface. This 1" space shall provide for a continuous sweep of fumes from the work surface.

1.03 SUBMITTALS

> Include number of each type of submittal required if this information is not covered in Division 1 or elsewhere.

A. Shop Drawings: Provide 3/4"=1'-0" scale elevations of all components, cross sections, rough-in and anchor placements, tolerances and clearances. Provide 1/4"= 1'-0" rough-in plan drawings for coordination with trades. Rough-in shall show free area.

1.04 QUALITY ASSURANCE

A. Single source responsibility: Laboratory furniture system, casework, work surfaces, laboratory equipment, chemical fume hoods and accessories shall be manufactured or furnished by a single laboratory furniture manufacturer.

B. Manufacturer's qualifications: Modern plant with proper tools, dies, fixtures and skilled workmen to produced high quality laboratory casework and equipment, and shall meet the following minimum requirements:

1. Five years or more experience in manufacture of laboratory casework and equipment of similar product type specified.

C. Installation: Only factory trained or certified installers shall be allowed to perform work.

D. Laboratory furniture systems shall not be UL Listed in a manner that restricts the re-configuration of services after initial installation. System shall be able to host components that are UL submitted,

approved and listed. Products must bear the UL Mark and shall be identified to those products that were evaluated by UL and found to comply with UL's requirements.

1.05 DELIVERY, STORAGE AND HANDLING

A. Schedule delivery of laboratory furniture system so that spaces are sufficiently complete that material can be installed immediately following delivery.

B. Protect finished surfaces from soiling or damage during handling and installation.

1.06 PROJECT CONDITIONS

A. Do not deliver or install equipment until the following conditions have been met:
   1. Windows and doors are installed and the building is secure and weather tight.
   2. Ceiling, overhead ductwork and lighting are installed.
   3. Ceiling grid installed prior to install of Ceiling Service Panels if applicable.
   4. All painting is completed and floor tile is installed.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Design, materials, construction and finish of laboratory furniture specified is the minimum acceptable standard of quality for adaptable laboratory casework. The basis of this specification is A.T. Villa USA, Inc., 1233 N. Mayfair Road, Suite 302, Milwaukee, WI 53226 1-800-554-9259.

2.11 FINISHES

A. Metal finish:
   1. Preparation: Spray clean metal with a heated cleaner/phosphate solution, pre-treat with iron phosphate spray, water rinse, and neutral final seal. Immediately dry in heated ovens, gradually cooled, prior to application of finish.
   2. Application: Electrostatically apply urethane powder coat of selected color and bake in controlled high temperature oven to assure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high grade laboratory furniture quality finish of the following thickness: Liquid, dipped, solvent based finishes are not and will not be acceptable.
      a. Exterior and interior exposed surfaces:
      b. 1.5 mil average and 1.2 mil min.
      c. Backs of cabinets and other surfaces not exposed to view: 1.2 mil average.

B. Cabinet Surface Finish Tests: All casework construction and performance characteristics shall be in full compliance with SEFA standards. At the owner's request, independent, third party performance testing must be submitted validating compliance and adheres to the finish specifications.

1. Chemical Spot Test

1.1 Purpose of Test

The purpose of the chemical spot test is to evaluate the resistance a finish has to chemical spills. Note: Many organic solvents are suspected carcinogens, toxic and/or flammable. Great care should be exercised to protect personnel and the environment from exposure to harmful levels of these materials.

1.2 Test Procedure

Obtain one sample panel measuring 14" x 24" (355.6mm x 609.6mm). The received sample to be tested for chemical resistance as described herein.

Place panel on a flat surface, clean with soap and water and blot dry. Condition the panel for 48-hours at 73+3F (23+2C) and 50+5% relative humidity. Test the panel for chemical resistance using forty-nine different chemical reagents by one of the following methods:

Method A -Test volatile chemicals by placing a cotton ball saturated with reagent in the mouth of a one-ounce (29.574cc) bottle and inverting the bottle on the surface of the panel.
Method B -Test volatile chemicals by placing five drops of the reagent on the surface of the panel and covering with a 24mm watch glass, convex side down.
For both of the above methods, leave the reagents on the panel for a period of one hour. Wash off the panel with water, clean with detergent and naphtha, and rinse with deionized water. Dry with a towel and evaluate after 24-hours at 73 _+ F (23 _+ C) and 50 _+ 5% relative using the following rating system:

Level 0 – No detectable change.
Level 1 – Slight change in color or gloss.
Level 2 – Slight surface etching or severe staining.
Level 3 – Pitting, cratering, swelling, or erosion of coating. Obvious and significant deterioration.

Test No.	Chemical Reagent	Test Method
1.	Acetate, Amyl	A
2.	Acetate, Ethyl	A
3.	Acetic Acid, 98%	B
4.	Acetone	A
5.	Acid Dichromate, 5%	B
6.	Alcohol, Butyl	A
7.	Alcohol, Ethyl	A
8.	Alcohol, Methyl	A
9.	Ammonium Hydroxide, 28%	B
10.	Benzene	A
11.	Carbon Tetrachloride	A
12.	Chloroform	A
13.	Chromic Acid, 60%	B
14.	Cresol	A
15.	Dichlor Acetic Acid	A
16.	Dimethylformanide	A
17.	Dioxane	A
18.	Ethyl Ether	A
19.	Formaldehyde, 37%	A
20.	Formic Acid, 90%	B
21.	Furfural	A
22.	Gasoline	A
23.	Hydrochloric Acid, 37%	B
24.	Hydrochloric Acid, 48%	B
25.	Hydrogen Peroxide, 3%	B
26.	Iodine, Tincture of	B
27.	Methyl Ethyl Ketone	A
28.	Methylene Chloride	A
29.	Mono Chlorobenzene	A
30.	Naphthalene	A
31.	Nitric Acid, 20%	B
32.	Nitric Acid, 30%	B
33.	Nitric Acid, 70%	B
34.	Phenol, 90%	A
35.	Phosphoric Acid, 85%	B
36.	Silver Nitrate, Saturated	B
37.	Sodium Hydroxide, 10%	B

38.	Sodium Hydroxide, 20%	B
39.	Sodium Hydroxide, 40%	B
40.	Sodium Hydroxide, Flake	B
41.	Sodium Hydroxide, Saturated	B
42.	Sulfuric Acid, 33%	B
43.	Sulfuric Acid, 77%	B
44.	Sulfuric Acid, 96%	B
45.	Sulfuric Acid, 77% and Nitric Acid, 70%, equal parts	B
46.	Toluene	A
47.	Trichloroethylene	A
48.	Xylene	A
49.	Zinc Chloride, Saturated	B

1.3 Acceptance Level

Results will vary from manufacturer to manufacturer. Laboratory grade finishes should result in no more than four Level 3 conditions. Suitability for a given application is dependent upon the chemicals used in a given laboratory.

2. Hot Water Test

2.1 Purpose of Test

The purpose of this test is to insure the coating is resistant to hot water.

2.2 Test Procedure

Hot water, 190oF to 205oF (88oC to 96oC), shall be allowed to trickle (with a steady stream and at a rate of not less than 6 ounces (177.44cc) per minute on the surface, which shall be set at an angle of 45-degrees, for a period of five minutes.

2.3 Acceptance Level

After cooling and wiping dry, the finish shall show no visible effect from the hot water.

3. Impact Test

3.1 Purpose of Test

The purpose of this test is to evaluate the ductility of the coating.

3.2 Test Procedure

A one-pound ball approximately 2" (50.8mm) in diameter shall be dropped form a distance of 12" (304.8mm) onto a flat horizontal surface, coated to manufacturer's standard manufacturing method.

3.3 Acceptance Level

There shall be no visible evidence to the naked eye of cracks or checks in the finish due to impact.

4. Paint Adhesion on Steel Test

4.1 Purpose of Test

The paint adhesion test is used to determine the bond of the coating to steel. This does not apply to non-steel products.

4.2 Test Procedure

This test is based on ASTM D2197-86 "Standard Method of Test for Adhesion of Organic Coating". Two sets of eleven parallel lines 1/16" (1.587mm) apart shall be cut with a razor blade to intersect at right angles thus forming a grid of 100 squares.
The cuts shall be made just deep enough to go through the coating, but not into the substrate. They shall then be brushed lightly with a soft brush for one minute.
Examine under 100-foot candles of illumination.

4.3 Acceptance Level

Ninety or more of the squares shall show finish intact.

5. Paint Hardness on Steel Test

5.1 Purpose of Test

The paint hardness test is used to determine the resistance of the coatings to scratches.

5.2 Test Procedure

Pencils, regardless of their brand, are valued in this way: 8-H is the hardest, and next 11 order of diminishing hardness are 7-H, 6-H, 5-H, 4-H, 3-H, 2-H, H, F, HB, B (soft), 2-B, 3-B, 4-B, 5-B (which are softest). The pencils shall be sharpened on emery paper to a wide sharp edge. Pencils of increasing hardness shall be pushed across the paint film in a chisel-like manner until one is found that will cut or scratch the film. The pencil used before that one, that is the hardest pencil that will not rupture the film, is then used to express or designate the hardness.

5.3 Acceptance Level

The paint shall have a hardness of 4-H minimum.

PART 3 EXECUTION

3.01 INSTALLATION

A. Furniture system installation:
   1. Install system in strict accordance with manufacturer's instructions.
   2. Set system components level on two planes with no distortion. Securely anchored to building structure using concealed shims where necessary in wall mount.

B. Install applications casework, work surfaces and accessory items per Section 12345.

3.02 ADJUSTING

A. Repair or remove and replace defective work, as directed by [Architect] [Owner] upon completion of installation.

3.03 CLEANING

A. Clean shop finished laboratory furniture system surfaces and touch up as required.

3.04 PROTECTION OF FINISHED WORK

A. Provide all necessary protective measures to prevent exposure of laboratory furniture system and attached components from exposure to other construction activity.

B. Advise contractor of procedures and precautions for protection of the installed laboratory furniture system and related components from damage by work of other trades.

ENVIRONMENTAL COMPLIANCE

1. Recycled Steel Content for Laboratory Casework

All steel used in the product fabrication shall comply with the LEED (Leadership in Energy and Environmental Design) Green Building Rating System. The manufacturer must submit documentation (i.e. "Source of Materials", Invoices, Third Party Validation, etc.) for steel purchased for this project providing recycled content. Such documentation shall be submitted to the Owner Representative/Architect for approval prior to award of contract.

A. Sheet Steel: All cold rolled sheet steel used in the fabrication of laboratory cabinets, fumehoods and modular laboratory systems shall have a minimal of 20% recycled steel content.

B. Recycled Steel Content: Of this 20% recycled content, 60% shall be purchased scrap (i.e. old cars, appliances) with the remaining 40% from generated in-house scrap and manufacturing fall-off.
C. Fabricators Scrap: Fabricators shall provide documentation that manufacturing fall-off is recycled to respective steel mills and does not enter the solid waste system and/or become a product of land fill space.

2. Finish for Steel Laboratory Products
All Steel Laboratory Products shall utilize a dry powdercoat paint process by means of electrostatically spray, providing high-transfer efficiency low waste generation. Any liquid-applied coatings shall not be acceptable. Manufacturer shall supply documentation that waste generated during the painting process, is a solid, non-hazardous material.

A. Pretreatment: Finish process shall incorporate a phosphate conversion coating during the pretreatment/ cleaning operation. Electrostatic application of dry powder shall follow. Coated parts shall pass through curing ovens, which shall cause the powder to melt, flow, gel, cure and bond onto the phosphatized steel substrate.
B. Chemically Resistance Finish: Only highly chemically resistant, dry powdercoated finishes will be acceptable.
C. Operator Protection: The application is convenient and easily mastered through robotic application plus manual detailing. The painting process is cleanly contained and has no solvent odor and is performed in an air-conditioned room.
D. Overspray Powder Paint: Shall be captured and resprayed. Efficiency shall be 99% effective in coating usage, reducing waste generation. A closed collection system shall be utilized for overspray that is not reused. Powder overspray, which can not escape the facility, is collected in bulk, eliminating the need for daily replacement/disposal of filter media.
E. VOC Emissions: Powder paint shall be sprayed and baked with a near zero (.29 lbs per gallon maximum) VOC (Volatile Organic Compounds) emissions.
F. Offgasing: After all steel powdercoated parts have cooled from the curing ovens, the coating shall be firm and stable. No further emissions or offgasing/ decomposition vapors shall occur at room temperature.

A.T. VILLA™

basic

fixed laboratory system

The A.T. Villa BASIC system is fixed casework at its finest. Designed to outfit both small support spaces or entire laboratories, BASIC can be configured to create a custom environment with a cost conscious product.

BASIC base cabinet offerings are available in heights of 30", 34" and 36", six widths and with a myriad of door drawer configurations. A full offering of 84" tall floor cabinets and wall hung cabinets and wall shelves ensure that any space can be transformed into a functional laboratory with complementing product and aesthetic.

CORE SUPPORT

Carefully designed to integrate with our FORTE, ERGOLAB and BRAVO adaptable benching solutions, BASIC provides a cost effective, proven solution that completes the A.T. Villa product family

- Full SEFA 8 Compliance
- Removable back panels for easy service access
- Laminate, Epoxy, Phenolic and Stainless Steel work top options
- Full compatibility with A.T. Villa's CORE SUPPORT Service Distribution System

MADE IN THE U.S.A.

basic

fixed laboratory system

CORE SUPPORT can also be used to neatly route and organize laboratory services such as power, data, gases and plumbing. CORE SUPPORT can even be used as low profile service chase when extended to the ceiling grid.

BASIC island and peninsula configurations that utilize A.T. Villa's CORE SUPPORT transform themselves into adaptable and re-configurable benching solutions. CORE SUPPORT also allows the addition of adjustable overhead shelving and storage options at any time.

CORE SUPPORT

The A.T. Villa BASIC and CORE SUPPORT offerings combine to provide the most cost effective and adaptable fixed benching solution available.

Widths	15", 18", 24", 30", 36", 42", 48", 58" end bench
Depths	14", 24", 30", 36"
Heights	30", 34" [ADA], 36" Finished Worktop Height 24", 31", 36", 48" Wall Cabinets 84" Tall Floor Cases
Finishes	Painted steel, 304SS and 316SS
Construction	Steel Box Steel Inset Steel and wood flush overlay
Services	UL Listed Raceways, UL Listed Power Strips, CSA Certified Inert Gases & CSA Certified Burning Gases

A.T. VILLA™
MADE IN THE U.S.A.

SEFA MEMBER

www.atvilla.com
sales@atvilla.com
p 800.554.9259
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Contact us today to learn how world-class products, innovative global - design experience and a passion for excellence result in truly superior research environments.

  1233 N. Mayfair Rd., Suite 302 Milwaukee, Wisconsin 53226

A.T. VILLA™

forte™

adaptable laboratory system

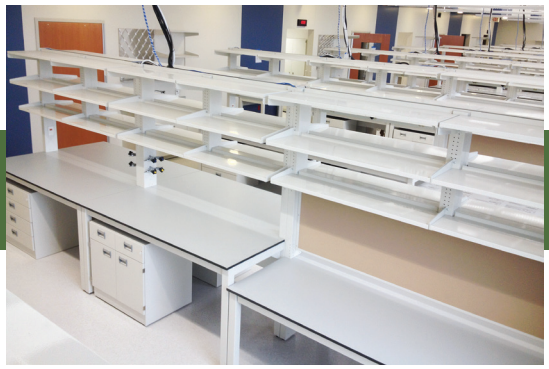
The A.T. Villa™ Forte™ system stands uncontested as one of the industry's most cost effective plug and play lab table systems. It's unique, telescoping frame allows the Forte™ system's work surfaces to adjust in 1" increments. Height adjustability is complimented with performance; worktops accommodate uniform loads of 1000lb each and upper shelves accommodate 200lbs each.

Single-sided and double-sided configurations are both available—allowing you to select the ideal level of adaptability and value for your specific environment.

THe Forte™ system's true plug and play service connections ensure that table and service reconfigurations can always be quickly completed — at minimum cost and down-time.

- 1500 lb. weight load capacity
- Height adjustable worktops: 30"-36" in 1" increments
- Single or double sided configurations
- Integrated plug and play services

As with all of the A.T. Villa™ solutions, the Forte™ table system stands 100% independently from building structure. UL listed raceways and CSA lab gas services, combined with overhead Ceiling Interface Panels [CIPs] create the ultimate adaptable solution for any lab.



The Forte™ system's tables provide simplicity and strength at it's best.

MADE IN THE U.S.A.

forte™

adaptable laboratory system

Ceiling Interface Panels [CIPs] are configured to the exact requirements of your lab; with the ability to accommodate future expansions.

Caster-based under table storage provides maximum adaptability and is available in several materials and configurations.

Suspended cabinets attach to table frame structure.

The Forte™ system's tables are also available in perimeter, free-standing and sink configurations. A myriad of supporting accessories ensure that your entire laboratory is not only functional but also a true aesthetic showcase.

Widths	36", 48", 60", 72", 84" & 96"
Depths	30" & 60"
Heights	36" & 84"
Worksurfaces	Adjustable 30" - 36": Phenolic Resin, Epoxy Resin, Stainless Steel & Laminate
Pedestals & Overheads	Wood Box/Wood Faces, Steel Box/Steel Faces, Steel Box/Wood Faces & High Density Laminate
Services	UL Listed Raceways, UL Listed Power Strips, CSA Certified Inert Gases & CSA Certified Burning Gases

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Item No. 021

SECTION 00 41 13 CONTRACTOR BID FORM

To:

Bureau of General Services
77 State House Station
Augusta, Maine 04333-0077

The undersigned, or *Bidder*, having carefully examined the form of contract, general conditions, specifications and drawings dated *25 March 2019*, prepared by *Lavallee Brensinger Architects* for *Greenlaw Building Renovations, Augusta, Maine*, as well as the premises and conditions relating to the work, proposes to furnish all labor, equipment and materials necessary for and reasonably incidental to the construction and completion of this project for the Base Bid amount of:

_____ Dollars

$ _____

Allowances *are included* on this project.

1. Alternate bids *are included* on this project.
    a. Alternate No. 1 – Parapet metal wall panels:
        i $_____
    b. Alternate No. 2 – Incinerator covered walk:
        i $_____
    c. Alternate No. 3 – South entry exterior modifications:
        i $_____
    d. Alternate No. 4 – AQA laboratory fit-up:
        i $_____
    e. Alternate No. 5 – Masonry repointing:
        i $_____
    f. Alternate No. 6 – Wall covering:
        i $_____
    g. Alternate No. 7 – High density storage:

i $_____

h. Alternate No. 8 – Operable wall:

i $_____

i. Alternate No. 9 – Stair tread and riser coverings:

i $_____

j. Alternate No. 10 – Fire fighter's communication system:

i $_____

k. Alternate No 11 – Vacuum system:

i $_____

l. Alternate No. 12 – Concrete slab on grade moisture barrier for finish flooring:

i $_____

m. Alternate No. 13 – Flooring:

i $_____

2. The Bidder acknowledges receipt of the following addenda to the specifications and drawings:

Addendum No. ____ Dated: _____

Addendum No. ____ Dated: _____

Addendum No. ____ Dated: _____

Addendum No. ____ Dated: _____

Addendum No. ____ Dated: _____

3. Bid security *is required* on this project.
The Bidder shall include a satisfactory Bid Bond (section 00 43 13) or a certified or cashier's check for 5% of the bid amount with this completed bid form submitted to the Owner.

4. Filed Sub-bids *are not required* on this project.
The bid amount includes the following Filed Sub-bids which were submitted to the Bidder and to the Maine Construction Bid Depository.

SECTION 00 41 13 CONTRACTOR BID FORM

5. The Bidder agrees, if this bid is accepted by the Owner, to sign the designated Owner-Contractor contract and deliver it, with any and all bonds and affidavits of insurance specified in the Bid Documents, within twelve calendar days after the date of notification of such acceptance, except if the twelfth day falls on a State of Maine government holiday or other closure day, a Saturday, or a Sunday, in which case the aforementioned documents must be received before 12:00 noon on the day following the holiday or other closure day, Saturday or Sunday.

   As a guarantee thereof, the Bidder submits, together with this bid, a bid bond or other acceptable instrument as and if required by the Bid Documents.

6. This bid is hereby submitted by:

Signature: _____

Printed name and title: _____

Company name: _____

Mailing address: _____

City, state, zip code: _____

Phone number: _____

Email address: _____

State of incorporation, _____
if a corporation:

List of all partners, _____
if a partnership:

Item No. 026

NORTHEAST TEST CONSULTANTS

May 11, 2007

Mr. Dennis Kingman
Project Manager
Summit Environmental
8 Harlow Street
Bangor, ME 04401

RE: Lead-Based Paint Determination Results
A.M.H.I. Greenlaw Bldg, Augusta, ME
NTC Job #10570-2007

Dear Mr. Kingman:

Northeast Test Consultants has completed the Lead-Based Paint Determination at the three-story Greenlaw Building located on the AMHI Campus in Augusta, Maine.

Purpose

The purpose of this assessment was to characterize the environmental conditions at this location for the presence of lead-containing materials. The information compiled may be utilized to assess the costs associated with any renovation work conducted.

The lead-based paint determination is a limited assessment of a facility for the purpose of identifying the presence of lead-containing materials. ***The intent of the lead determination is to assess similarities based upon component type and painting schemes, providing a general overview of the property.*** This lead-based paint determination should not be viewed as a comprehensive survey of the property. The assumption(s) can be made, in most cases, that building components similar to the ones tested may have the same test results.

The lead-based paint testing was performed utilizing a portable X-ray Fluorescence Analyzer (XRF) that non-destructively tests for the presence of lead on building components. Once identified as lead containing, a cursory visual assessment as to the current condition of the paint on these components, both interior and exterior, was performed.

Procedures

On April 24, 2007, a representative of *Northeast Test Consultants* was on-site at the subject property to perform the lead-based paint determination work.

The lead-based paint determination was performed in accordance with the protocols outlined in the State of Maine Department of Environmental Protections' Lead Management Regulations, Chapter 424, Section 7, as they apply to this particular project. Building components on both the interior and exterior of the structures were tested and assessed. This will enable the Owner or

Owner's representative to address appropriate engineering controls, worker protection, and disposal issues during the renovation phase of the project.

The lead-based paint determination was conducted utilizing a portable X-ray Fluorescence Lead Paint Analyzer (RMD LPA-1), which non-destructively tests for the presence of lead-based paint. This equipment is licensed with the Department of Human Services Radiation Control Program (#05605) and operated in accordance with all applicable regulations and conditions of licensure. The instrument satisfactorily underwent pre and post-calibration utilizing the manufacturer's reference standard.

Deborah A. Kasik, *ME DEP* certified Lead Risk Assessor, License #LR-0003, performed the lead determination testing including the visual assessment at the site.

OBSERVATIONS

Lead testing was performed throughout the facility to identify the presence of lead-based paint on accessible building components. Accessible areas and surfaces were tested utilizing the portable X-ray Fluorescence Analyzer (LPA-1). Some areas were not accessible at the time of the determination, therefore no results for these areas have been included.

Lead-containing components identified on the interior of the building consist of one type of material: faced block walls (identified in the report as "ceramic" followed by a color designation). Please note that regular ceramic wall tiles (utilized in bathrooms) were also identified and tested; they were not lead-containing. Due to the consistent nature of the building design, all accessible components were tested on the third floor then verified for consistency on both the second and first floors. Previously the building was utilized as a hospital, therefore the layout is generally the same, as well as the building components utilized. The basement area was also included for testing; it consists mainly of masonry wall systems with miscellaneous trim. The lead-containing faced block was identified in the bathrooms in the basement.

It is important to note that, in areas where new wall/ceiling systems have been installed (i.e. office areas), the original building components may still exist and should be assumed to contain lead-based paint based until proven otherwise.

Any conclusions contained herein are limited by the scope of work performed; no warranty, expressed or implied, is indicated as to any subsurface conditions not specifically noted within this report.

LEAD-BASED PAINT DETERMINATION

These commercial structures were constructed prior to the ban on the use of lead-based paint, therefore all surfaces both on the interior and exterior of the structures are potential sources for lead-based paint. Lead testing was performed in all accessible areas of the structure, the results of which have been documented on the 'field form" sheets, and are included with this final report. An assessment of the current condition of the paint, only on positively identified lead-containing components, has been noted as well on these forms. Drawings have been included to identify the locations of the rooms within the structure. An attempt has been made to identify all lead-containing components that were tested on the drawings provided.

A general listing of components tested for the presence of lead are as follows:

Ceilings & Trim	*Staircase Components*
Walls & Trim	*Miscellaneous Materials*

Door Units & Trim *Window Units & Trim*

Each individual reading for the components (whether positive or negative) tested have been documented on the 'Field Form' sheets; analysis results are indicated in milligrams per square centimeter (mg/cm^2). The positive components have been highlighted in blue on the field forms and the major components (such as walls and ceilings) have been identified on the drawing for your review.

Limitations

In certain circumstances, leaded components may be covered by other building components, such as paneling/sheetrock enclosing a painted wall. It should be understood that the lead determination process is non-destructive, unless authorization has been received by the Owner to access otherwise inaccessible components. In such cases, the Owner can either assume that these inaccessible components contain lead-based paint or have them tested when renovation work may disturb them. The XRF readings obtained on the accessible surface (i.e. paneling/sheetrock) are for that surface only and do not apply to the surface beneath it unless subsurface is noted.

Explanation of Analysis Methods

The X-ray Fluorescence Lead Paint Analyzer is a complete lead paint analysis system that quickly, accurately, and non-destructively measures the concentration of lead-based paint on surfaces. X-ray Fluorescence is a common technique utilizing gamma rays to bombard the surface, causing the atoms in the paint to emit characteristic X-rays. These characteristic X-rays are detected and analyzed to provide the concentration information.

The RMD LPA-1 has the ability to read concentrations of lead in paint up to 9.9 milligrams per square centimeter; if the content of lead in the paint is greater than 9.9, the reading for that component will be listed as >9.9 mg/cm2. The minimum detection limit of this particular equipment is 0.3 milligrams per square centimeter.

Calibration of the equipment is required prior to the inspection process and at the completion of the inspection process. As indicated previously, the calibration readings during the course of the inspection were within the limits established by the manufacturer.

Recommendations (Lead)

The objective of this determination was to determine the presence of lead-based paint and assess the condition of the paint as it currently exists. The information compiled during this testing is not intended to be substituted for a comprehensive lead-based paint survey, or to be used to express potential exposure to airborne lead for the purposes of regulation compliance. All scraping, sanding, cutting, welding, grinding, or demolition of any painted surface should not be performed under dry conditions in which airborne dust can be generated.

Similarly, renovation/demolition activities that may impact lead-containing components are of a concern with respect to the generation of airborne lead dust; therefore, safety measures such as the use of engineering controls are essential in order to protect human health and the environment. Contractors performing renovation/demolition activities in which excessive amounts of lead dust may be generated shall be trained in the hazards of lead-containing materials and the subsequent removal, cleaning, packaging, and handling of these materials as well as wearing NIOSH approved respirators, disposable clothing, and other requirements of the standard. All work operations shall be performed in accordance with the following:

OSHA 29 CFR Part 1926.62, Lead Standard.

Please review the information contained herein and should you have any questions at all, please don't hesitate to contact me.

Sincerely,

Deborah A. Kasik
Lead Division Manager

Enclosures

LEAD-BASED PAINT
EXPLANATION OF RESULTS

1. **RESULTS:**

The determination as to whether or not a component contains lead-based paint is based on the State of Maine, Department of Environmental Protections' Lead Management Regulations (Chapter 424) which regulates residential and daycare facilities. The DEP defines a component as lead-containing if the ***XRF result is equal to or greater than 1.0 milligram per square centimeter.*** [The limits for any additional sampling, i.e. soil, dust, and/or water, will be included on their individual report forms.]

Commercial Properties: As a standard operating procedure, NortheastTest Consultants utilizes the protocols outlined in the DEP Lead Management Regulations as a guideline for performance of lead inspection/determination work on commercial properties.

2. **CONDITION OF PAINT:**

The condition of the paint is a vital part of the lead inspection. The Department of Environmental Protection outlines definitions for three classifications of paint condition: good; fair; and poor. General Definitions for each are as follows:

GOOD: paint is entirely intact;

FAIR: paint is intact, but worn; minor chips are evident as a result of normal wear and tear; no adhesion or substrate problems are present;

POOR: paint is severely worn, weathered, or no longer adhering, i.e. peeling, cracking, flaking, chalking; or the substrate is broken, exposed, or otherwise deteriorated.

More detailed definitions for each condition of paint can be found in the *DEP Lead Management Regulations*, Section 1L(1)(2)(3) respectively. For the purposes of this report, components with paint found to be in poor condition are considered to be an environmental hazard and should be addressed as a priority. These components have been highlighted in YELLOW on the inspection report. All other identified lead components in good or fair condition are highlighted in BLUE on the report.

3. **DEFINITION OF TERMS**

Testing Methods: Testing methods used to determine Environmental Lead Hazards are XRF paint analysis and sampling for laboratory analysis.

XRF-LPA: X-ray Fluorescence Lead Paint Analyzer is a non-intrusive instrument that measures the concentration of lead in surface coatings on building components in milligrams per square centimeter.

Room Equivalent: means an identifiable part of a residence, such as a room, foyer, staircase, hallway or an exterior. Each room equivalent has been assigned both a room number and name that is consistently used on the diagrams, data forms, and summary.

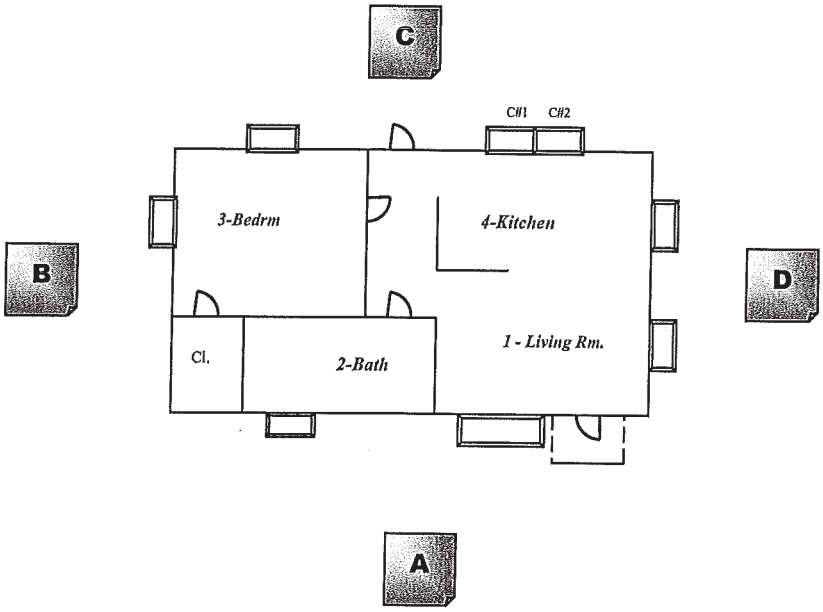
Side: Identifies the location of a building component by side. 'A' side is in the same plane or closest to the street address; 'B,C&D' sides are identified clockwise from the street address. The 'side' designation is consistently utilized throughout the report, on diagrams, data forms and the summary.

Source: Building component sampled for lead content, such as door and window units that are numbered sequentially from left to right.

Surface: Identifies the substrate beneath the surface coating (or, in some cases, the surface coating itself).

4. **DIAGRAM**:

A diagram of the facility is also an integral part of the final report. It establishes room identifications from which the typewritten report can be compared. There are always four sides to each room/area, which is consistent amongst inspectors. 'A' side always faces the street address of the building (unless otherwise indicated). The purpose is to be able to correlate the report to the drawing.



CLIENT: Summit Environmental

NTC JOB #: 10570-2007
DATE: April 24, 2007
PAGE: 1

LEAD-BASED PAINT ANALYTICAL RESULTS
METHOD: X-RAY FLUORESCENCE (XRF) ANALYZER
FIELD FORM

A.M.H.I. - GREENLAW BUILDING
AUGUSTA, MAINE

RESIDENTIAL: [ ] COMMERCIAL: [X] UNKNOWN: [ ]

FIELD ID #	SAMPLE DESCRIPTION	CONDITION	NUMBER OF READINGS	RESULTS MG/CM^2
L-1	THIRD FLOOR; RM #301 CEILING (WHITE)	N/A	1	<0.3
L-2	THIRD FLOOR; RM #301 UPPER WALLS (WHITE)	N/A	1	<.3
L-3	THIRD FLOOR; RM #301 LOWER WALLS (CERAMIC; GRAY)	GOOD	1	5.1
L-4	THIRD FLOOR; RM #301 DOOR CASING, JAMB (PALE GRAY)	N/A	2	<0.3/<0.3
L-5	THIRD FLOOR; RM #302 UPPER & LOWER WALLS (CERAMIC; GRAY)	GOOD	1	4.2
L-6	THIRD FLOOR; RM #302 WALL NEAR SINK (CERAMIC; MINT GREEN)	N/A	1	<0.3
L-7	THIRD FLOOR; RM #303 UPPER WALLS (CREAM)	N/A	1	<0.3
L-8	THIRD FLOOR; RM #303 LOWER WALLS (CERAMIC; PALE GREEN)	GOOD	1	3.3
L-9	THIRD FLOOR; RM #303 DOOR CASING, JAMB (PALE GRAY)	N/A	1	<0.3
L-10	THIRD FLOOR; RM #303 HEATER (PALE GRAY)	N/A	1	<0.3
L-11	THIRD FLOOR; RM #303A UPPER WALLS (CREAM)	N/A	1	<0.3
L-12	THIRD FLOOR; RM #303A LOWER WALLS (CERAMIC; PALE GRAY)	GOOD	1	4.2
L-13	THIRD FLOOR; RM #303A WALL NEAR SINK (CERAMIC; MINT GREEN)	N/A	1	<0.3
L-14	THIRD FLOOR; RM #304 UPPER WALLS (CREAM)	N/A	1	<0.3

DETECTION LIMIT OF XRF UNIT: 0.3 MG/CM^2 (Milligrams per square centimeter)

RMD LPA-1 (XRF); UNIT #1650; RADIATION LICENSE #05605
CALIBRATION STANDARD: 1.0 +/- 0.3 MG/CM^2

Pre-Use Calibration Reading: 1.0 MG/CM^2
Post-Use Calibration Reading: 1.0 MG/CM^2

LEAD INSPECTOR: DEBORAH KASIK

LEAD-BASED PAINT ANALYTICAL RESULTS
METHOD: X-RAY FLUORESCENCE (XRF) ANALYZER
FIELD FORM

A.M.H.I. - GREENLAW BUILDING
AUGUSTA, MAINE

RESIDENTIAL: [ ] COMMERCIAL: [X] UNKNOWN: [ ]

FIELD ID #	SAMPLE DESCRIPTION	CONDITION	NUMBER OF READINGS	RESULTS MG/CM^2
L-15	THIRD FLOOR; RM #304 LOWER WALLS (CERAMIC; PALE YELLOW)	GOOD	1	4.0
L-16	THIRD FLOOR; RM #305 UPPER WALLS (CREAM)	N/A	1	<0.3
L-17	THIRD FLOOR; RM #305 LOWER WALLS (CERAMIC; PALE PINK)	GOOD	1	4.1
L-18	THIRD FLOOR; RM #306 UPPER WALLS (CREAM)	N/A	1	<0.3
L-19	THIRD FLOOR; RM #306 ** LOWER WALLS (CERAMIC; PALE GREEN)	GOOD	1	4.2
L-20	THIRD FLOOR; RM #307 UPPER WALLS (CREAM)	N/A	2	<0.3/<0.3
L-21	THIRD FLOOR; RM #307 PAINTED LOWER WALLS (CERAMIC BENEATH; CR)	GOOD	1	3.9
L-22	THIRD FLOOR; RM #308 UPPER WALLS (CREAM)	N/A	1	<0.3
L-23	THIRD FLOOR; RM #308 LOWER WALLS (CERAMIC; PALE PINK)	GOOD	1	4.0
L-24	THIRD FLOOR; RM #309 UPPER&LOWER WALLS (CERAMIC; PALE GRAY)	GOOD	1	4.1
L-25	THIRD FLOOR; RM #309 PIPING (GRAY)	N/A	1	<0.3
L-26	THIRD FLOOR; RM #309 DOOR CASING, JAMB (X2; LIGHT GRAY)	N/A	2	<0.3/<0.3
L-27	THIRD FLOOR; RM #310 UPPER WALLS (WHITE)	N/A	1	<0.3
L-28	THIRD FLOOR; RM #310 LOWER WALLS (CERAMIC; PALE GRAY)	GOOD	1	3.6

DETECTION LIMIT OF XRF UNIT: 0.3 MG/CM^2 (Milligrams per square centimeter)

RMD LPA-1 (XRF); UNIT #1650; RADIATION LICENSE #05605
CALIBRATION STANDARD: 1.0 +/- 0.3 MG/CM^2

Pre-Use Calibration Reading: 1.0 MG/CM^2
Post-Use Calibration Reading: 1.0 MG/CM^2

LEAD INSPECTOR: DEBORAH KASIK

****NOT ON DRAWING**

LEAD-BASED PAINT ANALYTICAL RESULTS
METHOD: X-RAY FLUORESCENCE (XRF) ANALYZER
FIELD FORM

A.M.H.I. - GREENLAW BUILDING
AUGUSTA, MAINE

RESIDENTIAL: [ ] COMMERCIAL: [X] UNKNOWN: [ ]

FIELD ID #	SAMPLE DESCRIPTION	CONDITION	NUMBER OF READINGS	RESULTS MG/CM^2
L-29	THIRD FLOOR; RM #311 UPPER WALLS (WHITE)	N/A	1	<0.3
L-30	THIRD FLOOR; RM #311 LOWER WALLS (CERAMIC; PALE GRAY)*	GOOD	1	3.9
L-31	THIRD FLOOR; RM #311 DOOR CASING, JAMB (X2; LIGHT GRAY)	N/A	1	<0.3
L-32	THIRD FLOOR; RM #312A UPPER WALLS (PALE YELLOW)	N/A	1	<0.3
L-33	THIRD FLOOR; RM #312A LOWER WALLS (CERAMIC; PALE GREEN)	GOOD	1	3.3
L-34	THIRD FLOOR; RM #313 A&C' UPPER WALLS (CREAM)	N/A	2	<0.3/<0.3
L-35	THIRD FLOOR; RM #313 LOWER WALLS (CERAMIC; PALE PINK)	GOOD	2	4.1/5.0
L-36	THIRD FLOOR; RM #313 A' DOOR (METAL; GRAY)	N/A	1	<0.3
L-37	THIRD FLOOR; RM #313 A,B,D' DOOR CASING, JAMB (METAL; GRAY)	N/A	3	<0.3/<0.3/<0.3
L-38	THIRD FLOOR; RM #313 B&C' WINDOW FRAMES (METAL; GRAY)	N/A	1	<0.3
L-39	THIRD FLOOR; RM #315 (COMPUTER) UPPER WALLS (CREAM)	N/A	1	<0.3
L-40	THIRD FLOOR; RM #315 (COMPUTER) LOWER WALLS (CERAMIC; PALE GREEN)	GOOD	1	4.2
L-41	THIRD FLOOR; RM #315A UPPER WALLS (CREAM)	N/A	2	<0.3/<0.3
L-42	THIRD FLOOR; RM #315A LOWER WALLS (CERAMIC; PALE GREEN)	GOOD	1	4.2

DETECTION LIMIT OF XRF UNIT: 0.3 MG/CM^2 (Milligrams per square centimeter)

RMD LPA-1 (XRF); UNIT #1650; RADIATION LICENSE #05605
CALIBRATION STANDARD: 1.0 +/- 0.3 MG/CM^2

Pre-Use Calibration Reading: 1.0 MG/CM^2
Post-Use Calibration Reading: 1.0 MG/CM^2

LEAD INSPECTOR: DEBORAH KASIK

*NOTE: LOCATED BEHIND PANELING AS WELL

LEAD-BASED PAINT ANALYTICAL RESULTS
METHOD: X-RAY FLUORESCENCE (XRF) ANALYZER
FIELD FORM

A.M.H.I. - GREENLAW BUILDING
AUGUSTA, MAINE

RESIDENTIAL: [ ] COMMERCIAL: [X] UNKNOWN: [ ]

FIELD ID #	SAMPLE DESCRIPTION	CONDITION	NUMBER OF READINGS	RESULTS MG/CM^2
L-43	THIRD FLOOR; RM #315A HEATER (PALE GRAY)	N/A	1	<0.3
L-44	THIRD FLOOR; RM #315A DOOR CASINGS, JAMB (XALL; PALE GRAY)	N/A	3	<0.3/<0.3/<0.3
L-45	THIRD FLOOR; RM #315A SUPPORTS BETWEEN WINDOWS (CREAM)	N/A	1	<0.3
L-46	THIRD FLOOR; RM #316 UPPER WALLS (CREAM)	N/A	1	<0.3
L-47	THIRD FLOOR; RM #316 LOWER WALLS (CERAMIC; PALE YELLOW)	GOOD	1	3.8
L-48	THIRD FLOOR; RM #316 VINYL BASEBOARD (BLACK)	N/A	1	<0.3
L-49	THIRD FLOOR; RM #316 WINDOW SASH (METAL; BROWN)	N/A	1	<0.3
L-50	THIRD FLOOR; RM #317 UPPER WALLS (CREAM)	N/A	2	<0.3/<0.3
L-51	THIRD FLOOR; RM #317 LOWER WALLS (CERAMIC; PALE GRAY)	GOOD	1	4.7
L-52	THIRD FLOOR; RM #317 CEILING (WHITE)	N/A	1	<0.3
L-53	THIRD FLOOR; RM #317 STRUCTURAL STEEL SUPPORT (WHITE)	N/A	1	<0.3
L-54	THIRD FLOOR; RM #317 DOOR CASINGS, JAMBS(X3; GRAY)	N/A	2	<0.3/<0.3
L-55	THIRD FLOOR; RM #317A WALLS - BARE CINDERBLOCK	N/A	0	N/A
L-56	THIRD FLOOR; RM #317B WALLS - BARE BRICK	N/A	0	N/A

DETECTION LIMIT OF XRF UNIT: 0.3 MG/CM^2 (Milligrams per square centimeter)

RMD LPA-1 (XRF); UNIT #1650; RADIATION LICENSE #05605
CALIBRATION STANDARD: 1.0 +/- 0.3 MG/CM^2

Pre-Use Calibration Reading: 1.0 MG/CM^2
Post-Use Calibration Reading: 1.0 MG/CM^2

LEAD INSPECTOR: DEBORAH KASIK

LEAD-BASED PAINT ANALYTICAL RESULTS
METHOD: X-RAY FLUORESCENCE (XRF) ANALYZER
FIELD FORM

A.M.H.I. - GREENLAW BUILDING
AUGUSTA, MAINE

RESIDENTIAL: [ ] COMMERCIAL: [X] UNKNOWN: [ ]

FIELD ID #	SAMPLE DESCRIPTION	CONDITION	NUMBER OF READINGS	RESULTS MG/CM^2
L-57	THIRD FLOOR; RM #317B SUPPORT BEAM (BRIGHT YELLOW)	N/A	1	<0.3
L-58	THIRD FLOOR; RM #319 UPPER WALLS (PINK)	N/A	2	<0.3/<0.3
L-59	THIRD FLOOR; RM #319 LOWER WALLS (CERAMIC; PALE GRAY)	GOOD	1	4.1
L-60	THIRD FLOOR; RM #319 WINDOW SASH (METAL; BROWN)	N/A	1	<0.3
L-61	THIRD FLOOR; RM #319 DOOR CASING, JAMB (X2; GRAY)	N/A	1	<0.3
L-62	THIRD FLOOR; RM #320 UPPER WALLS (WHITE)	N/A	1	<0.3
L-63	THIRD FLOOR; RM #320 LOWER WALLS (CERAMIC; PALE GRAY)	GOOD	1	4.7
L-64	THIRD FLOOR; RM #320 DOOR CASING, JAMB (GRAY)	N/A	1	<0.3
L-65	THIRD FLOOR; RM #321 UPPER WALLS (CREAM)	N/A	1	<0.3
L-66	THIRD FLOOR; RM #321 LOWER WALLS (CERAMIC; PALE PINK)	GOOD	1	3.6
L-67	THIRD FLOOR; RM #321 HEATER (CREAM)	N/A	1	<0.3
L-68	THIRD FLOOR; RM #321 WINDOW SASH (METAL; BROWN)	N/A	1	<0.3
L-69	THIRD FLOOR; RM #321 DOOR CASING, JAMB (CREAM)	N/A	1	<0.3
L-70	THIRD FLOOR; RM #321 CABINETS (WHITE)	N/A	1	<0.3

DETECTION LIMIT OF XRF UNIT: 0.3 MG/CM^2 (Milligrams per square centimeter)

RMD LPA-1 (XRF); UNIT #1650; RADIATION LICENSE #05605
CALIBRATION STANDARD: 1.0 +/- 0.3 MG/CM^2

Pre-Use Calibration Reading: 1.0 MG/CM^2
Post-Use Calibration Reading: 1.0 MG/CM^2

LEAD INSPECTOR: DEBORAH KASIK

LEAD-BASED PAINT ANALYTICAL RESULTS
METHOD: X-RAY FLUORESCENCE (XRF) ANALYZER
FIELD FORM

A.M.H.I. - GREENLAW BUILDING
AUGUSTA, MAINE

RESIDENTIAL: [ ] COMMERCIAL: [X] UNKNOWN: [ ]

FIELD ID #	SAMPLE DESCRIPTION	CONDITION	NUMBER OF READINGS	RESULTS MG/CM^2
L-71	THIRD FLOOR; RM #322 UPPER WALLS (CREAM)	N/A	1	<0.3
L-72	THIRD FLOOR; RM #322 LOWER WALLS (CERAMIC; PALE PINK)	GOOD	1	3.6
L-73	THIRD FLOOR; RM #323 UPPER WALLS (WHITE)	N/A	2	<0.3/<0.3
L-74	THIRD FLOOR; RM #323 LOWER WALLS (CERAMIC; PALE GREEN)	GOOD	1	3.7
L-75	THIRD FLOOR; RM #323 DOOR CASING, JAMB (X6; CREAM)	N/A	1	<0.3
L-76	THIRD FLOOR; RM #323 WALL AROUND #335 (WHITE)	N/A	1	<0.3
L-77	THIRD FLOOR; RM #323A UPPER&LOWER WALLS (CERAMIC; PALE GRAY)	GOOD	1	4.2
L-78	THIRD FLOOR; RM #337 UPPER WALLS (CREAM)	N/A	1	<0.3
L-79	THIRD FLOOR; RM #337 LOWER WALLS (CERAMIC; PALE GRAY)	GOOD	1	4.8
L-80	THIRD FLOOR; RM #337 WINDOW SASH (METAL; BROWN)	N/A	1	<0.3
L-81	THIRD FLOOR; RM #337 PIPING (CREAM)	N/A	1	<0.3
L-82	THIRD FLOOR; RM #337 DOOR CASING, JAMB (X2; CREAM)	N/A	1	<0.3
L-83	THIRD FLOOR; RM #340 LOWER WALLS (CERAMIC; PALE GREEN)	GOOD	1	3.9
L-84	THIRD FLOOR; RM #340A UPPER&LOWER WALLS (CERAMIC; PALE GRAY)	GOOD	1	4.1

DETECTION LIMIT OF XRF UNIT: 0.3 MG/CM^2 (Milligrams per square centimeter)

RMD LPA-1 (XRF); UNIT #1650; RADIATION LICENSE #05605
CALIBRATION STANDARD: 1.0 +/- 0.3 MG/CM^2

Pre-Use Calibration Reading: 1.0 MG/CM^2
Post-Use Calibration Reading: 1.0 MG/CM^2

LEAD INSPECTOR: DEBORAH KASIK

LEAD-BASED PAINT ANALYTICAL RESULTS
METHOD: X-RAY FLUORESCENCE (XRF) ANALYZER
FIELD FORM

A.M.H.I. - GREENLAW BUILDING
AUGUSTA, MAINE

RESIDENTIAL: [ ] COMMERCIAL: [X] UNKNOWN: [ ]

FIELD ID #	SAMPLE DESCRIPTION	CONDITION	NUMBER OF READINGS	RESULTS MG/CM^2
L-85	THIRD FLOOR; RM #342 UPPER WALLS (CREAM)	N/A	1	<0.3
L-86	THIRD FLOOR; RM #342 LOWER WALLS (CERAMIC; PALE PINK)	GOOD	1	4.0
L-87	THIRD FLOOR; RM #343 UPPER WALLS (CREAM)	N/A	1	<0.3
L-88	THIRD FLOOR; RM #343 LOWER WALLS (CERAMIC; PALE GRAY)	N/A	1	3.9
L-89	THIRD FLOOR; RM #344 LOWER WALLS (CERAMIC; PALE GREEN)	GOOD	1	4.2
L-90	THIRD FLOOR; RM #345 LOWER WALLS (CERAMIC; PALE PINK)	GOOD	1	3.6
L-91	THIRD FLOOR; RM #346 LOWER WALLS (CERAMIC; PALE YELLOW)	GOOD	1	4.5
L-92	THIRD FLOOR; RM #347 UPPER WALLS (LAVENDER)	N/A	2	<0.3/<0.3
L-93	THIRD FLOOR; RM #347 LOWER WALLS (CERAMIC; PALE GRAY)	GOOD	1	3.3
L-94	THIRD FLOOR; RM #347 WALL AROUND SINK (CERAMIC; MINT GREEN)	N/A	1	<0.3
L-95	THIRD FLOOR; HALLWAY OUTSIDE RM 315 A,B,D UPPER WALLS (CREAM)	N/A	1	<0.3
L-96	THIRD FLOOR; HALLWAY OUTSIDE RM 315 A,B,D' LOWER WALLS (CERAMIC; PALE GREEN)	GOOD	1	2.9
L-97	THIRD FLOOR; HALLWAY OUTSIDE RM 315 STRUCTURAL STEEL ABOVE CT (ORANGE)	N/A	2	0.5/0.6
L-98	THIRD FLOOR; HALLWAY OUTSIDE RM 315 DOOR CASINGS, JAMBS (METAL & WOOD; GRAY)	N/A	2	<0.3

DETECTION LIMIT OF XRF UNIT: 0.3 MG/CM^2 (Milligrams per square centimeter)

RMD LPA-1 (XRF); UNIT #1650; RADIATION LICENSE #05605
CALIBRATION STANDARD: 1.0 +/- 0.3 MG/CM^2

Pre-Use Calibration Reading: 1.0 MG/CM^2
Post-Use Calibration Reading: 1.0 MG/CM^2

LEAD INSPECTOR: DEBORAH KASIK

CLIENT: Summit Environmental

NTC JOB #: 10570-2007
DATE: April 24, 2007
PAGE: 8

LEAD-BASED PAINT ANALYTICAL RESULTS
METHOD: X-RAY FLUORESCENCE (XRF) ANALYZER
FIELD FORM

A.M.H.I. - GREENLAW BUILDING
AUGUSTA, MAINE

RESIDENTIAL: [ ] COMMERCIAL: [X] UNKNOWN: [ ]

FIELD ID #	SAMPLE DESCRIPTION	CONDITION	NUMBER OF READINGS	RESULTS MG/CM^2
L-99	THIRD FLOOR; HALLWAY OUTSIDE RM 316 UPPER WALLS (CREAM)	N/A	2	<0.3/<0.3
L-100	THIRD FLOOR; HALLWAY OUTSIDE RM 316 LOWER WALLS (CERAMIC; PALE YELLOW)	GOOD	1	4.7
L-101	THIRD FLOOR; HALLWAY OUTSIDE RM 316 DOOR CASINGS, JAMBS (XALL; CREAM)	N/A	2	<0.3/<0.3
L-102	THIRD FLOOR; STAIRS NEAR RM 313 A,B,C,D CINDERBLOCK WALLS (CREAM)	N/A	2	<0.3/<0.3
L-103	THIRD FLOOR; STAIRS NEAR RM 313 CEILING (CREAM)	N/A	1	<0.3
L-104	THIRD FLOOR; STAIRS NEAR RM 313 PIPING (CREAM)	N/A	1	<0.3
L-105	THIRD FLOOR; STAIRS NEAR RM 313 DOOR, CASINGS, JAMBS (CREAM)	N/A	3	<0.3/<0.3/<0.3
L-106	THIRD FLOOR; STAIRS NEAR RM 303 CEILING (WHITE)	N/A	1	<0.3
L-107	THIRD FLOOR; STAIRS NEAR RM 303 CINDERBLOCK WALLS (CREAM)	N/A	1	<0.3
L-108	THIRD FLOOR; STAIRS NEAR RM 303 BASEBOARD (BROWN)	N/A	1	<0.3
L-109	THIRD FLOOR; STAIRS NEAR RM 346 CINDERBLOCK WALLS (CREAM)	N/A	1	<0.3
L-110	THIRD FLOOR; STAIRS NEAR RM 346 CEILING (CREAM)	N/A	1	<0.3
L-111	THIRD FLOOR; STAIRS NEAR RM 346 BASEBOARD (BROWN)	N/A	1	<0.3
L-112	SECOND FLOOR CEILINGS	N/A	MULTIPLE	<0.3

DETECTION LIMIT OF XRF UNIT: 0.3 MG/CM^2 (Milligrams per square centimeter)

RMD LPA-1 (XRF); UNIT #1650; RADIATION LICENSE #05605
CALIBRATION STANDARD: 1.0 +/- 0.3 MG/CM^2

Pre-Use Calibration Reading: 1.0 MG/CM^2
Post-Use Calibration Reading: 1.0 MG/CM^2

LEAD INSPECTOR: DEBORAH KASIK

CLIENT: Summit Environmental

NTC JOB #: 10570-2007
DATE: April 24, 2007
PAGE: 9

LEAD-BASED PAINT ANALYTICAL RESULTS
METHOD: X-RAY FLUORESCENCE (XRF) ANALYZER
FIELD FORM

A.M.H.I. - GREENLAW BUILDING
AUGUSTA, MAINE

RESIDENTIAL: [ ] COMMERCIAL: [X] UNKNOWN: [ ]

FIELD ID #	SAMPLE DESCRIPTION	CONDITION	NUMBER OF READINGS	RESULTS MG/CM^2
L-113	SECOND FLOOR UPPER WALLS	N/A	MULTIPLE	<0.3
L-114	SECOND FLOOR LOWER WALLS (CERAMIC; PALE YELLOW)	GOOD	2	4.3/3.5
L-115	SECOND FLOOR LOWER WALLS (CERAMIC; PALE TAN)	GOOD	1	3.9
L-116	SECOND FLOOR LOWER WALLS (CERAMIC; PALE PINK)	GOOD	1	3.9
L-117	SECOND FLOOR LOWER WALLS (CERAMIC; PALE GREEN)	GOOD	2	4.1/4.9
L-118	SECOND FLOOR LOWER WALLS (CERAMIC; PALE GRAY)	GOOD	1	4.9
L-119	SECOND FLOOR PAINTED CERAMIC WALLS (CREAM/GRAY)	GOOD	1	4.5
L-120	SECOND FLOOR PIPING	N/A	2	<0.3/<0.3
L-121	SECOND FLOOR HEATERS	N/A	2	<0.3/<0.3
L-122	SECOND FLOOR WINDOW SASHES (METAL; CREAM)	N/A	1	<0.3
L-123	SECOND FLOOR VENTS (CREAM)	N/A	1	<0.3
L-124	FIRST FLOOR OFFICES UPPER WALLS (WALLPAPERED)	N/A	MULTIPLE	<0.3
L-125	FIRST FLOOR OFFICES LOWER WALLS (CERAMIC; VARIOUS COLORS)	GOOD	MULTIPLE	3.9/3.6/4.0/3.9/4.2
L-126	GROUND FLOOR MASONRY WALLS (CREAM)	N/A	MULTIPLE	<0.3

DETECTION LIMIT OF XRF UNIT: 0.3 MG/CM^2 (Milligrams per square centimeter)

RMD LPA-1 (XRF); UNIT #1650; RADIATION LICENSE #05605
CALIBRATION STANDARD: 1.0 +/- 0.3 MG/CM^2

Pre-Use Calibration Reading: 1.0 MG/CM^2
Post-Use Calibration Reading: 1.0 MG/CM^2

LEAD INSPECTOR: DEBORAH KASIK

NOTE: MASONRY INCLUDES CINDERBLOCK & BRICK

LEAD-BASED PAINT ANALYTICAL RESULTS
METHOD: X-RAY FLUORESCENCE (XRF) ANALYZER
FIELD FORM

A.M.H.I. - GREENLAW BUILDING
AUGUSTA, MAINE

RESIDENTIAL: [ ] COMMERCIAL: [X] UNKNOWN: [ ]

FIELD ID #	SAMPLE DESCRIPTION	CONDITION	NUMBER OF READINGS	RESULTS MG/CM^2
L-127	GROUND FLOOR MASONRY WALLS (WHITE)	N/A	MULTIPLE	<0.3
L-128	GROUND FLOOR MASONRY WALLS (PALE YELLOW)	N/A	2	<0.3/<0.3
L-129	GROUND FLOOR CEILINGS (WHITE & PALE YELLOW)	N/A	MULTIPLE	<0.3
L-130	GROUND FLOOR FLOORS (BLUE & GRAY)	N/A	2	<0.3/<0.3
L-131	GROUND FLOOR SUPPORT COLUMNS (CREAM)	N/A	3	<0.3/<0.3/<0.3
L-132	GROUND FLOOR PIPING	N/A	1	<0.3
L-133	GROUND FLOOR; RM 1-B LOWER WALLS (CERAMIC; GRAY)	GOOD	1	3.0
L-134	GROUND FLOOR; RM 4-A LOWER WALLS (CERAMIC; GRAY)	GOOD	1	3.6
L-135	GROUND FLOOR; RM 11 & 12 LOWER WALLS (CERAMIC; GRAY)	GOOD	1	4.0
L-136	GROUND FLOOR; RM 13 FIRE DOOR (WHITE)	N/A	1	<0.3
L-137	GROUND FLOOR CASINGS, JAMBS (BLUE, PURPLE, WHITE, GREEN)	N/A	4	<0.3/<0.3/<0.3/<0.3
L-138	GROUND FLOOR; RM 1-B DOOR (BROWN)	N/A	1	<0.3
	END FIELD DOCUMENTATION			

DETECTION LIMIT OF XRF UNIT: 0.3 MG/CM^2 (Milligrams per square centimeter)

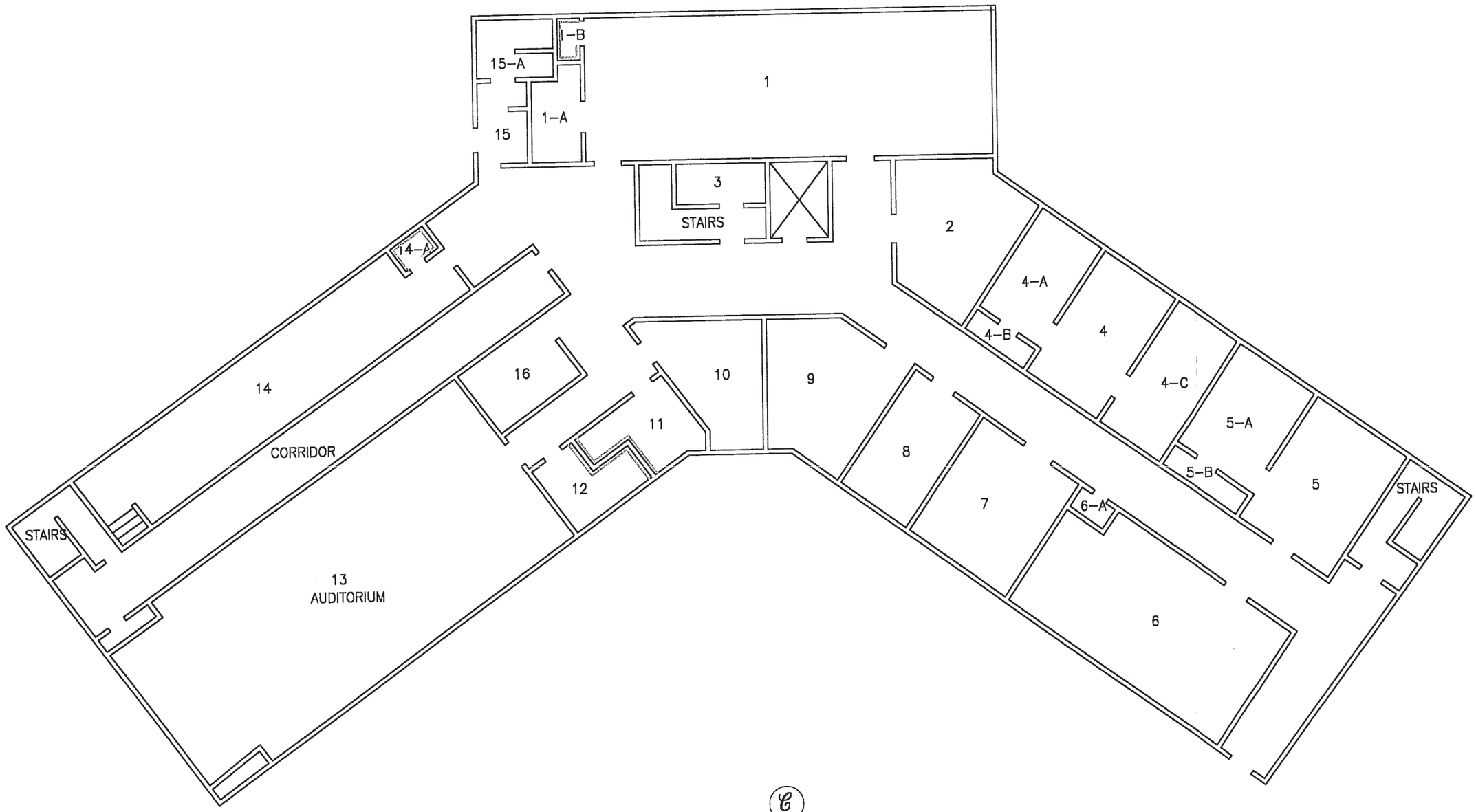
RMD LPA-1 (XRF); UNIT #1650; RADIATION LICENSE #05605
CALIBRATION STANDARD: 1.0 +/- 0.3 MG/CM^2

Pre-Use Calibration Reading: 1.0 MG/CM^2
Post-Use Calibration Reading: 1.0 MG/CM^2

LEAD INSPECTOR: DEBORAH KASIK

NOTE: MASONRY INCLUDES CINDERBLOCK & BRICK

A.M.H.I. - GREENLAW BUILDING



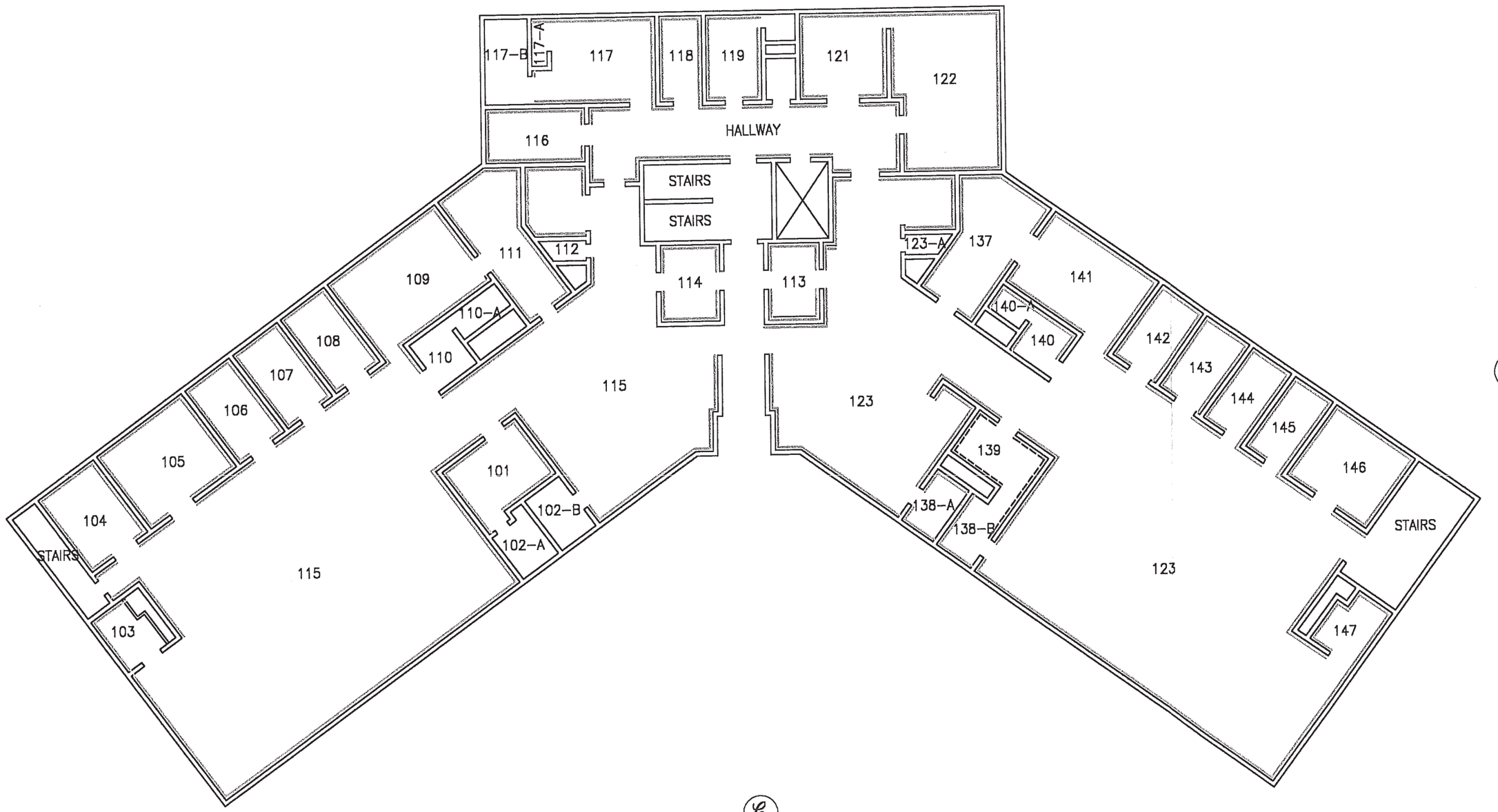
KEY:

——— – LOWER WALLS (CERAMIC TILE)

NORTHEAST TEST CONSULTANTS
587 SPRING STEET
WESTBROOK, MAINE 04092
PHONE (207) 854-3939

CLIENT:	SUMMIT ENVIRONMENTAL	DRAWING NUMBER:	3265
TITLE:	GROUND FLOOR	JOB NUMBER:	10570
NTS		DATE:	4/30/07
		DRAWN BY:	M.FOX

A.M.H.I. - GREENLAW BUILDING



KEY:

——— – LOWER WALLS (CERAMIC TILE)

- - - - - – ASSUMED CERAMIC TILE WALL

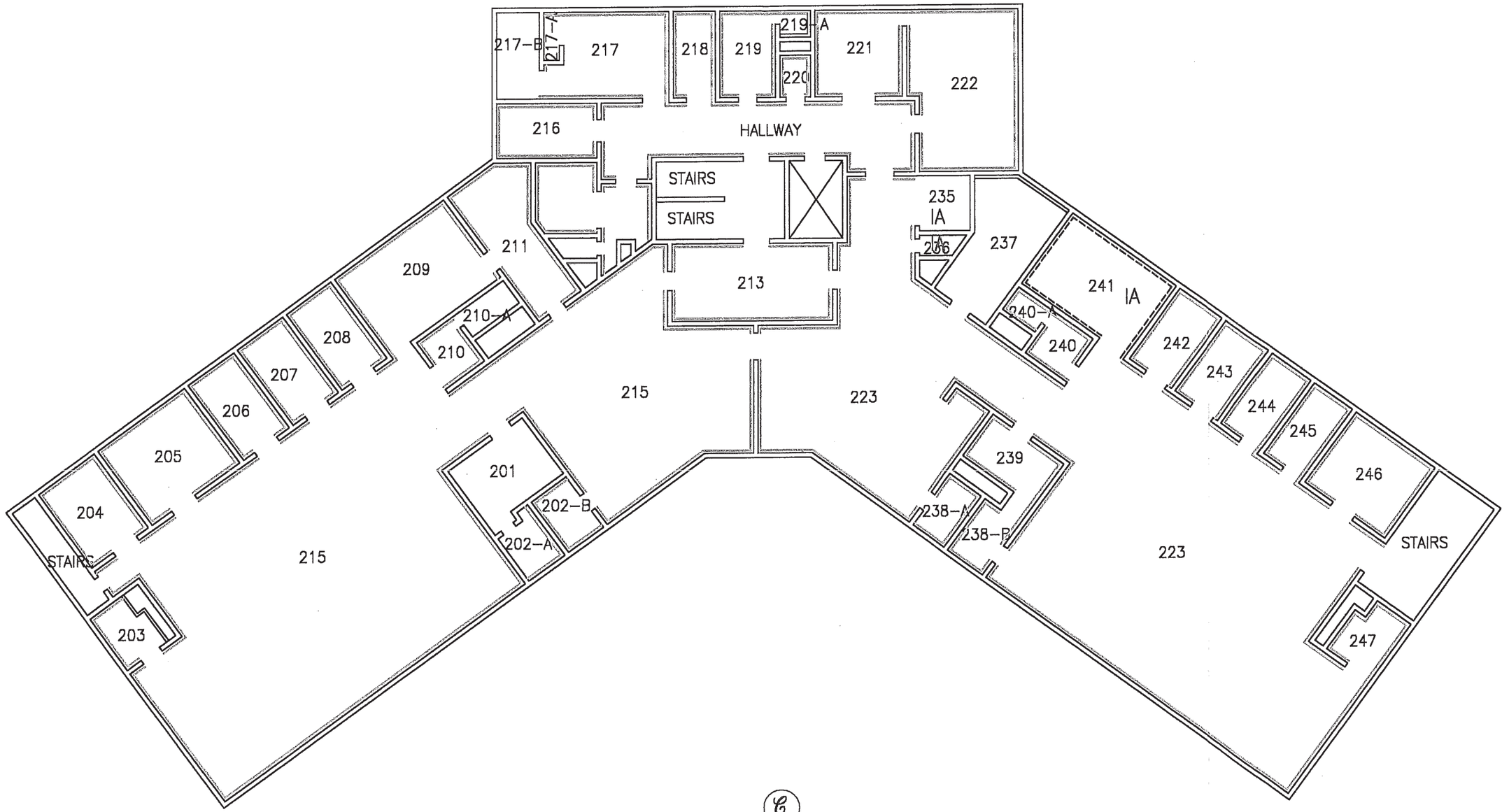
NTC

NORTHEAST TEST CONSULTANTS
587 SPRING STEET
WESTBROOK, MAINE 04092
PHONE (207) 854–3939

CLIENT:	SUMMIT ENVIRONMENTAL
TITLE:	FIRST FLOOR
NTS	

DRAWING NUMBER:	3265
JOB NUMBER:	10570
DATE:	4/30/07
DRAWN BY:	M.FOX

A.M.H.I. - GREENLAW BUILDING



KEY:

——— – LOWER WALLS (CERAMIC TILE)

- - - - - – ASSUMED CERAMIC TILE WALL

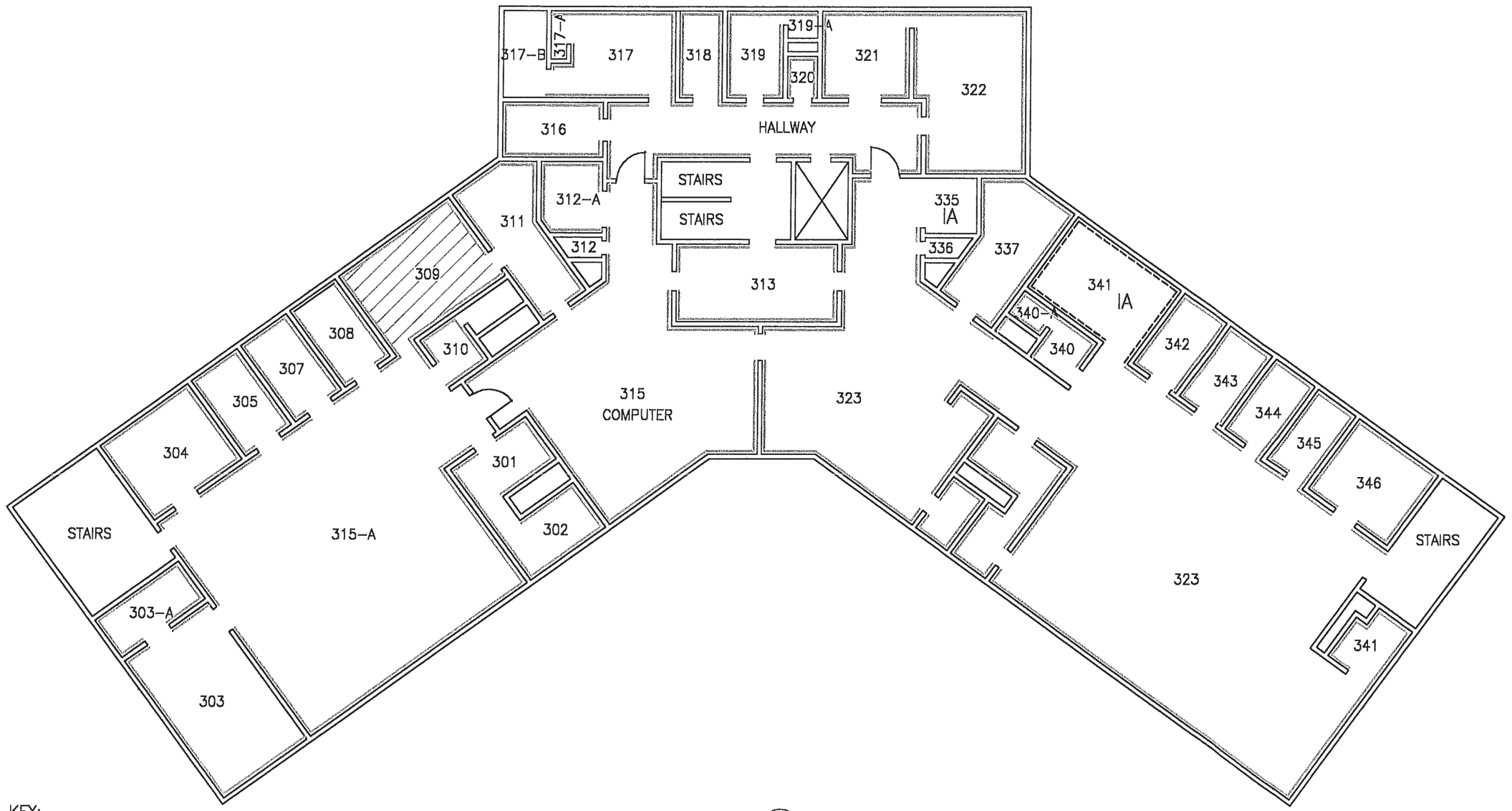
IA – INACCESSIBLE

NORTHEAST TEST CONSULTANTS
587 SPRING STEET
WESTBROOK, MAINE 04092
PHONE (207) 854-3939

CLIENT:	SUMMIT ENVIRONMENTAL
TITLE:	SECOND FLOOR
NTS	

DRAWING NUMBER:	3267
JOB NUMBER:	10570
DATE:	4/30/07
DRAWN BY:	M.FOX

A.M.H.I. - GREENLAW BUILDING



KEY:

/ / / – UPPER WALLS (CERAMIC TILE)

——— – LOWER WALLS (CERAMIC TILE)

----- – ASSUMED CERAMIC TILE WALL

IA – INACCESSIBLE

NTC

NORTHEAST TEST CONSULTANTS
587 SPRING STEET
WESTBROOK, MAINE 04092
PHONE (207) 854-3939

CLIENT:	SUMMIT ENVIRONMENTAL
TITLE:	THIRD FLOOR
	NTS

DRAWING NUMBER:	3268
JOB NUMBER:	10570
DATE:	4/30/07
DRAWN BY:	M.FOX

Item No. 028

NEW ENGLAND COMBUSTION PRODUCTS, Inc.

Providing Technical Advances to Combustion and Boiler Room Needs since 1976

May 13, 2019

Lavallee Brensinger Architects
305 Commercial St.
Portland, ME. 04101
Attn: John Adams

RE: Greenlaw Buildings Renovation
Augusta, Me.
Request for Information

Mr. Adams,
New England Combustion Products, Inc. would like to quote the Condensing Boilers to the HVAC Contractors.
Would Lavallee Brensinger Architects, Inc. consider sending the attached Substitition Request Form and the attachments to the HVAC engineers for consideration on this project.
We have taken the time to confirm the boilers will fit in the space provided.
Thank you

Craig Wood
New England Combustion Products, Inc.
PH 207-400-5139
Email cwood@necombustion.com

CONTRACTOR'S SUBSTITUTION REQUEST

To Architect: Lavallee Brensinger Architecs Date: May 6, 2019

From Contractor: New England Combustion Products, Inc. Number: _____

Specification Section: 23 52 16 Page: Entire Section

Article / Paragraph: Condensing Boilers

1. Product data for proposed substitution to include: Description of product, reference standards, performance, and test data.

   Sample attached: Yes__ No X To be sent if requested by Architect Yes ___ No X

2. Itemized comparison of proposed substitution with product specified is attached.

	ORIGINAL PRODUCT	PROPOSED SUBSTITUTION
Trade Name, Model:	Lochinvar FTX850N	Riello Array AR-2000 AR-3000
Manufacturer:	Lochinvar, LLC.	Riello North America
Installer:	To Be Determined	

   History of proposed substitution: New product __ 2-5 years old __ 5-10 years old X > 10 years old ___

   Significant variations of proposed substitution from original product: The Lochivar FTX851N Will provide (3) 851 MBH Boilers. Riello will provide (1) 2000 MBH Boiler and (1) 3,000 MBH Boiler

   Proposed substitution affects other parts of the Work: No __ Yes, explain The Lochivar FTX851N require (6) S&R Boiler Connections. The Riello AR2000 and AR-3000 require (2) S&R Connections.

   Similar installations within 150 miles: Provide project name, address, architect, install date: Lifetime Fitness Burlington, MA.

   Reason for not providing specified item: _____

3. Unit costs, if applicable: State if cost is materials only ___ or materials installed ___.

   Original product $ _____ per _____ Substitution $ _____ per _____

   Savings to Owner for accepting substitution: _____ $_____

   Proposed substitution changes Contract Time: No X Yes __ Add/Deduct _____ days.

   The Undersigned certifies:

   - Proposed substitution has been fully investigated and determined to be equal or superior to the specified product.
   - Same warranty will be furnished for proposed substitution as for the specified product.
   - Same maintenance service and source of replacement parts, as applicable, is available.
   - Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
   - Cost data as stated herein is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
   - Proposed substitution does not affect dimensions, functional clearances or design appearance.
   - Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
   - Coordination, installation and changes in the Work as necessary for accepted substitution will be complete in all respects.

   Submitted by: Craig Wood New England Combustion Products, Inc.

   Attachments: _____

NEW ENGLAND COMBUSTION PRODUCTS, Inc.

Providing Technical Advances to Combustion and Boiler Room Needs since 1976

Greenlaw Building Renovation Project

Gas Fired Condensing Boiler Comparison:

Lochivar FTX851N	Riello AR-2000 AR-3000
Stainless Steel Fire Tube HX	Stainless Steel Water Tube HX
(6) 851 MBH Heat Exchangers	(10) 500 MBH Heat Exchangers
	(4) Heat Exchangers in AR-2000
	(6) Heat Exchangers in AR-3000
	Piped, Wired, Vented
92.5 Thermal Efficiency- AHRI	96.1% Thermal Efficiency AHRI
Approximate Dimensions 261/4” W	AR-2000 Dimensions 33.3” W X
281/2” D X 531/2” H	60.8”Dx 83” Tall
	AR-3000 Dimensions 35.4” W X
	72.8” D X 83” Tall
Minimum Gas Pressure NG 4” WC	Minimum Gas Pressure NG 4” WC
Maximum Gas Pressure NG 14” WC	Maximum Gas Pressure NG 20” WC
(6)Electrical Requirements 120V/1/60	AR-2000 Elect Requirements 230V/1/60
	AR-3000 Elect Requirenents 230V/3/60
Air Intake (6) 6” Exhaust Outlet 6”	Air Intake 8” Exhaust Outlet 8”
Warranty 10 Years Heat Exchanger	Warranty 10 Years Heat Exchanger

Riello Boilers has been Manufacturing Water Tube Boilers in Europe since 1990.
Introduced to the US Market 2015

405 VFW Drive – Rockland MA 02370
781 337 8888

RIELLO **ARRAY**

Condensing Boiler

ANSI Z21.13

Project Details

Date:	May 6, 2019
Project Name:	Greenlaw Building Renovation Project
Project Location:	Augusta, ME.
Installing Contractor:	To Be Determined
Engineering Firm:	Allied Engineering
Riello Representative:	Craig Wood

Boiler Supply

AR-1000 Qty.	
AR-1500 Qty.	
AR-2000 Qty.	X
AR-3000 Qty.	X
AR-4000 Qty.	

Project Notes:

General Boiler Data

BOILER TYPE	CONDENSING HYDRONIC HEATING BOILER
AHRI CERTIFIED EFFICIENCY	96.1% (AHRI STANDARD 1500)
MAX. TEMPERATURE	210°F (203± 5.5°F HIGH LIMIT)
MAX. OPERATING TEMPERATURE	194°F
VESSLE DESIGN	80 PSIG MAWP (ASME SECTION IV)
PRESSURE RELIEF VALVES SETTING	75 PSIG (PER HEAT MODULE)
FUEL TYPE: AS SHIPPED	NATURAL GAS, 1004 BTU/SCF HHV
FUEL TYPE: ALTERNATE	PROPANE (REQUIRES CONVERSION KIT)
MIN. GAS SUPPLY PRESSURE	4.0” W.C. Natural Gas / 8.0” W.C. Propane
MAX. GAS SUPPLY PRESSURE	14” W.C.
FLAME SAFEGUARD CONTROLLER	EBM PAPST 905MN, ASME CSD-1
FLAME DETECTION	IONIZATION PROBE CURRENT

Optional Accessories

INLET FLANGED WATER STRAINER(S)	✓
MOTORIZED INTAKE AIR DAMPER(S)	
CONDENSATE NEUTRALIZER KIT(S)	✓
FLUE ADAPTER(S), PP TO STAINLESS	
FLUE ADAPTER(S), PP TO CPVC	
BOILER CLEANING KIT(S)	
PROPANE CONVERSION KIT(S)	
BACNET GATEWAY RS485	✓
LONWORKS GATEWAY RS232	
DHW TEMP. SENSOR & WELL	
SYSTEM TEMP. SENSOR & WELL	✓
OUTDOOR AIR TEMP. SENSOR	✓
EXTERNAL SPOOL & RELIEF-VALVE	

SETTING: 40 PSIG (WHOLE BOILER)

Factory Integrated Components

- Primary boiler pumps
- Main circuit breaker
- Sequencing controller
- Factory piped and wired;
  - Water-supply manifold
  - Water-return manifold
  - Exhaust manifold
  - Gas trains
  - Condensate drain manifold (no need for external traps)
  - Relief drain manifold
  - Pumps

Redundancy

- Multiple module design
- Controls for each module
- Isolation valves for each module
- Drain valves for each module

Performance Features

- 316L stainless heat exchanger
- High turndown with low excess air
- Air-cooled housing
- Variable speed fans
- Variable water flow (staged pumps)
- Low NOx (30, 20, or 9 ppm)

Operation

- Password protected control levels
- Identified fault circuitry
- Vortex flow meters to each module
- Dynamic operating limits
- 7” color touch screen
- Chart displays
- Adjustable sequencing control and firing rate parameters
- Indirect DHW function and priority
- Hinged front door
- Identical spare parts

Boiler Data Chart

	UNITS	AR 1000	AR 1500	AR 2000	AR 3000	AR 4000
Riello Product No.		20144525	20144524	20144523	20144522	20144042
I&O Manual Code		79788	79788	79788	79789	79789
	Redundancy					
Nº of Heating Modules	Qty.	2	3	4	6	8
	Combustion					
Maximum Input (<2,000 ft. alt., 30ppm NO_x)	BTU/hr	1,000,000	1,500,000	2,000,000	3,000,000	4,000,000
	(kW)	(293)	(440)	(586)	(879)	(1172)
Minimum Input	BTU/hr	100,000	100,000	100,000	100,000	100,000
	(kW)	(29)	(29)	(29)	(29)	(29)
Boiler Turndown	Ratio	10:1	15:1	20:1	30:1	40:1
Exhaust O_2 Range (NG)	%	4.4 – 5.8 (dry basis)				
Exhaust NOx (NG)	ppm	<30 ppm standard (<20 ppm & 9 ppm with fuel-air ratio / max. input adjustment)				
	Hydronic					
Water Volume (Total Boiler)	US Gal.	17	24	35	55	69
	(liter)	(64)	(91)	(132)	(208)	(261)
	Electrical					
Single-Point Electrical Feed	V/ph/Hz	120/1/60	120/1/60	220-240/1/60	208-230/3/60	208-230/3/60
Electrical Feed Wiring		L1,N ,GND	L1,N ,GND	L1,L2,N ,GND	L1,L2,L3,N ,GND	L1,L2,L3,N ,GND
Electrical (FLA)	Amps	20.3A	24.0A	20.1A	20.1A	30.2A
Electrical (MOCP)	Amps	50A	60A	50A	50A	70A
Electrical (MCA)	Amps	25A	30A	25A	25A	38A
	Connections					
Gas Inlet (NPT)	Ø Inch	1.5”	1.5”	1.5”	2.0”	2.0”
Water Return / Supply (ANSI #150 Flange – Raised Face)	Ø Inch	3”	3”	4”	4”	4”
Relief Drain Connection (NPT Female)	Ø Inch	2.5”	2.5”	2.5”	2.5”	2.5”
	(Ø mm)	(65 mm)	(65 mm)	(65 mm)	(65 mm)	(65 mm)
Condensate Drain Connection (PVC Female)	Ø Inch	1”	1”	1”	1”	1”
	(Ø mm)	(25 mm)	(25 mm)	(25 mm)	(25 mm)	(25 mm)
Flue Outlet (Integral Female “Centrotherm” PP)	Ø Inch	6” Nominal		8” Nominal	[8” or 10”] Nominal	
Adaptors & Suitable Vent Materials		CPVC, PP, Stainless Steel, AL29-4C				
Air Inlet (Sheet Metal Opening)	Ø Inch	5.90”		7.87”	9.84”	
	(Ø mm)	(150)		(200)	(250)	
System Sensor		6mm Ø, 45mm Bullet type NTC with 6,000mm cable (shipped loose)				
System Sensor Thermowell		½” x 4” (weld-in type, shipped loose)				
	Misc.					
Ambient Storage Temperature	°F	5 to 158				
	(°C)	-15 to 70				
Ambient Functioning Temperature	°F	32 to 120				
	(°C)	(0 to 49)				
Heat Exchanger Surface Area (Per Module)	ft^2	43				
	(m^2)	(4)				

Major Components Distribution

	Common to Boiler	On Each Independent Heat Module
Electrical Compartment	• 7" Color touch screen (non-controlling) • LCD service display and touchpad • Electrical feed landing terminals • Main boiler circuit breaker • System input/output terminals	• Burner, sequencing, and flame safeguard controller • Module on/off rocker switch • Overload fuse
Water-side	• Manifold piping for water supply with ANSI 150 flange • Manifold piping for water return with ANSI 150 flange • Manifold piping for relief drain with 2.5" NPT connection • Manifold piping for condensate drain with 1" PVC connection • Water-pressure switch (low) • Water-level switch (low) • Boiler drain valve • Boiler supply temperature sensor • System supply temperature sensor and well • Outdoor air temperature sensor	• Safety relief valve: ASME rated 75 psig (517 kPa) setting. • Hydronic Pump • Temperature and pressure gauge (supply side) • Supply manual isolation valve • Return manual isolation valve • Check valve • Drain valve • Module return temperature sensor • Module supply temperature sensor • Module high temperature limit control • Module low water cut-off • Automatic air vent • Water flow meter
Gas-Side	• Male NPT connection to gas supply line. • Low gas pressure switch (manual reset). • High gas pressure switch (manual reset). • Block cabin air inlet switch	• Gas burner with variable speed blower • Self-compensating zero governing gas valve with dual safety shut off function • Manual gas shutoff valve upstream of the zero governing gas valve • Manual gas shutoff valve before the burner • Combination flame supervision & ignition electrode • Flue gas temperature sensor • Module exhaust backflow check valve (clapper)

Available Head Pressure

The Array boiler includes a dedicated internal primary pump for each 500MBH module. The Table below shows the head available for the system at the outlet of the boiler. The near boiler primary loop piping must be sized to accommodate boiler maximum flow at or below the available head pressure and connected to the distribution piping using closely spaced Tees (consult Installation Manual for more details).

		Available Head Pressure				
		AR-1000	**AR-1500**	**AR-2000**	**AR-3000**	**AR-4000**
ΔT 36°F Across Boiler	**Water Flowrate (USgpm)** *(Est., No Glycol, Full Firing)*	53	80	107	160	213
	Available Head **Water Only**	10 ft.	10 ft.	10 ft.	9 ft.	9 ft.
	Available Head **50% Glycol**	7 ft.	7 ft.	7 ft.	7 ft.	7 ft.
ΔT 45°F Across Boiler	**Water Flowrate (USgpm)** *(Est., No Glycol, Full Firing)*	43	64	85	128	171
	Available Head **Water Only**	17 ft.	17 ft.	17 ft.	21 ft.	21 ft.
	Available Head **50% Glycol**	15 ft.	15 ft.	15 ft.	16 ft.	16 ft.

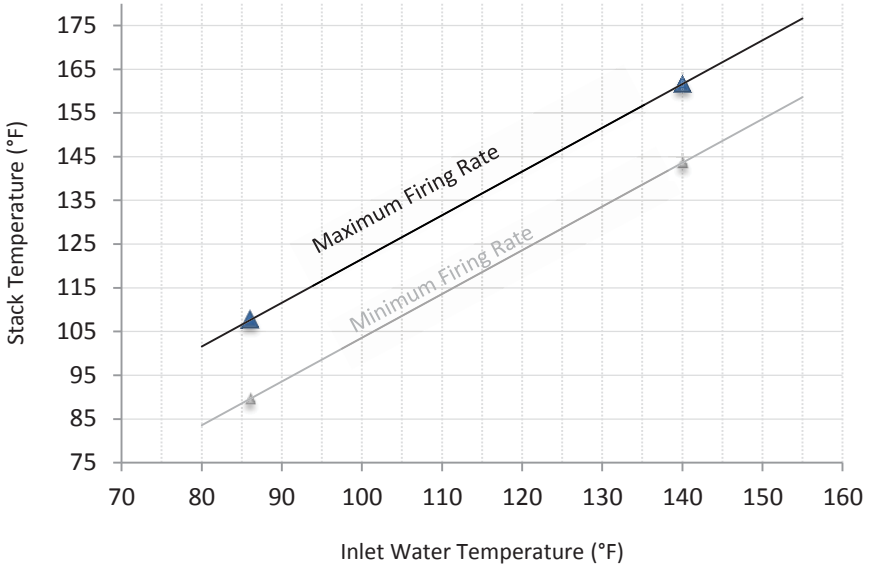
Venting

Installation must comply with local requirements and with the National Fuel Gas Code ANSI Z223.1. **Array** boilers vent and air piping can be installed through the roof or through a sidewall. Suitable, UL approved, positive pressure, watertight vent materials **MUST** be used for safety and UL certification. (CPVC, PP, Stainless Steel, AL29-4C)

	Allowable Vent Pressures			
Model	Exhaust Mass Flow Rate	Max. Allowable Negative Draft at Boiler Exit	Max. Positive Vent Pressure at Boiler Exit (1)	
			176°F supply / 140°F return	104°F supply / 86°F return
AR 1000	0.26 lbs/s	-62 Pa (-0.25" W.C.)	500 Pa (2.00"W.C.)	590 Pa (2.37" W.C.)
AR 1500	0.40 lbs/s	-62 Pa (-0.25")	350 Pa (1.41")	420 Pa (1.69")
AR 2000	0.52 lbs/s	-62 Pa (-0.25")	339 Pa (1.36")	360 Pa (1.45")
AR 3000	0.78 lbs/s	-62 Pa (-0.25")	194 Pa (0.78")	265 Pa (1.06")
AR 4000	1.04 lb/s	-62 Pa (-0.25")	189 Pa (0.76")	257 Pa (1.03")

(1) Pressure drop from ducted combustion air must be subtracted from the allowable exhaust vent pressure.

Linearized Exhaust Temperatures
(Operating at 36°F Across Boiler)



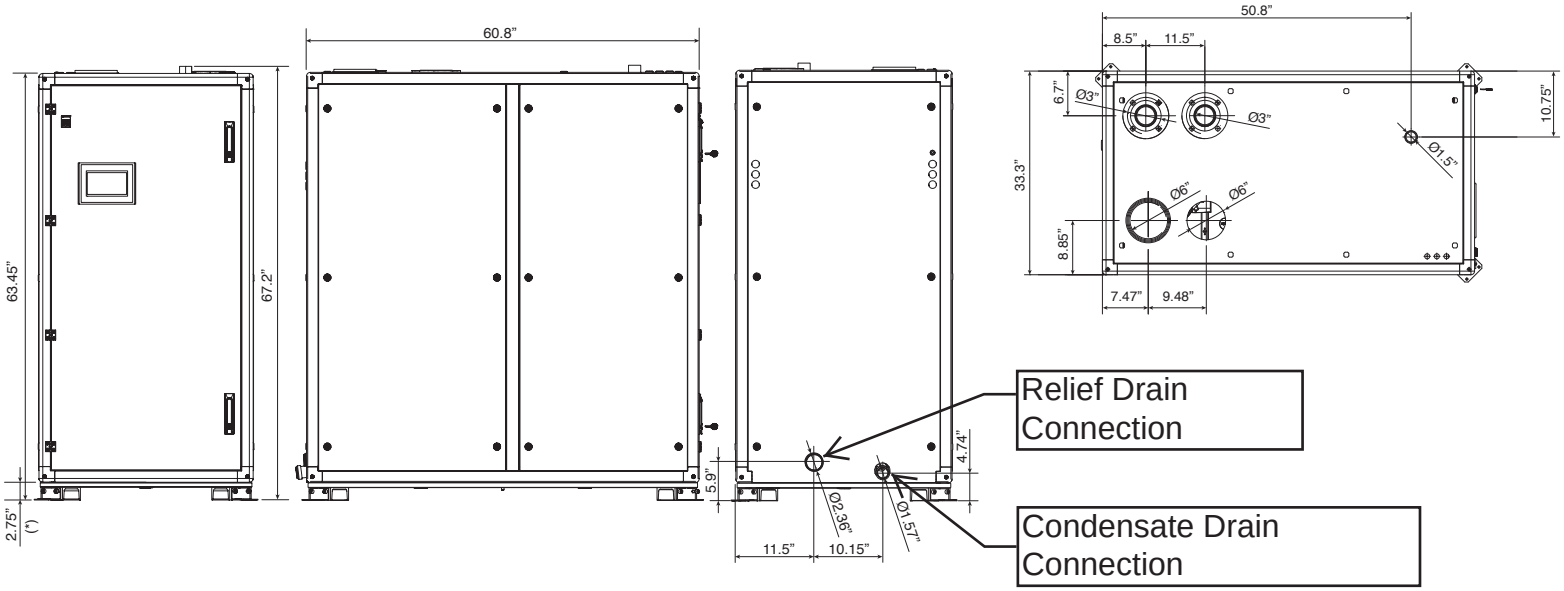
Allowable Vent Pressures Calculated as Maximum Equivalent Total Venting Length (1)						
Model	Pipe Size – 6"		Pipe Size – 8"		Pipe Size – 10"	
	Max. Equiv. (m)	Max. Equiv. (ft.)	Max. Equiv. (m)	Max. Equiv. (ft.)	Max. Equiv. (m)	Max. Equiv. (ft.)
AR 1000	30	100	-	-	-	-
AR 1500	30	100	-	-	-	-
AR 2000	-	-	30	100	-	-
AR 3000	-	-	21	70	30	100
AR 4000	-	-	12	40	30	100

(1) Length of ducted combustion air must be included as part of the total venting.

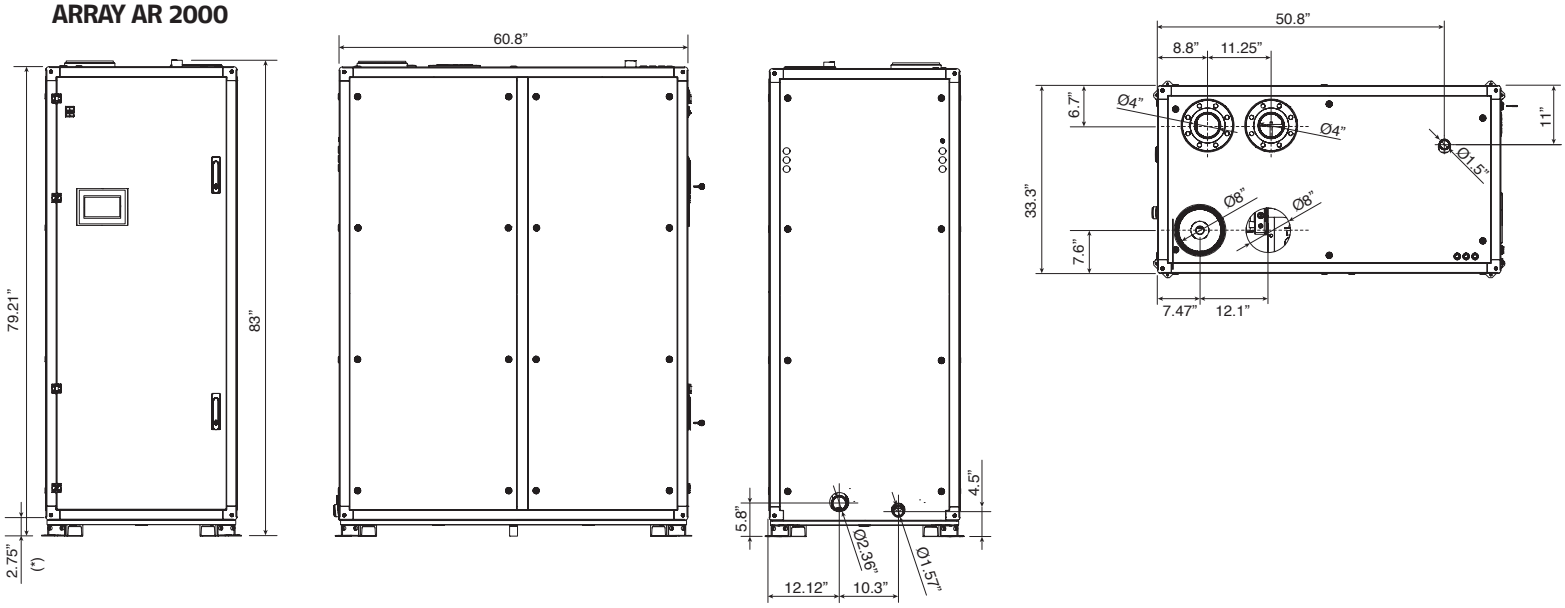
	Equivalent Length for Fittings											
	6" Nominal				8" Nominal				10" Nominal			
Model	45° Elbow - 6"		90° Elbow - 6"		45° Elbow - 8"		90° Elbow - 8"		45° Elbow - 10"		90° Elbow - 10"	
	Equiv. (m)	Equiv. (ft.)	Equiv. (m)	Equiv. (ft.)	Equiv. (m)	Equiv. (ft.)	Equiv. (m)	Equiv. (ft.)	Equiv. (m)	Equiv. (ft.)	Equiv. (m)	Equiv. (ft.)
AR 1000	1.5	5	1.8	6	-	-	-	-	-	-	-	-
AR 1500	1.5	5	1.8	6	-	-	-	-	-	-	-	-
AR 2000	-	-	-	-	2.1	7	2.7	9	-	-	-	-
AR 3000	-	-	-	-	2.1	7	2.7	9	1.5	5	1.8	6
AR 4000	-	-	-	-	2.1	7	2.7	9	1.5	5	1.8	6

NOT TO SCALE

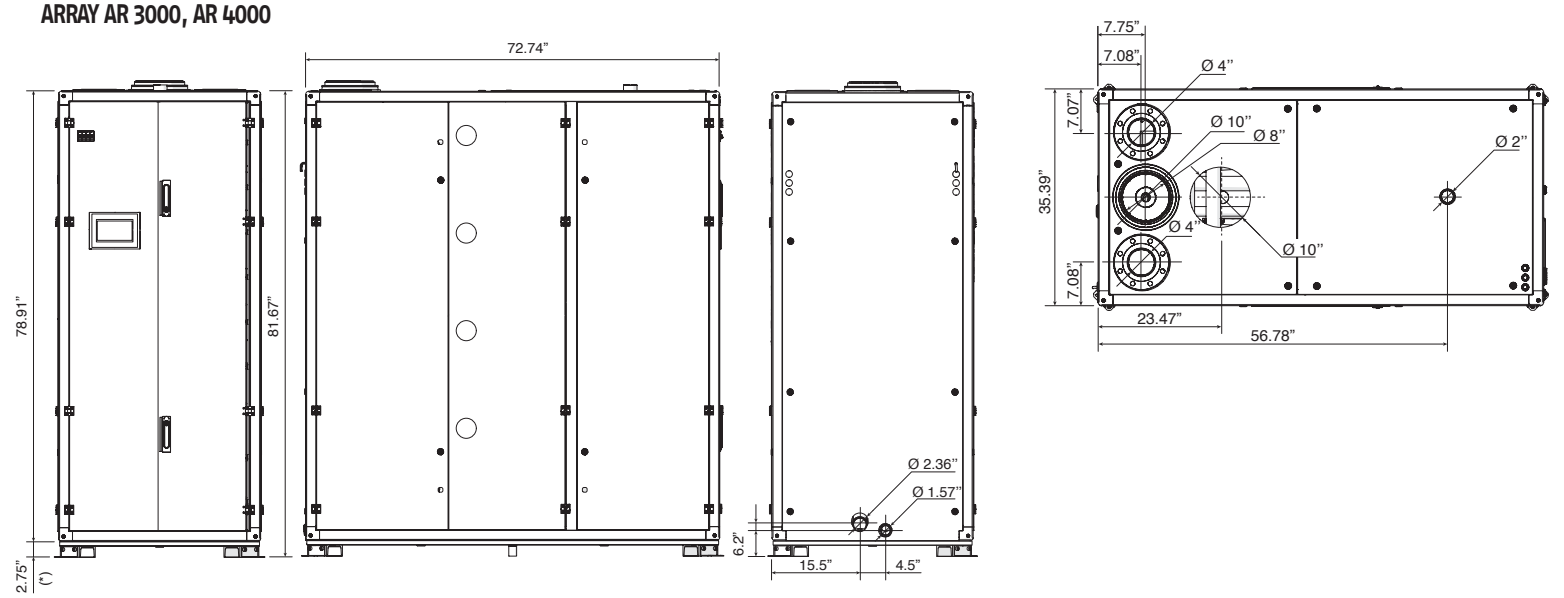
ARRAY AR 1000, AR 1500



ARRAY AR 2000



ARRAY AR 3000, AR 4000



(*) Boilers' feet may be removed for reducing overall height of 2".

NOT TO SCALE

Dimensions are in inches

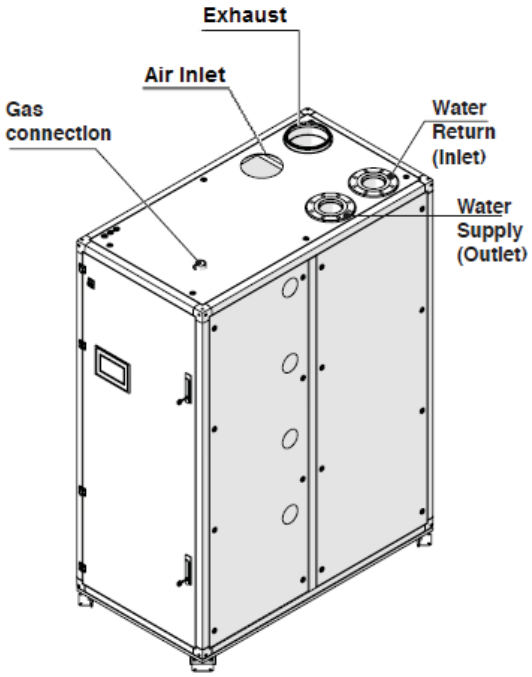
General Dimensions & Weight

		AR1000	AR1500	AR2000	AR3000	AR4000
Width	Inches	33.3	33.3	33.3	35.4	35.4
	(mm)	(846)	(846)	(846)	(900)	(900)
Height*	Inches	67.2	67.2	83.0	83.0	83.0
	(mm)	(1707)	(1707)	(2108)	2108)	2108)
Depth	Inches	60.8	60.8	60.8	72.8	72.8
	(mm)	(1544)	(1544)	(1544)	(1850)	(1850)
Dry Weight	Lbs.	1058	1323	1676	2315	2998
	(kg)	(480)	(600)	(760)	(1050)	(1360)
Operating Weight	Lbs.	1200	1523	1968	2774	3574
	(kg)	(544)	(691)	(892)	(1258)	(1621)

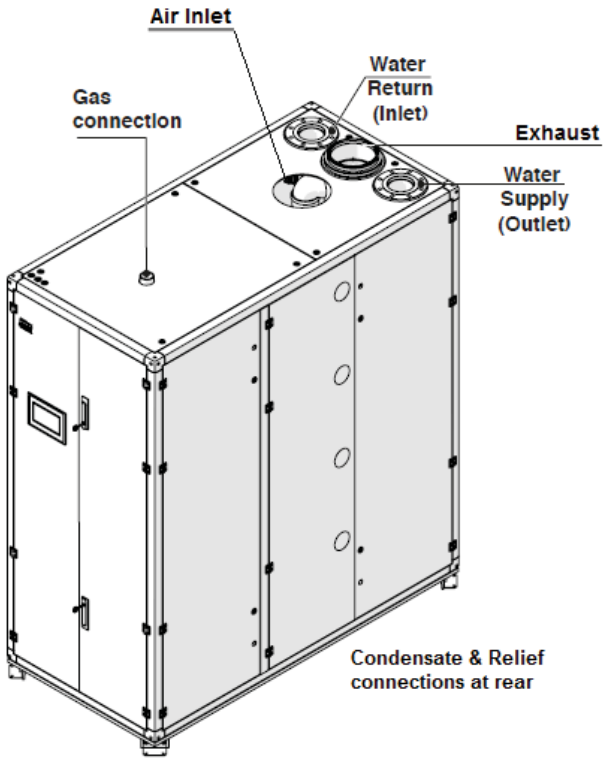
Recommended Clearances

Sides	24”
Front	31.5”
Rear	24”
Top	24”

These clearances apply to all ARRAY boiler sizes from AR 1000 to AR 4000 and are recommended for ease of maintenance and care of equipment. If Local Building Codes require additional clearances, these codes shall supersede Riello requirements.



AR1000 | AR1500 | AR2000



Not to scale

AR3000 | AR4000

RIELLO NORTH AMERICA
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2165 Meadowpine Blvd
Mississauga, ON L5N 6H6, Canada

USA OFFICE
35 Pond Park Rd.
Hingham,MA02043,USA

Phone: 905-542-0303
Fax: 905-542-1525

RIELLO
Energy For Life

AHRI CERTIFIED®
www.ahridirectory.org

Certificate of Product Ratings

AHRI Certified Reference Number : 9910657 Date : 04-08-2019 Model Status: Active

Brand Name : RIELLO

Series Name : ARRAY

Model Number : AR 2000

Material : Stainless Steel

Location : Indoor

Fuel Type : Natural Gas

Input Rating, MBH : 2000

Input Rating, gph :

Gross Output (MBH) : 1922

Ignition Type : Intermittent/Electronic Ignition

Heating Medium : Water

Draft Type: Forced Draft

CO2 : 9.5

Rated as follows in accordance with Department of Energy (DOE) Boiler test procedures as published in the latest edition of the Code of Federal Regulations, 10 CFR Part 431 and subject to verification of rating accuracy by AHRI-sponsored, independent, third party testing:

	At 2000 MBH
Combustion Efficiency (%)	96.1
Thermal Efficiency (%) :	96.1

†"Active" Model Status are those that an AHRI Certification Program Participant is currently producing AND selling or offering for sale; OR new models that are being marketed but are not yet being produced."Production Stopped" Model Status are those that an AHRI Certification Program Participant is no longer producing BUT is still selling or offering for sale.
Ratings that are accompanied by WAS indicate an involuntary re-rate. The new published rating is shown along with the previous (i.e. WAS) rating.

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CERTIFICATE NO.: 131992167376120392

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Certificate of Product Ratings

AHRI Certified Reference Number : 9910658 Date : 05-10-2019 Model Status: Active

Brand Name : RIELLO

Series Name : ARRAY

Model Number : AR 3000

Material : Stainless Steel

Location : Indoor

Fuel Type : Natural Gas

Input Rating, MBH : 3000

Input Rating, gph :

Gross Output (MBH) : 2883

Ignition Type : Intermittent/Electronic Ignition

Heating Medium : Water

Draft Type : Forced Draft

CO2 : 9.5

Rated as follows in accordance with Department of Energy (DOE) Boiler test procedures as published in the latest edition of the Code of Federal Regulations, 10 CFR Part 431 and subject to verification of rating accuracy by AHRI-sponsored, independent, third party testing:

	At 3000 MBH
Combustion Efficiency (%)	96.1
Thermal Efficiency (%) :	96.1

†"Active" Model Status are those that an AHRI Certification Program Participant is currently producing AND selling or offering for sale; OR new models that are being marketed but are not yet being produced."Production Stopped" Model Status are those that an AHRI Certification Program Participant is no longer producing BUT is still selling or offering for sale.
Ratings that are accompanied by WAS indicate an involuntary re-rate. The new published rating is shown along with the previous (i.e. WAS) rating.

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RIELLO
Energy For Life

Array
Condensing Boiler
Timeline

The RIELLO Array Boiler - New to America, but not a new product

1990 **Fontecal (today a wholly owned subsidiary of RIELLO) is founded and introduces its first helical coil condensing boiler.** ***The same model is still produced today; over 200,000 units have been built and are in operation.***

2012 **The Array heat exchanger platform introduced in Europe.** ***Over 40,000 units have been built and are in operation today.***

2015 **RIELLO introduces the Array Boiler in North America**

2017 **RIELLO ships 500th Array to North America**

2018 **RIELLO ships 1000th Array to North America**

Select Array Installations in the United States

California
Electric Car Manufacturer (Freemont)
Lyman Gilmore Middle School
(Grass Valley) - (x1) AR200
Yreka Union School District
(Yreka) - (x1) AR3000 *propane fired* &
(x1) AR2000
Ukiah Wastewater Treatment Plant
(Ukiah) - (x1) AR2000
Humboldt State University
(Arcata) - (x1) AR1000
Mt. St. Joseph Carmelite Monastery
(San Jose) - (x1) AR1000 *propane fired*
West Contra Costa School District
(Richmond) - (x1) AR1500

Colorado
Multiple boilers in operation through full heating seasons, all at an altitiude of 7000+ feet
Denver Public Schools
(Denver) - multiple sites
Roaring Fork School District
(Glenwood Springs)
Breckenridge Recreation Center
(Breckenridge)
Arapahoe County Municipal Courthouse
(Centennial)

Florida
Naples Community Hospital
(Bonita Springs)
Escambia County Jail
(Pensacola)

Illinois
Galesburg Department of Transportation
(Galesburg) - (x1) AR1000
Westin Hotels (Chicago Area)

Indiana
Indiana Glove Company Condominium
(Indianapolis) - AR1000

Iowa

Aegon
(Cedar Rapids) (x1) AR1500
Newton YMCA
(Newton) - (x1) AR4000
Norwalk School
(Norwalk) - (x2) AR1500
Iowa Western Community College
(Council Bluffs) - (x1) AR2000
Toyota Financial
(Cedar Rapids) - (x1) AR3000
Linn County Building
(Cedar Rapids) - (x3) AR1500
Elkhorn Lutheran Church
(Elkhorn) - (x1) AR1500
Sidney Elementary School
(Sidney) - (x1) AR1000
Baptist Church (Grinnell) (x1) AR1000

Maryland

Town of Belair - Dept. of Public Works
(Harford County) - AR1000
Briggs Chaney Middle School
(Silver Spring) - (x4) AR2000
Lake Seneca Elementary School
(Germantown) - (x2) AR15000
Montegomery County Schools

Michigan

Butman-Fish Library (Saginaw)

Missouri

St.Charles Community College
(Cottleville)
Alberici Construction
(St. Louis)
Association of General Contractors
(St. Louis)
Boeing Aerospace Facility
(St. Louis)

Mississippi

State Governor's Mansion
(Jackson) - (x2) AR1500

Nebraska

Grand Island Senior H.S.
(Grand Island)
Table Rock School
(Table Rock) - (x1) AR2000
Kearney Catholic School
(Kearney) - (x1) AR2000
Mercy High School
(Omaha) - (x2) AR1500
Miracle Hills Tower
(Omaha) - (x1) AR2000
St. Andrews Church
(Omaha) - (x1) AR1500
Justice for Our Neighbors
(Omaha) - (x1) AR1500
Harvard Rest Haven
(Harvard) - (x1) AR1500
Plaza on the Green
(Lincoln) - (x1) AR1500
US Bank
(Grand Island) - (x1) AR1500
St. Thomas More
(Omaha) - (x2) AR1500
DC West School
(Valley) - (x1) AR2000
Western Nebraska Community College
(Scottsbluff) - (x1) AR3000
Pius X School
(Lincoln) - (x2) AR1000
Pilgrim Lutheran Church
(Bellevue) - (x1) AR1500
Columbian School
(Omaha) - (x1) AR2000
Swanson School
(Omaha) - (x2) AR1500
Norris School
(Omaha) - (x2) AR3000

New Jersey
Barclays (Whippany) - (x2) AR1500
Whole Foods
(Weehawken) - (x2) AR1000
Morris County Vocational School
(Denville) - (x2) AR2000

New Mexico
Albuquerque Public Schools

New York
Genesis Homes
(Brooklyn) - (x6) AR1500
1399 Park Ave
(New York) - (x2) AR4000
The Residence at North Hills
(North Hills) - (x2) AR1000 and
(x1) AR1500
23 E. 39th Street
(Manhattan) - (x3) AR1000
575 4th Avenue (Brooklyn)
Brooklyn Center for Rehabilitation
(Brooklyn)
Victoria Theatre (Manhattan)

North Carolina
Wayne County Environmental
Building/Jeffreys Building
(Goldsboro) – AR1500
St Lukes Church
(Salisbury) - AR 1500
Credit Suisse
(Raleigh) – (x2) AR4000

Virginia
Greensville Public Schools (Emporia)

Washington
University of Washington (Bothell)

Item No. 043

OPTIMA™ ADAPTABLE LABORATORY FURNITURE SOLUTIONS

Optima™ Laboratory Bench Systems

Optima™ Laboratory Bench systems has been designed to adapt to an array of laboratory processes, equipment and users. It conveniently supplies all the services and features required for today's laboratory in a self-contained and self-standing bench assembly. This stylish system is available in different designs with the option of a powder coated steel finish or stainless steel.

With the Optima™ system, laboratories can be easily created, changed and reconfigured for new applications or changing space. Integrated services deliver quick and easy access while providing superior flexibility by keeping the work surface open. Plumbing, electrical and data services are factory installed and designed to quick connect to ceiling mounted service panels or overhead service carriers. The Optima™ system provides the ultimate answer to flexibility by offering adjustable work surfaces and shelving to accommodate the ever-changing requirements in today's laboratories.

For additional information and help in planning contact Mott Manufacturing.

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QUALITY BY DESIGN

OPTIMA™ 2550 SERIES LABORATORY BENCH SYSTEM

Optima™ Series 2550

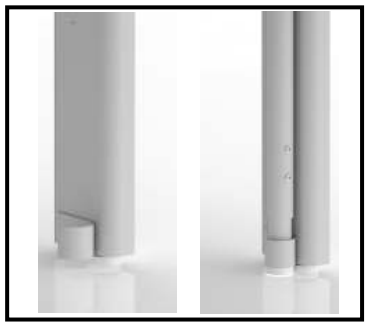
Optima™ 2550 adapts to an array of laboratory processes, equipment, and users. This system offers increased flexibility by providing a freestanding bench with an integrated stand alone table all at the same price of our Optima™ 2500 laboratory bench system.

c UL us LISTED

- Overall assembly is 84" high, 2" x 6" deep rear posts with leveling feet, comes complete with cantilevered table frame and freestanding round leg table (without uprights).
- Table frame is height adjustable in 1" increments from 29" to 36" (work surface not included).
- Available in 58" and 70" depths, overall depth does not include work surface.
- Shelves and end panels are not included and must be ordered separately.
- Complete with hanging rails to suspend lower cabinets on units 72" wide and smaller. To order suspended base cabinets and mobile cabinets refer to that catalog sections (assemblies larger than 72" wide cannot suspend cabinets).
- A maximum of three plumbing fixtures are available on the plumbing post.
- Four electrical receptacles are standard in lower electrical post.
- Utility channel will have electrical and data provisions, see page Q5 and Q6 for details.
- Available in powder coated steel finish or stainless steel.
- Ships partially assembled.

Please contact Mott Manufacturing for maximum load ratings.

Four legged table is easily removable without tools and can be used as a self-supporting work area anywhere in your lab. Before removing the four leg table the above shelves must be removed.



Back of bench is independent and freestanding round leg table without uprights or shelving and docks almost invisibly into the upright. Held in place by clips at the bottom of the frame.

Profile is flat on the exterior side of the bench and is rounded on the inside which provides a clean and uniform appearance when benches are sequenced.

OPTIMA™ 1550 & 1100 SERIES LABORATORY BENCH SYSTEM

Optima™ Series1550

The Optima™ Series 1550 is a double-sided bench with a 6″ rectangular shared center post and 2″ square front legs. One side of the bench is an independent four leg table is easily removable without tools and can be used as a self-supporting work area anywhere in your lab. Before removing the four leg table the above shelves should be removed. This bench offers the same features as the 2550 series. Contact Mott Manufacturing for details and ordering.

Rectangular profile provides a clean and uniform appearance when benches are sequenced.

Optima™ Series1100

The Optima™ Series 1100 is a single-sided bench with 2" x 2" square legs. This bench offers the same features as the 2100 series. Contact Mott Manufacturing for details and ordering.

Square profile provides a clean and uniform appearance when benches are sequenced.

Please contact Mott Manufacturing for maximum load ratings.

Typical Assemblies

Double Sided Assembly

Note: Double Sided Assembly as shown is not available in the USA.

For the USA version, Optima™ 2550 - refer to page Q2 for product details.

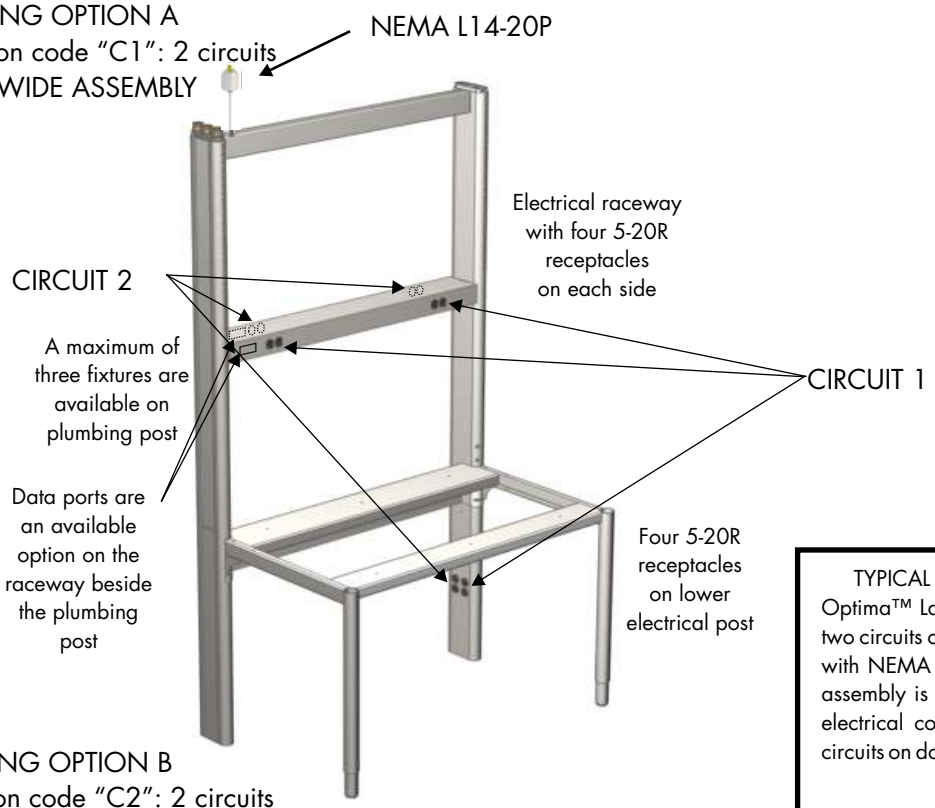
Single Sided Assembly

Stationary Table Frame

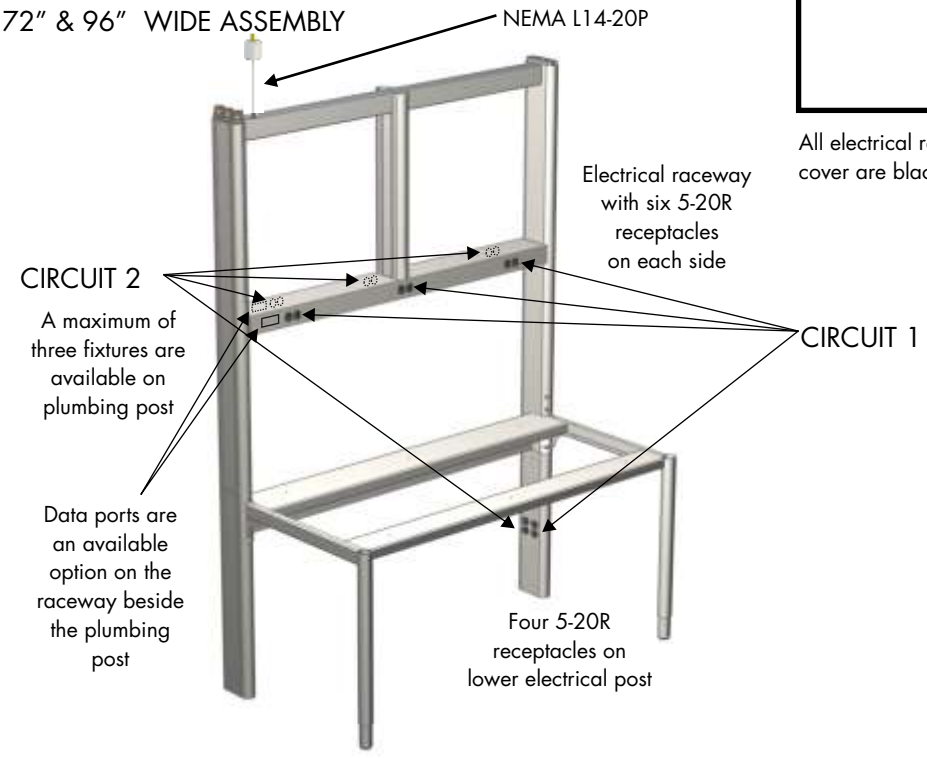
Tech Desk Station Frame

Single Sided Assembly Circuit Options

WIRING OPTION A
Option code "C1": 2 circuits
48" WIDE ASSEMBLY



WIRING OPTION B
Option code "C2": 2 circuits
60", 72" & 96" WIDE ASSEMBLY



TYPICAL ELECTRICAL PLUG DETAIL

Optima™ Laboratory Bench systems with two circuits or more are typically equipped with NEMA L14-20P locking plugs. Each assembly is supplied with 4 feet of white electrical cord. Requires 2X 120V, 20A circuits on double pole circuit breaker.

All electrical receptacles and data ports with cover are black.

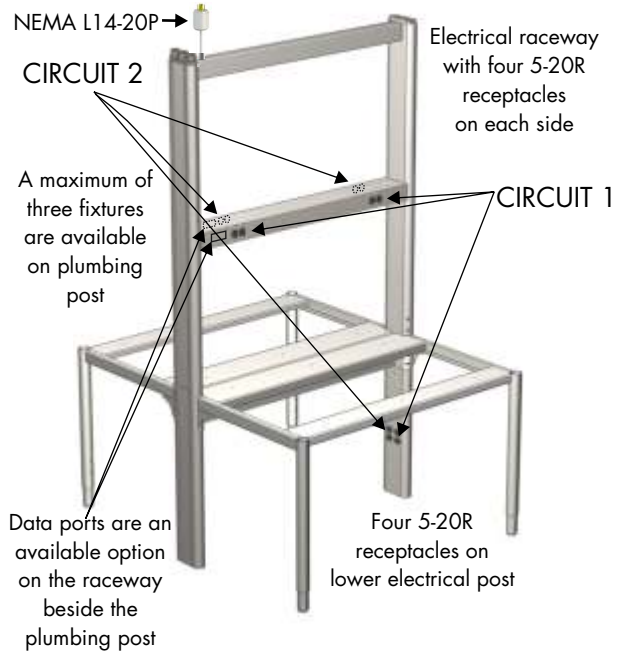
Note: Double Sided Assembly as shown is not available in the USA.

Double Sided Assembly Circuit Options

WIRING OPTION A

Option code "C1": 2 circuits on a double pole circuit breaker

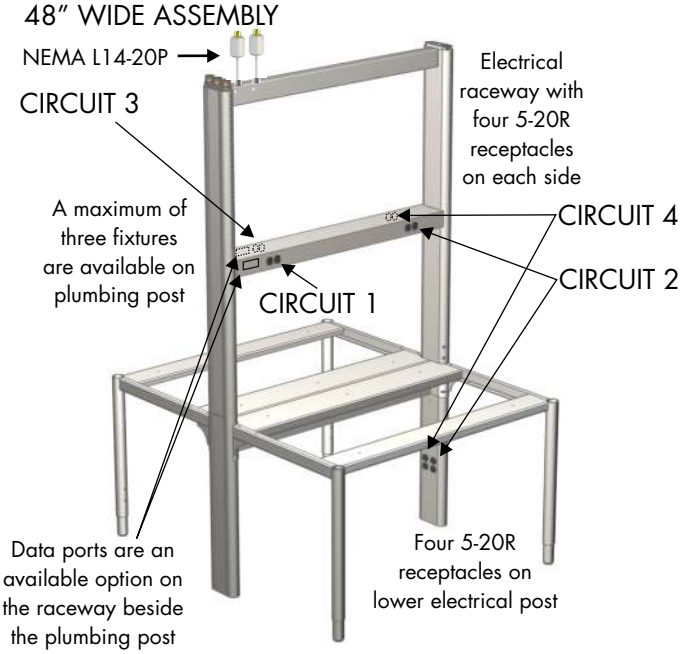
48" WIDE ASSEMBLY



WIRING OPTION C

Option code "C3": 4 circuits on a double pole circuit breakers

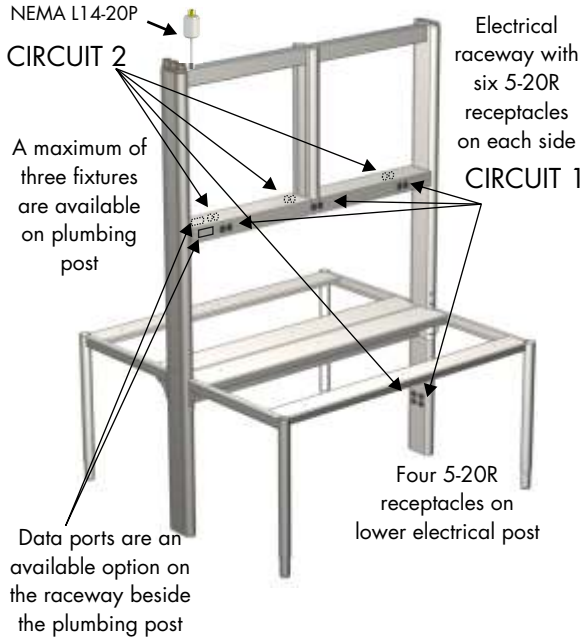
48" WIDE ASSEMBLY



WIRING OPTION B

Option code "C2": 2 circuits on a double pole circuit breaker

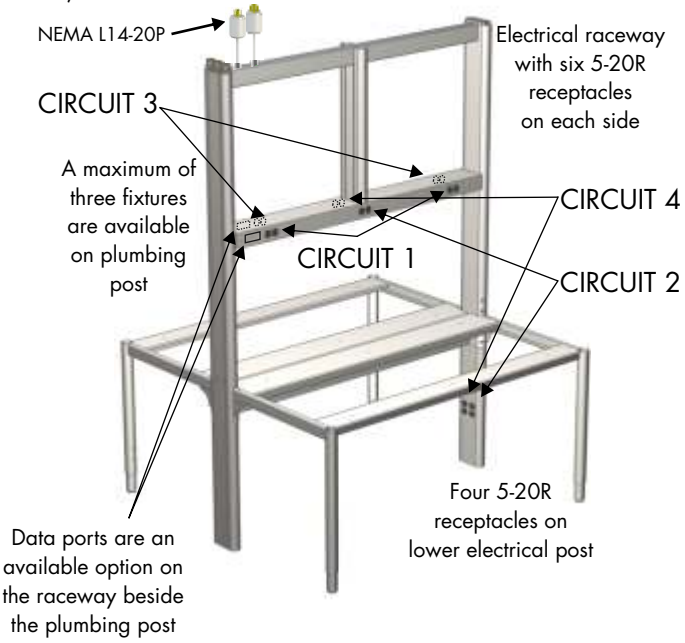
60", 72" & 96" WIDE ASSEMBLY



WIRING OPTION D

Option code "C4": 4 circuits on a double pole circuit breakers

60", 72" & 96" WIDE ASSEMBLY

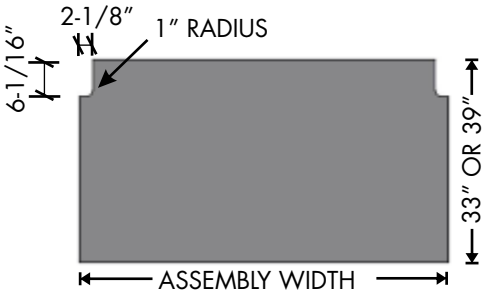


Four Leg Table Work Surface For 28″ Deep And 34″ Deep Units

Width of Bench	Black Epoxy 30″ Deep	Black Epoxy 36″ Deep	Stainless Steel 30″ Deep	Stainless Steel 36″ Deep
48″	EOP3048	EOP3648	SOP3048	SOP3648
60″	EOP3060	EOP3660	SOP3060	SOP3660
72″	EOP3072	EOP3672	SOP3072	SOP3672
96″	EOP3096	EOP3696	SOP3096	SOP3696

- Stainless steel work surfaces are type 304-4, flat, square edges, 1″ thick.
- Epoxy work surfaces with 1/8" [3mm] beveled edges are 1″ thick. The cutouts for posts are not beveled.
- 1″ overhang at front and back.

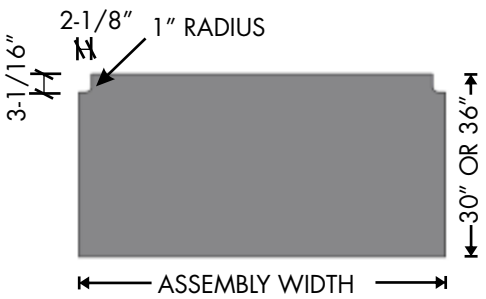
Single Sided Assembly Work Surface For 32″ Deep And 38″ Deep Units



Width of Bench	Black Epoxy 33″ Deep	Black Epoxy 39″ Deep	Stainless Steel 33″ Deep	Stainless Steel 39″ Deep
48″	EOS3348	EOS3948	SOS3348	SOS3948
60″	EOS3360	EOS3960	SOS3360	SOS3960
72″	EOS3372	EOS3972	SOS3372	SOS3972
96″	EOS3396	EOS3996	SOS3396	SOS3996

- Stainless steel work surfaces are type 304-4, flat, square edges, 1″ thick.
- Epoxy work surfaces with 1/8" [3mm] beveled edges are 1″ thick. The cutouts for posts are not beveled.
- 1″ overhang at front.

Double Sided Assembly Work Surface For 58″ Deep And 70″ Deep Units (1″ overhang at front)



Width of Bench	Black Epoxy 30″ Deep	Black Epoxy 36″ Deep	Stainless Steel 30″ Deep	Stainless Steel 36″ Deep
48″	EOD3048	EOD3648	SOD3048	SOD3648
60″	EOD3060	EOD3660	SOD3060	SOD3660
72″	EOD3072	EOD3672	SOD3072	SOD3672
96″	EOD3096	EOD3696	SOD3096	SOD3696

- Part numbers are for one work surface only. Two work surfaces are required for a double sided assembly.
- These work surfaces can also be used for Two Leg Frame units.
- Stainless steel work surfaces are type 304-4, flat, square edges, 1″ thick.
- Epoxy work surfaces with 1/8" [3mm] beveled edges are 1″ thick. The cutouts for posts are not beveled.
- 1″ overhang at front.

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QUALITY BY DESIGN

OPTIMA™ 2500 SERIES LABORATORY BENCH SYSTEM

Single Sided Assemblies

48" wide unit

60", 72" & 96" wide unit

c UL us LISTED

Width	32" Deep	38" Deep
48"	VOA0248	VOA0348
60"	VOA0260	VOA0360
72"	VOA0272	VOA0372
96"	VOA0296	VOA0396

- Available in powder coated steel finish or stainless steel.
- Overall assembly is 84" high, 6" deep rear posts with leveling feet and comes complete with cantilevered table frame. Height adjustable in 1" increments from 29" to 36" (work surface not included).
- Complete with hanging rails to suspend lower cabinets on units 72" wide and smaller.
- To order suspended base cabinets and mobile cabinets refer to the catalog section.
- Utility channel will have electrical provisions, see page Q5 for details.
- Four electrical receptacles are standard in lower electrical post.
- Overall depth of assembly does not include work surface.
- Optima™ End Panels are not included and must be ordered separately.
- Shipped partially assembled.

- When option code 97 is applied to the Optima™ system, the bench is supplied with leveling casters, side and rear stretchers.
- When casters are supplied, the load rating is reduced, contact Mott for details.

Double Sided Assemblies

48" wide unit

60", 72" & 96" wide unit

c UL us LISTED

Width	58" Deep	70" Deep
48"	VOA0448	VOA0548
60"	VOA0460	VOA0560
72"	VOA0472	VOA0572
96"	VOA0496	VOA0596

- Available in powder coated steel finish or stainless steel.
- Overall assembly is 84" high, 6" deep rear posts with leveling feet and comes complete with cantilevered table frames. Height adjustable in 1" increments from 29" to 36" (work surface not included).
- Complete with hanging rails to suspend lower cabinets on units 72" wide and smaller.
- To order suspended base cabinets and mobile cabinets refer to the catalog sections (assemblies larger than 72" wide cannot suspend cabinets).
- Utility channel will have electrical provisions, see page Q6 for details.
- Four electrical receptacles are standard in lower electrical post.
- Overall depth of assembly does not include work surface.
- Optima™ End Panels are not included and must be ordered separately.
- Shipped partially assembled.

Note: Double sided and single sided assembly as shown is not available in the USA. For the USA version, Optima™ 2550 - refer to page Q2 for product details.

OPTIMA™ 2500 SERIES LABORATORY BENCH SYSTEM

Single Sided Tech Desk Stations

48" wide unit

60", 72" & 96" wide unit

Width	32" Deep	38" Deep
48"	VTD0248	VTD0348
60"	VTD0260	VTD0360
72"	VTD0272	VTD0372
96"	VTD0296	VTD0396

- Available in powder coated steel finish or stainless steel.
- Overall assembly is 84" high with 6" deep rear posts with leveling feet.
- Standard 30" high fixed height table (work surface not included).Tech Desk as shown is not intended to be height adjustable.
- Complete with hanging rails to suspend lower cabinets on units 72" wide and smaller.
- To order suspended base cabinets and mobile cabinets refer to the catalog section (assemblies larger than 72" wide cannot suspend cabinets).
- Tech Desk Stations feature double sided linoleum bulletin boards (height of bulletin boards are designed for a 1" thick work surface) and a modesty panel (8-1/8" high). The bulletin board eliminates the use of service fixtures.
- Four electrical receptacles are standard in lower electrical post.
- Utility channel will have electrical provisions, see page Q5 for details.
- Optima™ End Panels are not included and must be ordered separately.
- Shipped partially assembled.

c UL us LISTED

Double Sided Tech Desk Stations

48" wide unit

60", 72" & 96" wide unit

Width	58" Deep	70" Deep
48"	VTD0448	VTD0548
60"	VTD0460	VTD0560
72"	VTD0472	VTD0572
96"	VTD0496	VTD0596

- Available in powder coated steel finish or stainless steel.
- Overall assembly is 84" high with 6" deep rear posts with leveling feet.
- Standard 30" high fixed height table (work surface not included).Tech Desk as shown is not intended to be height adjustable.
- Complete with hanging rails to suspend lower cabinets on units 72" wide and smaller.
- To order suspended base cabinets and mobile cabinets refer to the catalog section (assemblies larger than 72" wide cannot suspend cabinets).
- Tech Desk Stations feature double sided linoleum bulletin boards (height of bulletin boards are designed for a 1" thick work surface) and a modesty panel (8-1/8" high). The bulletin board eliminates the use of service fixtures.
- Four electrical receptacles are standard in lower electrical post.
- Utility channel will have electrical provisions, see page Q6 for details.
- Optima™ End Panels are not included and must be ordered separately.
- Shipped partially assembled.

c UL us LISTED

Note: Double sided and single sided assembly as shown is not available in the USA. For the USA version, Optima™ 2550 - refer to page Q2 for product details.

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QUALITY BY DESIGN

OPTIMA™ 2500 SERIES LABORATORY BENCH SYSTEM

Stationary Four Leg Tables

Width	28″ Deep	34″ Deep
48″	OTF0248	OTF0448
60″	OTF0260	OTF0460
72″	OTF0272	OTF0472
96″	OTF0296	OTF0496

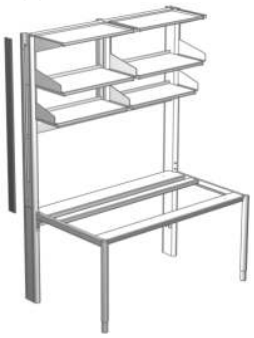
- Available in powder coated steel finish or stainless steel.
- 2″ tubular legs with leveling feet. Height adjustable in 1″ increments from 29″ to 36″ (work surface not included).
- Stationary Table Frame complete with hanging rails to suspend lower cabinets on one side of unit on units 72″ wide and smaller.
- To order suspended base cabinets and mobile cabinets refer to the catalog section (assemblies larger than 72″ wide cannot suspend cabinets).
- When option code 97 is applied to the Optima™ table system, the table is supplied with self leveling casters, side and rear stretchers.
- Shipped assembled.

Two Leg Frames

Width	26″ Deep	32″ Deep
48″	VTL0148	VTL0348
60″	VTL0160	VTL0360
72″	VTL0172	VTL0372
96″	VTL0196	VTL0396

- Available in powder coated steel finish or stainless steel.
- Add to Single Sided Assembly to create a Double Sided Assembly.
- 2″ tubular legs with leveling feet. Height adjustable in 1″ increments from 29″ to 36″ (work surface not included).
- Complete with hanging rails to suspend lower cabinets on units 72″ wide and smaller.
- To order suspended base cabinets and mobile cabinets refer to the catalog section (assemblies larger than 72″ wide cannot suspend cabinets).
- Shipped assembled.
- Two Leg Frame is available in the USA as a service part only, for use on a Single Sided Table Assembly.

Upper End Panel



Item Number
UPV0000

- Available in powder coated steel finish or stainless steel.
- Upper End Panel used to enclose uncovered ends of Optima™ assembly.
- End panel snaps on for easy installation.

Lower End Panel

Item Number
LPV0000

- Available in powder coated steel finish or stainless steel.
- Lower End Panel used to enclose uncovered ends of Optima™ assembly.
- End panel snaps on for easy installation.

Modesty Panels

Width	Item Number
48″	MPV0148
60″	MPV0160
72″	MPV0172
96″	MPV0196

- Available in powder coated steel finish or stainless steel.
- Mounts to Optima™ post below work top with bracket (hardware included).
- Height is 8-1/8″ high.
- Ships not assembled on Optima™.

Bulletin Boards

Option Code	
Single Sided	Double Sided
1B	2B

- The use of a bulletin board eliminates the use of service fixtures.
- Linoleum bulletin boards are double sided and 15″ high.
- Mounts to Optima™ posts above work top and below electrical raceway.
- Ships assembled on Optima™.
- See Mott dealer representative for color choices.

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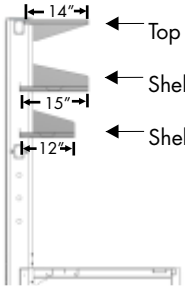
QUALITY BY DESIGN

OPTIMA™ 2500 SERIES STEEL & GLASS SHELF COMPONENTS

Typical 2500 Series Steel Shelf Assembly



Top Shelf Assembly - 14″ deep shelf with 12″ deep bracket

Shelf Assembly - 15″ deep shelf with 12″ deep bracket

Shelf Assembly - 12″ deep shelf with 9″ deep bracket

Top Shelf Assemblies - Steel and Glass

Full width shelf on 48″ wide benches (Glass shelf with Tapered bracket shown)

Radius Profile

Two half width shelves on 60″, 72″ and 96″ wide benches (Steel shelves with Tapered bracket shown)

Width of Bench	Glass Assembly Tapered Profile	Glass Assembly Radius Profile	Steel Assembly Tapered Profile	Steel Assembly Radius Profile	Shelves Per Side
48″	VSG1448	VRG1448	VSS1448	VRS1448	1
60″	VSG1460	VRG1460	VSS1460	VRS1460	2
72″	VSG1472	VRG1472	VSS1472	VRS1472	2
96″	VSG1496	VRG1496	VSS1496	VRS1496	2

- 48″ wide assembly includes one 1″ thick shelf, one 14″ deep shelf and a pair of 12″ deep brackets. 60″, 72″ and 96″ wide assemblies includes two 1″ thick half width shelves, two 14″ deep shelves and two pairs of 12″ deep brackets. Available in stainless steel.
- 6mm thick laminated safety glass.
- Shelves are adjustable in 1″ increments.
- Suitable for Optima™ 2500 Series only.
- All width dimensions are nominal.

Steel Shelf Assemblies

Full width shelf on 48″ wide benches (Tapered bracket shown)

Radius Profile

Two half width shelves on 60″, 72″ and 96″ wide benches (Tapered bracket shown)

Width of Bench	12″ Deep Assembly Tapered Profile	12″ Deep Assembly Radius Profile	15″ Deep Assembly Tapered Profile	15″ Deep Assembly Radius Profile	Shelves Per Side
48″	SAV1248	SRV1248	SAV1548	SRV1548	1
60″	SAV1260	SRV1260	SAV1560	SRV1560	2
72″	SAV1272	SRV1272	SAV1572	SRV1572	2
96″	SAV1296	SRV1296	SAV1596	SRV1596	2

- 48″ wide assembly includes one 1″ thick shelf, one rear shelf angle, one 12″ deep or 15″ deep shelf and a pair of brackets. 60″, 72″ and 96″ wide assemblies include two 1″ thick half width shelves, two rear shelf angles, two 12″ deep or 15″ deep shelves and two pairs of brackets (9″ Bracket for 12″ deep assembly, 12″ bracket for 15″ deep assembly). Available in stainless steel.
- Shelves are adjustable in 1″ increments.
- Suitable for Optima™ 2500 Series only.
- All width dimensions are nominal.

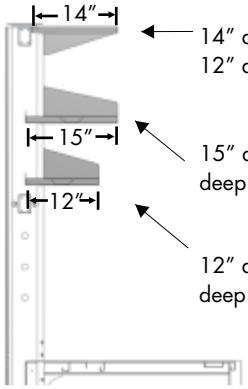
Retainer Rods For Shelf Assemblies

Retainer Rod Option Code	
Powder Coated	Stainless Steel
CR	SR

- 1″ high retainer rod (5/16″ dia.) prevents articles from falling off the shelf.
- 48″ wide benches receive one retainer rod and three turrets up to 71″. Benches 72″ wide and above receive two retaining rod and four turrets.
- Not suitable for Mott glass shelves.
- Available in stainless steel or powder coated stainless steel.
- Retainer rods ships loose.

OPTIMA™ 2500 SERIES WOOD SHELVING COMPONENTS

Typical 2500 Series Wood Shelves

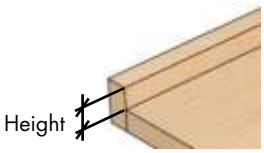


14″ deep top shelf fits on a 12″ deep bracket

15″ deep shelf fits on a 12″ deep bracket

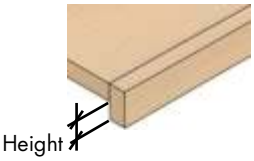
12″ deep shelf fits on a 9″ deep bracket

Wood Shelving Options



Height	Back Lip	Front Lip	Back & Front Lip
1″	ARW1	AFW1	ABW1
2″	ARW2	AFW2	ABW2
3″	ARW3	AFW3	ABW3
4″	ARW4	AFW4	ABW4

- Height of the lip is measured from the top of the shelf to the top of the lip. Lip is 3/4″ thick.
- Shelves are 1″ thick.



Height	Front Valance
1″	FV1
2″	FV2
3″	FV3
4″	FV4

- Height of the valance is measured from the bottom of the shelf to the bottom of the valance. Valance is 3/4″ thick.
- Shelves are 1″ thick.

Wood Shelves for 12″ Deep Top Shelf Brackets

Full width shelf on 48″ wide benches

Two half width shelves on 60″, 72″ and 96″ wide benches

Width of Bench	Top Shelves for 2500 Series	Shelves Per Side
48″	VWS1448W	1
60″	VWS1460W	2
72″	VWS1472W	2
96″	VWS1496W	2

- Shelves are 1″ thick.
- Shelves are suitable for Optima™ 2500 series only.
- Shelf brackets are not included and must be ordered separately.
- All width dimensions are nominal.

Wood Shelves for 9″ Deep and 12″ Deep Shelf Brackets

Full width shelf on 48″ wide benches

Two half width shelves on 60″, 72″ and 96″ wide benches

Width of Bench	Shelves for 9″ Bracket	Shelves for 12″ Bracket	Shelves Per Side
48″	SAV1248W	SAV1548W	1
60″	SAV1260W	SAV1560W	2
72″	SAV1272W	SAV1572W	2
96″	SAV1296W	SAV1596W	2

- Shelves are 1″ thick.
- Shelves are suitable for Optima™ 2500 series only.
- Shelf brackets are not included and must be ordered separately.
- All width dimensions are nominal.

Retainer Rods For Shelf Assemblies

Retainer Rod Option Code	
Powder Coated	Stainless Steel
CR	SR

- 1″ high retainer rod (5/16″ dia.) prevents articles from falling off the shelf.
- 48″ wide benches receive one retainer rod and three turrets up to 71″. Benches 72″ wide and above receive one retaining rod and four turrets.
- Not suitable for Mott glass shelves.
- Available in stainless steel or powder coated stainless steel.
- Retainer rods ships loose.

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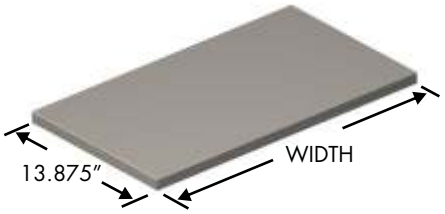
QUALITY BY DESIGN

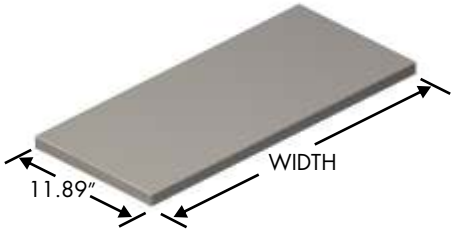
OPTIMA™ 2500 SERIES NON-MOTT SHELF DIMENSIONS

Typical Shelf for 12" Top Shelf Bracket



Shelf dimensions for non-Mott shelves:
- Quantity of 1 - 43.563" wide shelf is suits a 48" wide Single Sided Assembly
- Quantity of 2 - 26.563" wide shelves suits a 60" wide Single Sided Assembly
- Quantity of 2 - 32.563" wide shelves suits a 72" wide Single Sided Assembly
- Quantity of 2 - 44.563" wide shelves suits a 96" wide Single Sided Assembly

Typical Shelf for 9" Bracket



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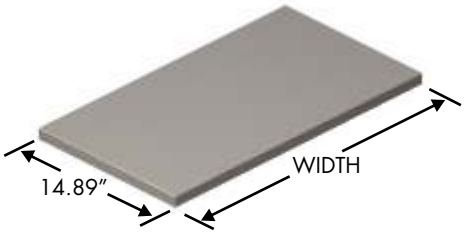
Typical Shelf for 12" Bracket



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- Quantity of 2 - 44.563" wide shelves suits a 96" wide Single Sided Assembly

OPTIMA™ 2500 SERIES SHELF COMPONENTS

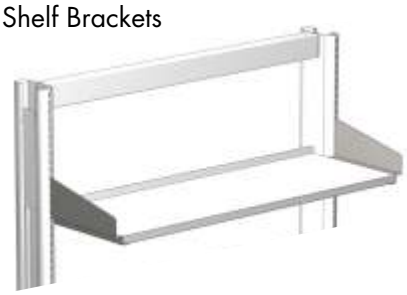
Top Shelf Brackets

Radius Profile

Depth	Tapered Profile	Radius Profile
12"	VTB0012	VTB3012

- One pair of 12" powder coated steel end brackets for top shelves. Designed to be used for shelves of different materials, mounts to slotted post. Available in stainless steel.
- Adjustable in 1" increments.
- Suitable for Optima™ 2500 series only.
- See page Q13 for Mott wood shelves. See Q14 for non-Mott shelf dimensions.

Shelf Brackets



Radius Profile

Depth	Tapered Profile	Radius Profile
9"	VSB0009	VSB3009
12"	VSB0012	VSB3012

- One pair of powder coated steel end brackets designed to be used for shelves of different materials, mounts to slotted post. Available in stainless steel.
- Adjustable in 1" increments.
- Suitable for Optima™ 2500 Series only.
- See page Q13 for Mott wood shelves. See Q14 for non-Mott shelf dimensions.

OPTIMA™ 2500 SERIES SHELF COMPONENTS

Optima™ Shelf Retainer Rods

≤30″ wide assemblies

>30″ wide assemblies

Width	Steel Shelves Powder Coated	Steel Shelves Stainless Steel	Wood Shelves Powder Coated	Wood Shelves Stainless Steel	Retainer Rod Parts
48″	PRR0048-OP	SRR0048-OP	PRR0048-OPW	SRR0048-OPW	1 Rod & 3 Turrets
60″	PRR0060-OP	SRR0060-OP	PRR0060-OPW	SRR0060-OPW	2 Rods & 4 Turrets
72″	PRR0072-OP	SRR0072-OP	PRR0072-OPW	SRR0072-OPW	2 Rods & 6 turrets
96″	PRR0096-OP	SRR0096-OP	PRR0096-OPW	SRR0096-OPW	2 Rods & 6 Turrets

- 1″ high retainer rod (5/16″ dia.) Prevents articles from falling off the shelf.
- Retainer rods are measured on centers.
- Can be added to existing Optima™ shelves.
- Available in stainless steel or powder coated stainless steel.
- Threaded turrets includes hardware for mounting to shelf (shelf must have holes drilled to accept turrets).
- Ships loose.
- OP and OPW at the end of the part numbers represent option codes.

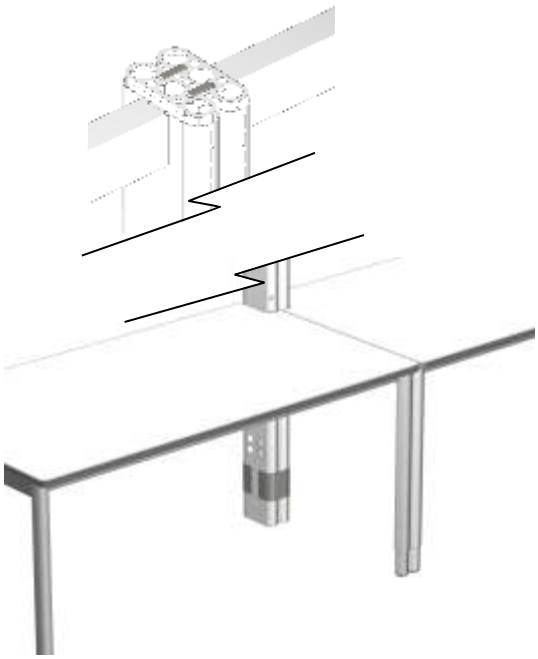
Shelf Angles

Width of Bench	Item Number	Shelf Angles Included
48″	ASR2148	1
60″	ASR2160	2
72″	ASR2172	2
96″	ASR2196	2

- Shelf angles can be added to any existing Optima™ shelf and are used to stop items from sliding off of shelving.
- 2″ high with a 1″ return and notched for shelf brackets. Available in stainless steel.
- Ships loose.

OPTIMA™ 2500 SERIES COMPONENTS

Side-To-Side Fastener Kit



Item Number
VSF0000

- Lower bracket attaches to bottom of the rear post legs and the top "U" shaped clips attach to the plumbing quick connect brackets on the top of the rear post legs to stabilize two assemblies that are situated side-to-side.
- Kit available in stainless steel.
- Hardware not included.
- Suitable for Optima™ 2500 Series only.

mott MANUFACTURING

QUALITY BY DESIGN

OPTIMA™ 2100 SERIES LABORATORY BENCH SYSTEM

Typical Assemblies

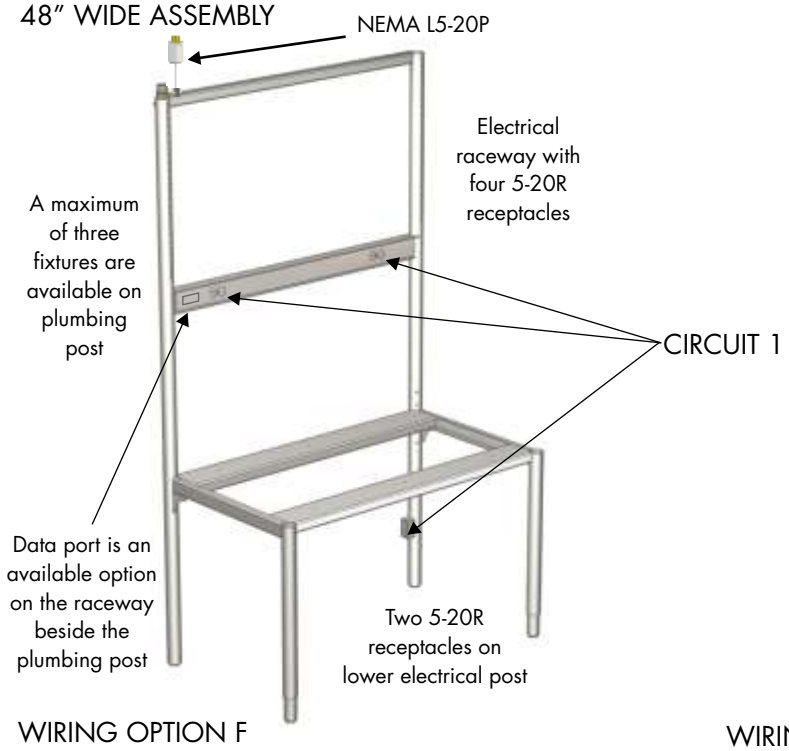
Standard Assembly

Stationary Table Frame

Tech Desk Station Frame

Circuit Options

WIRING OPTION E
Option code "1E": 1 CIRCUIT
48" WIDE ASSEMBLY



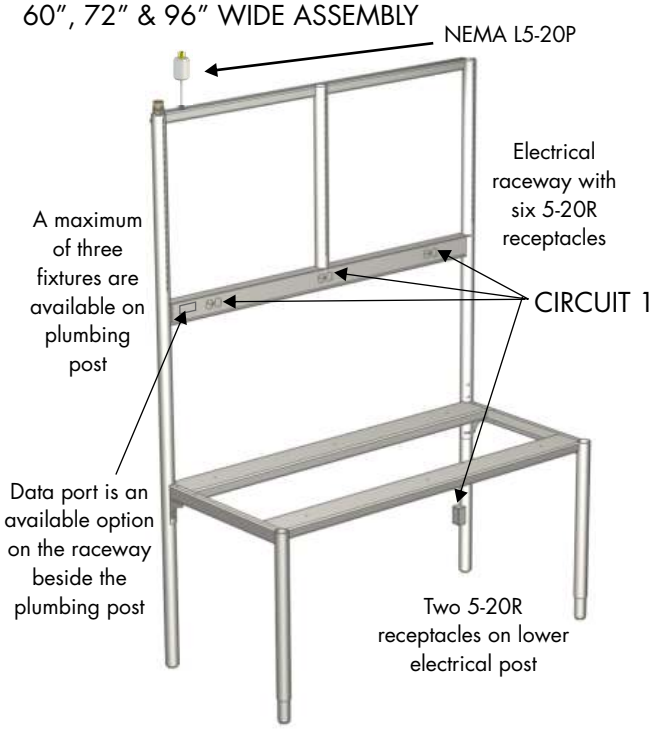
TYPICAL ELECTRICAL PLUG DETAIL

Optima™ Laboratory Bench systems with one circuit are typically equipped with NEMA L5-20P locking plugs. Each assembly is supplied with 4 feet of white electrical cord. Requires 1 X 120V, 20A circuits.

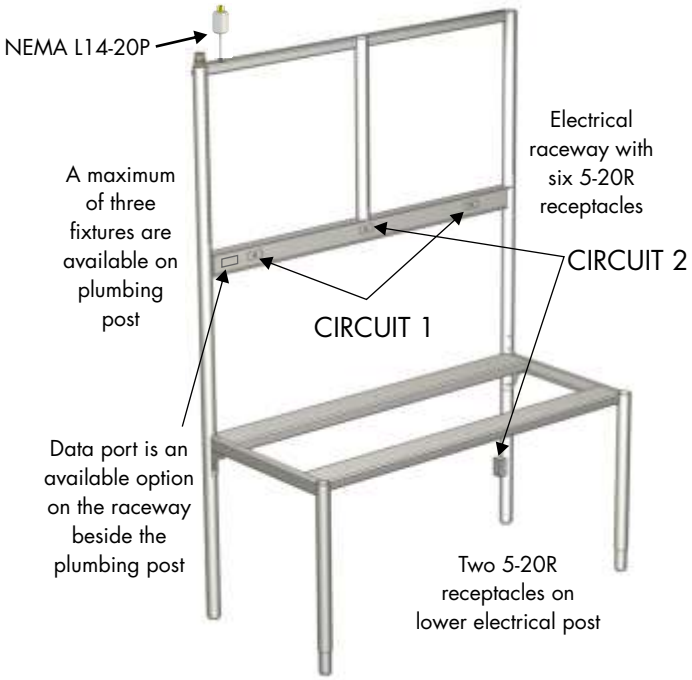
TYPICAL ELECTRICAL PLUG DETAIL

Optima™ Laboratory Bench systems with two circuits or more are typically equipped with NEMA L14-20P locking plugs. Each assembly is supplied with 4 feet of white electrical cord. Requires 2X 120V, 20A circuits on a double pole circuit breaker.

WIRING OPTION F
Option code "2E": 1 CIRCUIT
60", 72" & 96" WIDE ASSEMBLY



WIRING OPTION G
Option code "3E": 2 CIRCUITS
60", 72" & 96" WIDE ASSEMBLY



mott MANUFACTURING

QUALITY BY DESIGN

OPTIMA™ 2100 SERIES LABORATORY BENCH SYSTEM

Optima™ 2100 Series Assembly

48" wide unit

60", 72" & 96" wide unit

Width	29" Deep	35" Deep
48"	ROA0248	ROA0348
60"	ROA0260	ROA0360
72"	ROA0272	ROA0372
96"	ROA0296	ROA0396

- Available in powder coated steel finish or stainless steel.
- Overall assembly is 84" high, 2" tubular rear posts with leveling feet and comes complete with cantilevered table frame. Height adjustable in 1" increments from 29" to 36" (work surface not included).
- Complete with hanging rails to suspend lower cabinets on units 72" wide and smaller.
- To order suspended base cabinets and mobile cabinets refer to the catalog section (assemblies larger than 72" wide cannot suspend cabinets).
- Utility channel will have electrical provisions, see page Q17 for details.
- Two electrical receptacles are standard in lower electrical post.
- Overall depth of assembly does not include work surface.
- Shipped partially assembled.

- When option code 97 is applied to the Optima™ system, the bench is supplied with leveling casters, side and rear stretchers.
- When casters are supplied, the load rating is reduced, contact Mott for details.

Tech Desk Station

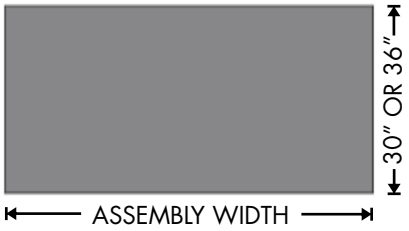
48" wide unit

60", 72" & 96" wide unit

Width	29" Deep	35" Deep
48"	RTD0248	RTD0348
60"	RTD0260	RTD0360
72"	RTD0272	RTD0372
96"	RTD0296	RTD0396

- Available in powder coated steel finish or stainless steel.
- Overall assembly is 84" high with 2" tubular rear posts with leveling feet.
- Standard 30" high fixed height table (work surface not included).Tech Desk as shown is not intended to be height adjustable.
- Complete with hanging rails to suspend lower cabinets on units 72" wide and smaller.
- To order suspended base cabinets and mobile cabinets refer to the catalog section (assemblies larger than 72" wide cannot suspend cabinets).
- Tech Desk Stations feature a single sided linoleum bulletin board (height of bulletin board is designed for a 1" thick work surface) and a modesty panel (13-3/4" high). The bulletin board eliminates the use of service fixtures.
- Two electrical receptacles are standard in lower electrical post.
- Utility channel will have electrical provisions, see page Q17 for details.
- Shipped partially assembled.

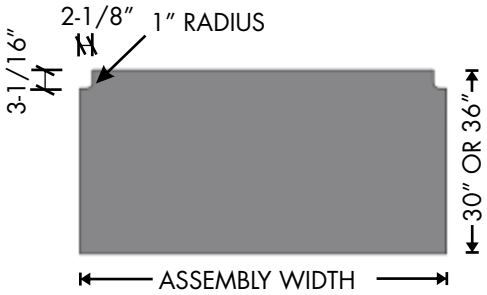
Four Leg Table Work Surface For 28″ Deep And 34″ Deep Units



Width of Bench	Black Epoxy 30″ Deep	Black Epoxy 36″ Deep	Stainless Steel 30″ Deep	Stainless Steel 36″ Deep
48″	EOP3048	EOP3648	SOP3048	SOP3648
60″	EOP3060	EOP3660	SOP3060	SOP3660
72″	EOP3072	EOP3672	SOP3072	SOP3672
96″	EOP3096	EOP3696	SOP3096	SOP3696

- Stainless steel work surfaces are type 304-4, flat, square edges, 1″ thick.
- Epoxy work surfaces with 1/8" [3mm] beveled edges are 1″ thick. The cutouts for posts are not beveled.

2100 Series Work Surface For 29″ Deep And 35″ Deep Units



Width of Bench	Black Epoxy 30″ Deep	Black Epoxy 36″ Deep	Stainless Steel 30″ Deep	Stainless Steel 36″ Deep
48″	ERS3048	ERS3648	SRS3048	SRS3648
60″	ERS3060	ERS3660	SRS3060	SRS3660
72″	ERS3072	ERS3672	SRS3072	SRS3672
96″	ERS3096	ERS3696	SRS3096	SRS3696

- Stainless steel work surfaces are type 304-4, flat, square edges, 1″ thick.
- Epoxy work surfaces with 1/8" [3mm] beveled edges are 1″ thick. The cutouts for posts are not beveled.

mott MANUFACTURING

QUALITY BY DESIGN

OPTIMA™ 2100 SERIES LABORATORY BENCH SYSTEM

Four Leg Tables

Width	28″ Deep	34″ Deep
48″	OTF0248	OTF0348
60″	OTF0260	OTF0360
72″	OTF0272	OTF0372
96″	OTF0296	OTF0396

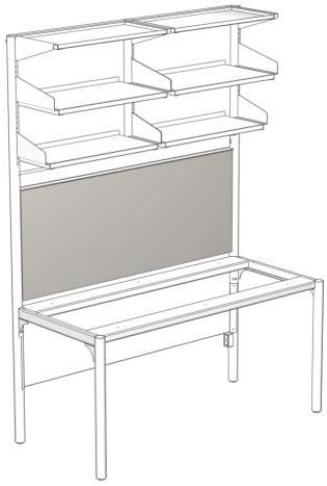
- Available in powder coated steel finish or stainless steel.
- 2″ tubular legs with leveling feet. Height adjustable in 1″ increments from 29″ to 36″ (work surface not included).
- To order suspended base cabinets and mobile cabinets refer to the catalog section (assemblies larger than 72″ wide cannot suspend cabinets).
- Table Frame complete with hanging rails to suspend lower cabinets on one side on units 72″ wide and smaller.
- When option code 97 is applied the table is supplied with self leveling casters, side and rear stretchers.
- Shipped assembled.

Modesty Panels

Width	Item Number
48″	MPR0148
60″	MPR0160
72″	MPR0172
96″	MPR0196

- Available in powder coated steel finish or stainless steel.
- Mounts to Optima™ post below work top with bracket (hardware included).
- Height is 13-3/4″ high.
- Ships not assembled on Optima™.

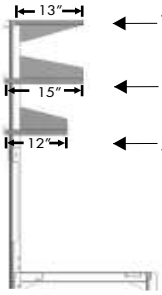
Bulletin Board



Option Code
1B

- The use of a bulletin board eliminates the use of service fixtures.
- Linoleum bulletin boards are single sided and 15″ high.
- Mounts to Optima™ posts above work top and below electrical raceway.
- Ships assembled on Optima™.

Typical 2100 Series Steel Shelf Assembly



Top Shelf Assembly - 13" deep with 12" deep bracket

Shelf Assembly - 15" deep with 12" deep bracket

Shelf Assembly - 12" deep with 9" deep bracket

Top Shelf Assemblies - Steel and Glass

Full width shelf on 48" wide benches (Glass shelf with Tapered bracket shown)

Radius Profile

Two half width shelves on 60", 72" and 96" wide benches (Steel shelves with Tapered bracket shown)

Width of Bench	Glass Shelf Assembly Tapered Profile	Glass Shelf Assembly Radius Profile	Steel Shelf Assembly Tapered Profile	Steel Shelf Assembly Radius Profile	Shelves Per Side
48"	RSG1348	RRG1348	RSS1348	RRS1348	1
60"	RSG1360	RRG1360	RSS1360	RRS1360	2
72"	RSG1372	RRG1372	RSS1372	RRS1372	2
96"	RSG1396	RRG1396	RSS1396	RRS1396	2

- 48" wide assembly includes one 1" thick shelf, one 13" deep shelf and a pair of 12" deep brackets. 60", 72" and 96" wide assemblies include two 1" thick half width shelves, two 13" deep shelves and two pairs of 12" deep brackets. Available in stainless steel.
- 6mm thick laminated safety glass.
- Shelves are adjustable in 1" increments.
- Suitable for Optima™ 2100 Series only.
- All width dimensions are nominal.

Steel Shelf Assemblies

Full width shelf on 48" wide benches (Tapered bracket shown)

Radius Profile

Two half width shelves on 60", 72" and 96" wide benches (Tapered bracket shown)

Width of Bench	12" Deep Assembly Tapered Profile	12" Deep Assembly Radius Profile	15" Deep Assembly Tapered Profile	15" Deep Assembly Radius Profile	Shelves Per Side
48"	SAR1248	SSR1248	SAR1548	SSR1548	1
60"	SAR1260	SSR1260	SAR1560	SSR1560	2
72"	SAR1272	SSR1272	SAR1572	SSR1572	2
96"	SAR1296	SSR1296	SAR1596	SSR1596	2

- 48" wide assembly includes one 1" thick shelf, one rear shelf angle, one 12" deep or 15" deep shelf and a pair of brackets. 60", 72" and 96" wide assemblies include two 1" thick half width shelves, two rear shelf angles, two 12" deep or 15" deep shelves and two pairs of brackets.(9" Bracket for 12" deep assembly, 12" bracket for 15" deep assembly). Available in stainless steel.
- Shelves are adjustable in 1" increments.
- Suitable for Optima™ 2100 Series only.
- All width dimensions are nominal.

Retainer Rods For Shelf Assemblies

Retainer Rod Option Code	
Powder Coated	Stainless Steel
CR	SR

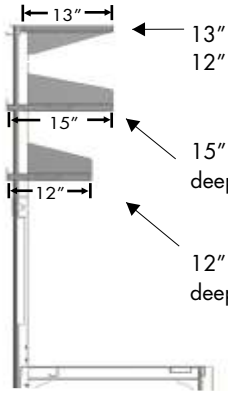
- 1" high retainer rod (5/16" dia.) prevents articles from falling off the shelf.
- 48" wide benches receive one retainer rod and three turrets up to 71". Benches 72" wide and above receive one retaining rod and four turrets.
- Not suitable for Mott glass shelves.
- Available in stainless steel or powder coated stainless steel.
- Retainer rods ships loose.

mott MANUFACTURING

QUALITY BY DESIGN

OPTIMA™ 2100 SERIES WOOD SHELVING COMPONENTS

Typical 2100 Series Wood Shelves

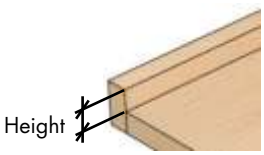


13″ deep top shelf fits on a 12″ deep bracket

15″ deep shelf fits on a 12″ deep bracket

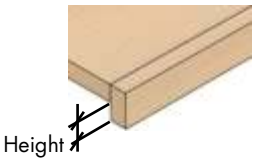
12″ deep shelf fits on a 9″ deep bracket

Wood Shelving Options



Height	Back Lip	Front Lip	Back & Front Lip
1″	ARW1	AFW1	ABW1
2″	ARW2	AFW2	ABW2
3″	ARW3	AFW3	ABW3
4″	ARW4	AFW4	ABW4

- Height of the lip is measured from the top of the shelf to the top of the lip. Lip is 3/4″ thick.
- Shelves are 1″ thick.



Height	Front Valance
1″	FV1
2″	FV2
3″	FV3
4″	FV4

- Height of the valance is measured from the bottom of the shelf to the bottom of the valance. Valance is 3/4″ thick.
- Shelves are 1″ thick.

Wood Shelves for 12″ Deep Top Shelf Brackets

Full width shelf on 48″ wide benches

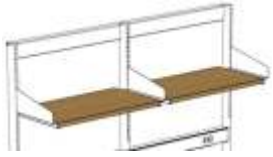
Two half width shelves on 60″, 72″ and 96″ wide benches

Width of Bench	Top Shelves for 2100 Series	Shelves Per Side
48″	RSW1348W	1
60″	RSW1360W	2
72″	RSW1372W	2
96″	RSW1396W	2

- Shelves are 1″ thick.
- Shelves are suitable for Optima™ 2100 series only.
- Shelf brackets are not included and must be ordered separately.
- All width dimensions are nominal.

Wood Shelves for 9″ Deep and 12″ Deep Shelf Brackets

Full width shelf on 48″ wide benches



Two half width shelves on 60″, 72″ and 96″ wide benches

Width of Bench	Shelves for 9″ Bracket	Shelves for 12″ Bracket	Shelves Per Side
48″	SAW1248W	SRW1548W	1
60″	SAW1260W	SRW1560W	2
72″	SAW1272W	SRW1572W	2
96″	SAW1296W	SRW1596W	2

- Shelves are 1″ thick.
- Shelves are suitable for Optima™ 2100 series only.
- Shelf brackets are not included and must be ordered separately.
- All width dimensions are nominal.

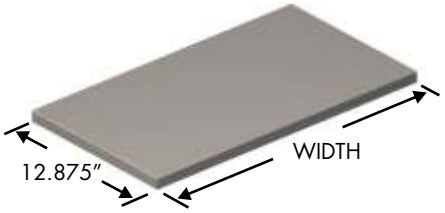
Retainer Rods For Shelf Assemblies

Retainer Rod Option Code	
Powder Coated	Stainless Steel
CR	SR

- 1″ high retainer rod (5/16″ dia.) prevents articles from falling off the shelf.
- 48″ wide benches receive one retainer rod and three turrets up to 71″. Benches 72″ wide and above receive one retaining rod and four turrets.
- Not suitable for Mott glass shelves.
- Available in stainless steel or powder coated stainless steel.
- Retainer rods ships loose.

OPTIMA™ 2100 SERIES NON-MOTT SHELF DIMENSIONS

Typical Shelf for 12″ Top Shelf Bracket



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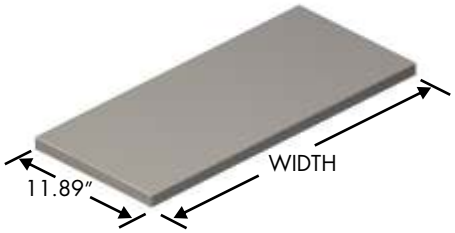
- Quantity of 2 - 32.563″ wide shelves suits a 72″ wide Single Sided Assembly
- Quantity of 2 - 44.563″ wide shelves suits a 96″ wide Single Sided Assembly

Typical Shelf for 9″ Bracket



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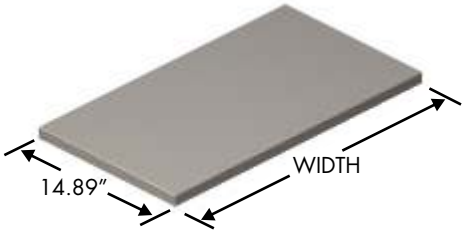
- Quantity of 2 - 26.563″ wide shelves suits a 60″ wide Single Sided Assembly
- Quantity of 2 - 32.563″ wide shelves suits a 72″ wide Single Sided Assembly
- Quantity of 2 - 44.563″ wide shelves suits a 96″ wide Single Sided Assembly

Typical Shelf for 12″ Bracket



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- Quantity of 2 - 26.563″ wide shelves suits a 60″ wide Single Sided Assembly
- Quantity of 2 - 32.563″ wide shelves suits a 72″ wide Single Sided Assembly
- Quantity of 2 - 44.563″ wide shelves suits a 96″ wide Single Sided Assembly

OPTIMA™ 2100 SERIES SHELF COMPONENTS

Top Shelf Brackets

Radius Profile

Depth	Tapered Profile	Radius Profile
12″	RTB0012	RTB3012

- One pair of 12″ powder coated steel end brackets for top shelves. Designed to be used for shelves of different materials, mounts to slotted post. Available in stainless steel.
- Adjustable in 1″ increments.
- Suitable for Optima™ 2100 series only.
- See page Q22 for Mott wood shelves. See page Q23 for non-Mott shelf dimensions.

Shelf Brackets

Radius Profile

Depth	Tapered Profile	Radius Profile
9″	RSB0009	RSB3009
12″	RSB0012	RSB3012

- One pair of powder coated steel end brackets designed to be used for shelves of different materials, mounts to slotted post. Available in stainless steel.
- Adjustable in 1″ increments.
- Suitable for Optima™ 2100 Series only.
- See page Q22 for Mott wood shelves. See page Q23 for non-Mott shelf dimensions.

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QUALITY BY DESIGN

OPTIMA™ 2100 SERIES SHELF COMPONENTS

Optima™ Shelf Retainer Rods

≤ 30″ wide assemblies

> 30″ wide assemblies

Width	Steel Shelves Powder Coated	Steel Shelves Stainless Steel	Wood Shelves Powder Coated	Wood Shelves Stainless Steel	Retainer Rod Parts
48″	PRR0048-OP	SRR0048-OP	PRR0048-OPW	SRR0048-OPW	1 Rod & 3 Turrets
60″	PRR0060-OP	SRR0060-OP	PRR0060-OPW	SRR0060-OPW	2 Rods & 4 Turrets
72″	PRR0072-OP	SRR0072-OP	PRR0072-OPW	SRR0072-OPW	2 Rods & 6 turrets
96″	PRR0096-OP	SRR0096-OP	PRR0096-OPW	SRR0096-OPW	2 Rods & 6 Turrets

- 1″ high retainer rod (5/16″ dia.) Prevents articles from falling off the shelf.
- Retainer rods are measured on centers.
- Available in stainless steel or powder coated stainless steel and can be added to existing Optima™ shelves.
- Threaded turrets includes hardware for mounting to shelf (shelf must have holes drilled to accept turrets).
- Ships loose.
- OP and OPW at the end of the part number represents option codes.

Steel Shelf Angles

Width of Bench	Item Number	Shelf Angles Included
48″	ASR2148	1
60″	ASR2160	2
72″	ASR2172	2
96″	ASR2196	2

- Steel Shelf angles can be added to any existing Optima™ shelf and are used to stop items from sliding off of shelving.
- 2″ high with a 1″ return and notched for shelf brackets. Available in stainless steel.
- Dimensions are nominal.
- Ships loose.

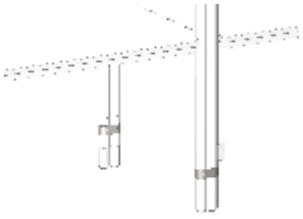
OPTIMA™ 2100 SERIES COMPONENTS

Back-To-Back Fastener Kit

Item Number
RBF0000

- Lower bracket attaches to bottom of the rear post legs to stabilize two assemblies that are situated back-to-back.
- Fastener available in stainless steel.
- Hardware not included.
- Suitable for Optima™ 2100 Series only.

Side-To-Side Fastener



Item Number
RSF0000

- The bracket attaches to the front or rear post legs to stabilize two assemblies that are situated side-to-side.
- Fastener available in stainless steel.
- Hardware not included.
- Suitable for Optima™ 2100 Series only.

Note: Side-To-Side Fasteners as shown from behind the Optima™ 2100 Series assembly.

EdgeWave™ LED Shelf Task Light

LED Shelf Lighting Option Codes	
Dimming On/Off Switch	Occupancy Sensor
LL1	LL2

- Low profile EdgeWave™ LED task light mounts into underside of shelf and is designed to directly illuminate work surfaces.
- Recessed across the width of steel or wood shelves, the EdgeWave™ LED light option is included in our Optima™ bench UL listing.
- Finished bottoms will be provided on the underside of steel shelves.
- The driver is concealed within the horizontal raceway. Small low voltage power plugs connect light to electrical raceway for easy shelf adjustability.
- Option LL1: Soft touch on/off dimmable light switch with programmed on/off memory; the intensity when turned off is the same intensity when turned back on. Dimmable feature not compatible with Occupancy Sensor.
- Option LL2: The optional sensor ensures that the lights will turn on automatically when motion is detected and turns off automatically in 30 seconds when motion is no longer detected. Sensor does not work in conjunction with Dimmable on/off switch.

Under Mount Shelf Task Lights

Note: Shown on Optima™ 2500 Series

Length of Light	Item Number
14"	TLW0014
23"	TLW0023
36"	TLW0036
48"	TLW0048
59"	TLW0059

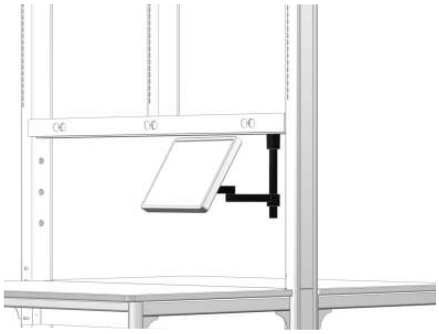
- Order light a minimum 6" shorter than the shelf.
- UL Listed Low profile (.98" wide by 1.65" high) T5 white fluorescent task light mounts to underside of the shelf and to be plugged into the Optima™ raceway.
- Shatterproof polycarbonate lens protects the lamp.
- Easily linkable in one continuous line using Flexible Connectors. 6" Flexible Connector and 6' power plug comes standard with each light. See below to order longer Flexible Connectors.
- On-off rocker switch located on the side of the fixture.
- 8000 hour, cool white replaceable T5 lamp included.
- Ships loose, includes Mott's mounting brackets.

Task Light Flexible Connectors

Length	Item Number
12"	LFC0012
24"	LFC0024
36"	LFC0036

- Flexible Connector allows to easily link T5 fluorescent lights in one continuous line. Only for use on Under Mount Shelf Task Lights.

LCD Monitor Arms



Item Number	
Anodized Silver Finish	Black Finish
MONARMS	MONARMB

- Position your LCD for maximum productivity and comfort.
- Features foldable arms which adjust vertically up and down a 12" pole. The arms can fold up to fit in about 3" of space and extend out 14". Rotates 360 degrees at three joints, monitor tilting mechanism can tilt over 200 degrees and adjustable tension at joints which is ideal for touch-screen applications.
- Weight capacity adjusts to hold up to 40lbs (Monitor depth greater than 2" may diminish capacity). Monitor not included.
- Easily attaches to LCDs that are VESA MIS-D, 100/75, compliant.
- Ships loose. Installs easily to lower cross member with one screw.
- The use of a monitor arm prevents usage of a bulletin board.

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QUALITY BY DESIGN

OPTIMA™ SERVICE FIXTURES

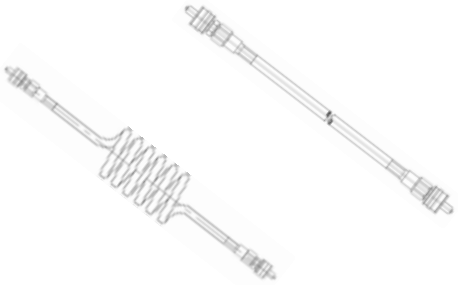
Female Quick Connect Fittings

Standard Optima™ Laboratory Bench systems are UL962 Listed, however this listing does not cover plumbing fixtures and associated piping. The customer is responsible for ensuring that internal piping and components meet local codes and standards. In some jurisdictions on-site inspection and testing may be required, this service is not provided by Mott Manufacturing.

For Coiled & Straight Hose			For Stainless Steel Hose	
Service	Band Color	Item Number	Band Color	Item Number
AIR	Orange	MCPVAIR	Orange	MSSAAIR
ARG	Violet	MCPVARG	Violet	MSSAARG
CW	Green	MCPVCWT	Green	MSSACWT
GAS	Blue	MCPVGAS	Blue	MSSAGAS
HE	Black	MCPVHEL	Black	MSSAHEL
NIT	Brown	MCPVNIT	Brown	MSSANIT
VAC	Yellow	MCPVVAC	Yellow	MSSAVAC

- These parts are shipped loose.
- A panel mounted brass keyed quick connect is suitable for panel mounting on overhead service carriers/panels.
- Complete with a 3/8" male NPT inlet.
- Only plug and body quick connects of the same color will couple and allow flow.

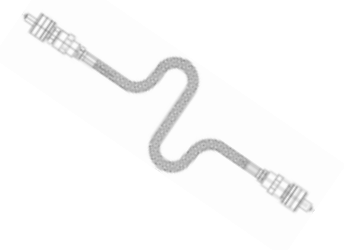
Coiled & Straight Hose Assemblies



Coiled Hose			Straight Hose	
Service	Band Color	Item Number	Band Color	Item Number
AIR	Orange	COHAAIR	Orange	PVHAAIR
ARG	Violet	COHAARG	Violet	PVHAARG
CW	Green	COHACWT	Green	PVHACWT
GAS	Blue	COHAGAS	Blue	PVHAGAS
HE	Black	COHAHEL	Black	PVHAHEL
NIT	Brown	COHANIT	Brown	PVHANIT
VAC	Yellow	COHAVAC	Yellow	PVHAVAC

- These parts are shipped loose. Suitable for all Optima™ series.
- Coiled Assembly complete with 3/8" I.D. X 9/16" O.D. Coiled polyurethane hose (color of hose is white) and keyed plug quick connects.
- Straight Assembly complete with 3/8" I.D. X 72"long reinforced straight white polyurethane hose color-coded per service and keyed plug quick connects.
- Only plug and body quick connects of the same color will couple and allow flow.

Stainless Steel Hose Assemblies



Note: The above hoses may not be acceptable for use with burning gas in some jurisdictions. Please consult with the local authorities before ordering. Consult Mott for further information.

Stainless Steel Hose		
Service	Band Color	Item Number
AIR	Orange	SSHAAIR
ARG	Violet	SSHAARG
CW	Green	SSHACWT
GAS	Blue	SSHAGAS
HE	Black	SSHAHEL
NIT	Brown	SSHANIT
VAC	Yellow	SSHAVAC

- These parts are shipped loose.
- Assembly complete with 3/8" I.D. X 72" long stainless steel braided hose (hose has Teflon core) and stainless steel keyed plug quick connects.
- Corrugated gas appliance connector is supplied for burning gas.
- Suitable for Optima™ series.
- Only plug and body quick connects of the same color will couple and allow flow.

Quick Connect Valve Assemblies

Standard Optima™ Laboratory Bench systems are UL962 Listed, however this listing does not cover plumbing fixtures and associated piping. The customer is responsible for ensuring that internal piping and components meet local codes and standards. In some jurisdictions on-site inspection and testing may be required, this service is not provided by Mott Manufacturing.

For 2500 Series Service	Band Color	Coiled & Straight Hose	Stainless Hose
AIR	Orange	QCV1AIR	QCV3AIR
ARG	Violet	QCV1ARG	QCV3ARG
CW	Green	QCV1CWT	QCV3CWT
GAS	Blue	-	QCV3GAS
HE	Black	QCV1HEL	QCV3HEL
NIT	Brown	QCV1NIT	QCV3NIT
VAC	Yellow	QCV1VAC	QCV3VAC

- These parts are shipped loose.
- Assembly complete with panel mounted wye service fixture (Instrumentation Needle Valve supplied, Note: *Cold Water is supplied with ball valve), keyed quick connect body and tubing. Hoses are not included and must be ordered separate. (When ordering assembly for Coiled & Straight hose, brass keyed quick connect body and copper tubing is supplied. When ordering assembly for Stainless Steel hose, stainless steel keyed quick connect body and stainless steel tubing is supplied.)
- Corrugated gas appliance connector is supplied for natural gas.
- This assembly is only suitable for Optima™ 2500 Series.
- Only plug and body quick connects of the same color will couple and allow flow.

For 2100 Series Service	Band Color	Coiled & Straight Hose	Stainless Hose
AIR	Orange	QCV2AIR	QCV4AIR
ARG	Violet	QCV2ARG	QCV4ARG
CW	Green	QCV2CWT	QCV4CWT
GAS	Blue	-	QCV4GAS
HE	Black	QCV2HEL	QCV4HEL
NIT	Brown	QCV2NIT	QCV4NIT
VAC	Yellow	QCV2VAC	QCV4VAC

- These parts are shipped loose.
- Assembly complete with panel mounted single service fixture (Instrumentation Needle Valve supplied, Note: *Cold Water is supplied with ball valve), keyed quick connect body and tubing. Hoses are not included and must be ordered separate. (When ordering assembly for Coiled & Straight hose, brass keyed quick connect body and copper tubing is supplied. When ordering assembly for Stainless Steel hose, stainless steel keyed quick connect body and stainless steel tubing is supplied.)
- Corrugated gas appliance connector is supplied for natural gas.
- This assembly is only suitable for Optima™ 2100 Series.
- Only plug and body quick connects of the same color will couple and allow flow.

ALTUS™ TABLE SYSTEM ADAPTABLE LABORATORY FURNITURE SOLUTIONS

Altus™ Table System

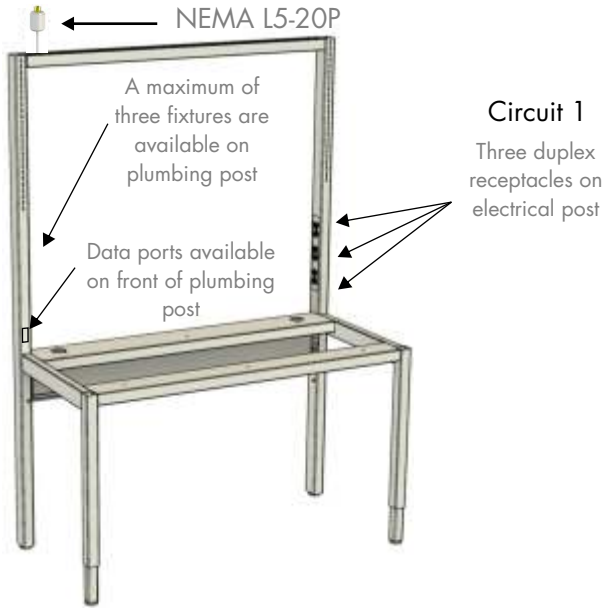
The Altus™ table system is designed to adapt to an array of laboratory processes, equipment and users. It conveniently supplies all the services and features required for today's laboratory in a self-contained and self-standing bench assembly. This stylish system is available in powder coated steel finish or stainless steel.

With Altus™, laboratories can be easily created, changed and reconfigured for new applications or changing space. Integrated services deliver quick and easy access while providing superior flexibility by keeping the work surface open. Plumbing and electrical services are factory installed and designed to quick connect to ceiling mounted service panels or overhead service carriers.

For additional information and help in planning contact Mott Manufacturing.

Circuit Details

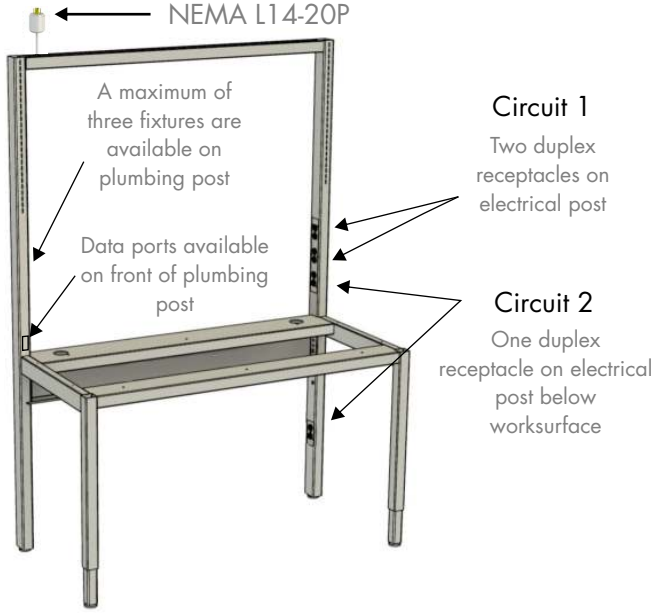
Standard Wiring
1 Circuit
48", 60", 72" Wide Assembly



TYPICAL ELECTRICAL PLUG DETAIL
Altus™ Table Systems with one circuit are available and are typically equipped with NEMA L5-20P locking plugs. Each assembly is supplied with 4 feet of white electrical cord. Requires 2X 120V, 20A circuits.

All electrical receptacles and data are white.

Wiring Option A
Option code "D2": 2 Circuits
48", 60", 72" Wide Assembly



TYPICAL ELECTRICAL PLUG DETAIL
Altus™ Table Systems with two circuits are available and are typically equipped with NEMA L14-20P locking plugs. Each assembly is supplied with 4 feet of white electrical cord. Requires 2X 120V, 20A circuits on double circuit breaker.

All electrical receptacles and data are white.

ALTUS™ TABLE SYSTEM

Assembly

Width	23" Deep	29" Deep
48"	ATS2348	ATS2948
60"	ATS2360	ATS2960
72"	ATS2372	ATS2972

- Available in powder coated steel finish or stainless steel.
- Overall assembly is 84" high, 2" X 3" deep rear posts, 2" square tubular front legs with leveling feet. Table frame is an all-welded construction. Table frame is height adjustable in 1" increments from 29" to 36" (work surface not included).
- Complete with hanging rails to suspend lower cabinets on units 72" wide and smaller.
- Standard depth hanging cabinets are not suitable for 23" deep tables.
- To order suspended base cabinets, mobile cabinets, pencil drawers and pull out writing tablets refer to those catalog sections.
- A maximum of three fixtures are available on the plumbing post.
- Three duplex electrical receptacles are standard on side electrical post (data an available option).
- Overall depth of assembly does not include work surface.
- Shipped partially assembled.

Four Leg Table

Width	22" Deep	28" Deep
48"	ATF2248	ATF2848
60"	ATF2260	ATF2860
72"	ATF2272	ATF2872

- Available in powder coated steel finish or stainless steel.
- Table frame is an all-welded construction. 2" square tubular legs with leveling feet. Table frame is height adjustable in 1" increments from 29" to 36" (work surface not included).
- Table frame complete with hanging rails to suspend lower cabinets.
- Standard depth hanging cabinets are not suitable for 22" deep tables.
- To order suspended base cabinets, mobile cabinets, pencil drawers and pull out writing tablets refer to those catalog sections.
- Shipped assembled.

Altus™ Caster Option

- When option code 97 is applied to the Altus™ table system, the table comes with leveling casters, side and rear supports.
- When casters are supplied, the load rating is reduced, contact Mott for details.

Note: This caster option invalidates the UL listing on the Altus™.

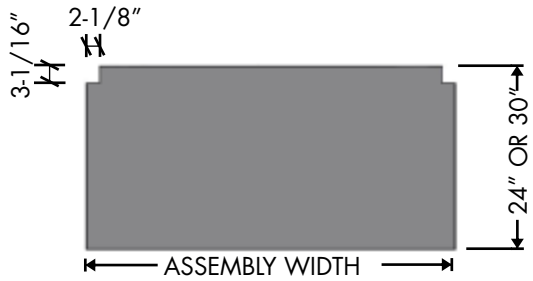
Altus™ Crank-Operated Option

- To add the crank adjustable system to an Altus™ please contact Mott Manufacturing for ordering details.
- Crank-operated table frame adjustability from 28-3/4" to 39-3/4", work surface not included.
- Legs are supplied with leveling feet.
- Contact Mott for maximum load rating.

Note: This crank option invalidates the UL listing on the Altus™.

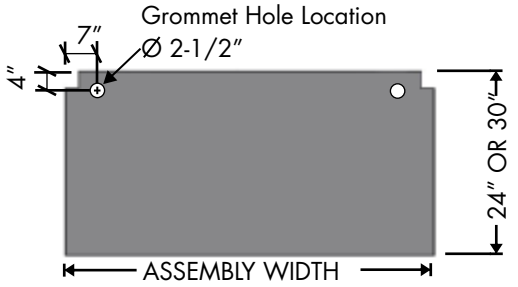
ALTUS™ TABLE SYSTEM — WORK SURFACES

Work Surface for 23″ Deep & 29″ Deep Units



Width of Bench	Black Epoxy 24″ Deep	Black Epoxy 30″ Deep	Stainless Steel 24″ Deep	Stainless Steel 30″ Deep
48″	EAL2448	EAL3048	SAL2448	SAL3048
60″	EAL2460	EAL3060	SAL2460	SAL3060
72″	EAL2472	EAL3072	SAL2472	SAL3072

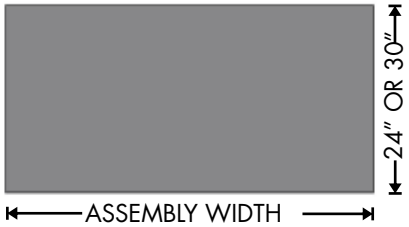
- Stainless steel work surfaces are type 304-4, flat, square edges, 1″ thick.
- Epoxy work surfaces with 1/8" [3mm] beveled edges are 1″ thick. The cutouts for posts are not beveled.
- 1″ overhang at front.



Width of Bench	Black Epoxy 24″ Deep	Black Epoxy 30″ Deep	Stainless Steel 24″ Deep	Stainless Steel 30″ Deep
48″	EAH2448	EAH3048	SAH2448	SAH3048
60″	EAH2460	EAH3060	SAH2460	SAH3060
72″	EAH2472	EAH3072	SAH2472	SAH3072

- Grommet hole cutout available in work surface when lower raceway option is ordered.
- Stainless steel work surfaces are type 304-4, flat, square edges, 1″ thick.
- Epoxy work surfaces with 1/8" [3mm] beveled edges are 1″ thick. The cutouts for posts are not beveled.
- 1″ overhang at front.

Four Leg Table Work Surface For 22″ Deep & 28″ Deep Units

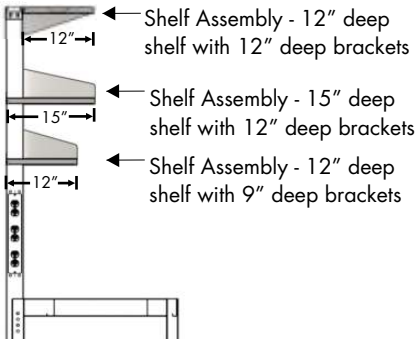


Width of Bench	Black Epoxy 24″ Deep	Black Epoxy 30″ Deep	Stainless Steel 24″ Deep	Stainless Steel 30″ Deep
48″	EAT2448	EAT3048	SAT2448	SAT3048
60″	EAT2460	EAT3060	SAT2460	SAT3060
72″	EAT2472	EAT3072	SAT2472	SAT3072

- Stainless steel work surfaces are type 304-4, flat, square edges, 1″ thick.
- Epoxy work surfaces with 1/8" [3mm] beveled edges are 1″ thick. The cutouts for posts are not beveled.
- 1″ overhang at front and back.

ALTUS™ TABLE SYSTEM — STEEL SHELF COMPONENTS

Altus™ Steel Shelf Assembly



Shelf Assembly - 12″ deep shelf with 12″ deep brackets

Shelf Assembly - 15″ deep shelf with 12″ deep brackets

Shelf Assembly - 12″ deep shelf with 9″ deep brackets

Top Steel Shelf Assemblies

Radius Profile

Width of Bench	Tapered Profile	Radius Profile
48″	AAS1248	AAR1248
60″	AAS1260	AAR1260
72″	AAS1272	AAR1272

- Assembly includes one 1″ thick 12″ deep shelf and a pair of 12″ deep brackets. Also available in stainless steel.
- Shelves are adjustable in 1″ increments.
- Suitable for Altus™ only.
- All width dimensions are nominal.

Steel Shelf Assemblies

Radius Profile

Width of Bench	12″ Deep Assembly Tapered Profile	12″ Deep Assembly Radius Profile	15″ Deep Assembly Tapered Profile	15″ Deep Assembly Radius Profile
48″	SAA1248	SRA1248	SAA1548	SRA1548
60″	SAA1260	SRA1260	SAA1560	SRA1560
72″	SAA1272	SRA1272	SAA1572	SRA1572

- Assembly includes one 1″ thick shelf, one rear shelf angle, one 12″ deep or 15″ deep shelf and a pair of brackets. (9″ brackets for 12″ deep assembly, 12″ deep brackets for 15″ deep assembly). Also available in stainless steel.
- Shelves are adjustable in 1″ increments.
- Suitable for Altus™ only.
- All width dimensions are nominal.

Retainer Rods For Shelf Assemblies

Retainer Rod Option Codes	
Powder Coated Steel	Stainless Steel
CR	SR

- 1″ high retainer rod (5/16″ dia.) prevents articles from falling off the shelf.
- Shelves receive one retainer rod and three turrets on 48″ wide and 60″ wide shelves and one retainer rod and four turrets on 72″ wide shelves.
- Available in stainless steel or powder coated stainless.
- Retainer rod ships loose.

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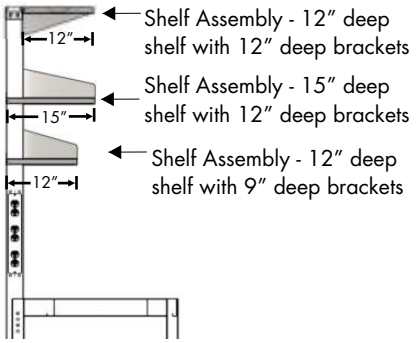
QUALITY BY DESIGN

ALTUS™ TABLE SYSTEM — WOOD SHELF COMPONENTS

Altus™ Wood Shelves



Shelf Assembly - 12″ deep shelf with 12″ deep brackets

Shelf Assembly - 15″ deep shelf with 12″ deep brackets

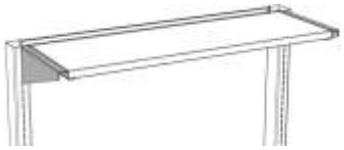
Shelf Assembly - 12″ deep shelf with 9″ deep brackets

Wood Shelves for 12″ Deep Top Shelf Brackets

Width of Bench	Item Number
48″	AAS1248W
60″	AAS1260W

- Shelves are 1″ thick. Shelves are suitable for Altus™ only.
- Shelf brackets are not included and must be ordered separately.
- To add wood lips or valances to shelves see page R7 for option codes.
- 72″ wide wood shelves not available.
- See page R7 for non-Mott shelf dimensions.
- All width dimensions are nominal.

Top Shelf Brackets



Radius Profile

Depth	Tapered Profile	Radius Profile
12″	TBA0012	TBA3012

- One pair of powder coated steel end brackets for Top Shelves. Designed to be used for shelves of different materials, mounts to slotted post. Available in stainless steel. Suitable for Altus™ only.
- Adjustable in 1″ increments.
- See page R7 for non-Mott shelf dimensions.

Wood Shelves for 9″ Deep & 12″ Deep Shelf Brackets

Width of Bench	Shelves for 9″ Bracket	Shelves for 12″ Bracket
48″	SAA1248W	SAA1548W
60″	SAA1260W	SAA1560W

- Shelves are 1″ thick. Shelves are suitable for Altus™ only.
- Shelf brackets are not included and must be ordered separately.
- To add wood lips or valances to shelves see page R7 for option codes.
- 72″ wide wood shelves not available.
- All width dimensions are nominal.

Shelf Brackets

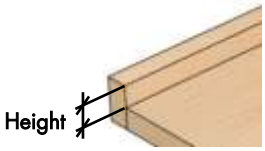
Radius Profile

Depth	Tapered Profile	Radius Profile
9″	SBA0009	SBA3009
12″	SBA0012	SBA3012

- One pair of powder coated steel end brackets designed to be used for shelves of different materials, mounts to slotted post. Available in stainless steel. Suitable for Altus™ only.
- Adjustable in 1″ increments.
- See page R7 for non-Mott shelf dimensions.

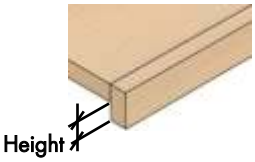
ALTUS™ TABLE SYSTEM — SHELF COMPONENTS

Wood Shelving Options



- Height of the lip is measured from the top of the shelf to the top of the lip. Lip is 3/4" thick.
- Shelves are 1" thick.

Height	Back Lip	Front Lip	Back & Front Lip
1"	ARW1	AFW1	ABW1
2"	ARW2	AFW2	ABW2
3"	ARW3	AFW3	ABW3
4"	ARW4	AFW4	ABW4



- Height of the valance is measured from the bottom of the shelf to the bottom of the valance. Valance is 3/4" thick.
- Shelves are 1" thick.

Height	Front Valance
1"	FV1
2"	FV2
3"	FV3
4"	FV4

Retainer Rods For Shelf Assemblies

Retainer Rod option Code	
Powder Coated	Stainless Steel
CR	SR

- 1" high retainer rod (5/16" dia.) prevents articles from falling off the shelf.
- Shelves receive one retainer rod and three turrets on 48" wide and 60" wide shelves and one retainer rod and four turrets on 72" wide shelves.
- Available in stainless steel or powder coated stainless.
- Retainer rod ships loose.

Metal Shelf Angles

Width of Bench	Item Number	Shelf Angles Included
48"	ARS2148	1
60"	ARS2160	1
72"	ARS2172	1

- Metal shelf angles can be added to any existing Altus™ shelf and are used to stop items from sliding off of shelving.
- 2" high with a 1" return and notched for shelf brackets. Also available in stainless steel.
- Ships loose.

Shelf Retainer Rods

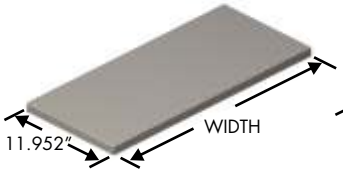
≤ 30" wide assemblies

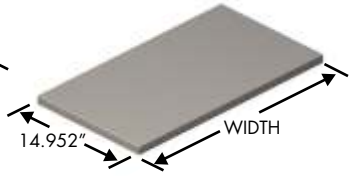
> 30" wide assemblies

Bench Width	Steel Shelves		Wood Shelves		
	Powder Coated	Stainless Steel	Powder Coated	Stainless Steel	Retainer Rod Parts
48"	PRR0048-AT	SRR0048-AT	PRR0048-ATW	SRR0048-ATW	1 rod & 3 turrets
60"	PRR0060-AT	SRR0060-AT	PRR0060-ATW	SRR0060-ATW	1 rod & 3 turrets
72"	PRR0072-AT	SRR0072-AT	-	-	1 rod & 4 turrets

- 1" high retainer rod (5/16" dia.) prevents articles from falling off the shelf.
- Retainer rods are measured on centers.
- Can be added to existing Altus™ shelves.
- Available in stainless steel or powder coated stainless steel.
- Threaded turrets includes hardware for mounting to shelf (shelf must have holes drilled to accept turrets).
- Ships loose.
- AT and ATW at the end of the part numbers represent option codes.

Dimensions For Non-Mott Shelf On A 9" Bracket & 12" Bracket





Typical shelf dimensions for non-Mott shelves:

- Quantity of 1 - 43.550" wide shelf is suits a 48" wide
- Quantity of 1 - 55.550" wide shelves suits a 60" wide
- Quantity of 1 - 67.550" wide shelves suits a 72" wide

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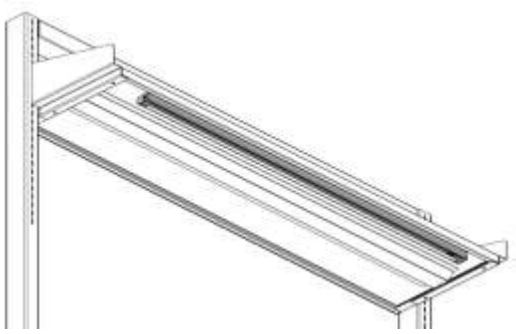
QUALITY BY DESIGN

ALTUS™ TABLE SYSTEM COMPONENTS

Under Mount Shelf Task Lights



Length of Light	Item Number
14"	TLW0014
23"	TLW0023
36"	TLW0036
48"	TLW0048
59"	TLW0059

- Order light a minimum 6" shorter than the shelf.
- Low profile (.98" wide by 1.65" high) T5 white fluorescent task light mounts to underside of the shelf.
- Task light to be plugged into the raceway.
- Shatterproof polycarbonate lens protects the lamp.
- Easily linkable in one continuous line using Flexible Connectors. 6" Flexible Connector and 6' power plug comes standard with each light. See below to order longer Flexible Connectors.
- On-off rocker switch located on the side of the fixture.
- 8000 hour, cool white replaceable T5 lamp included.
- UL listed.
- Ships loose, includes Mott's mounting brackets.

Task Light Flexible Connectors

Length	Item Number
12"	LFC0012
24"	LFC0024
36"	LFC0036

- Flexible Connector allows to easily link T5 fluorescent lights in one continuous line.

LCD Monitor Arms

Anodized Silver Finish	Black Finish
MONARMS	MONARMB

- Position your LCD for maximum productivity and comfort.
- Features foldable arms which adjust vertically up and down a 12" pole. The arms can fold up to fit in about 3" of space and extend out 14". Rotates 360 degrees at three joints, monitor tilting mechanism can tilt over 200 degrees and adjustable tension at joints which is ideal for touch-screen applications.
- Weight capacity adjusts to hold up to 40lbs (Monitor depth greater than 2" may diminish capacity). Monitor not included.
- Easily attaches to LCDs that are VESA MIS-D, 100/75, compliant.
- Ships loose.

Back-To-Back Fastener Kit

Item Number
ABF0000

- Bracket attaches to the bottom of the rear post legs to stabilize two assemblies that are situated back-to-back.
- Kit available in stainless steel.
- Hardware not included.
- Suitable for Altus™ only.

Side-To-Side Fastener Kit

Item Number
ASF0000

- Bracket attaches to the bottom of the rear post legs to stabilize two assemblies that are situated side-to-side.
- Kit available in stainless steel.
- Hardware not included.
- Suitable for Altus™ only.

ALTUS™ TABLE SYSTEM — SERVICE FIXTURES

Female Ceiling Quick Connect Fittings

The customer is responsible for ensuring that internal piping and components meet local codes and standards. In some jurisdictions on-site inspection and testing may be required, this service is not provided by Mott Manufacturing.

For Coiled & Straight Hose Service	Band Color	Item Number
AIR	Orange	MCPVAIR
ARG	Violet	MCPVARG
CW	Green	MCPVCWT
GAS	Blue	MCPVGAS
HE	Black	MCPVHEL
NIT	Brown	MCPVNIT
VAC	Yellow	MCPVVAC

- These parts are shipped loose.
- A panel mounted stainless steel keyed quick connect body is suitable for panel mounting on overhead service carriers and Ceiling Service Panels with stainless steel hoses.
- A panel mounted brass keyed quick connect body is suitable for panel mounting on overhead service carriers and Ceiling Service Panels with Straight hoses.
- Complete with 3/8" NPT inlet.
- Only plug and body quick connects of the same color will couple and allow flow.

Service Assemblies

Altus™ Service	Band Color	White Hose	Stainless Hose
AIR	Orange	ASAPAIR	-
ARG	Violet	ASAPARG	-
CW	Green	ASAPCWT	-
GAS	Blue	-	ASASGAS
HE	Black	ASAPHEL	-
NIT	Brown	ASAPNIT	-
VAC	Yellow	ASAPVAC	-

- These parts are shipped loose.
- Assembly complete with panel mounted single service fixture (Needle Valve supplied, Note: * Cold Water is supplied with ball valve), keyed quick connect plug and hose.
- Corrugated gas appliance connector with stainless steel keyed quick connect is supplied for burning gas.
- These assemblies are only suitable for the Altus™ Tables.
- Supplied with 4 feet of service lines above table height.
- Only plug and body quick connects of the same color will couple and allow flow.
- Fixtures may not be exactly as shown.
- Epoxy coated fixtures.

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QUALITY BY DESIGN

STEEL TABLES

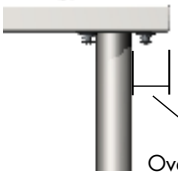
All-Welded Table Frame

Width	22" Deep	28" Deep
48"	TDA2148	TDA2248
60"	TDA2160	TDA2260
72"	TDA2172	TDA2272

- Available in powder coated steel finish or stainless steel.
- Table frame is an all-welded construction, capable to support evenly distributed 800lbs load. 2" square tubular legs with leveling feet. Table frame is height adjustable in 1" increments from 28-3/4" to 34-3/4" (work surface not included).
- Table frame complete with hanging rails to suspend lower cabinets. Note: 28" deep table frame only fits 22" deep hanging cabinets. Standard depth hanging cabinets are not suitable for 22" deep tables.
- To order suspended base cabinets, mobile cabinets, pencil drawers and pull out writing tablets refer to the catalog section.
- Ships assembled.

Stainless Steel Table Assembly

48" wide table shown

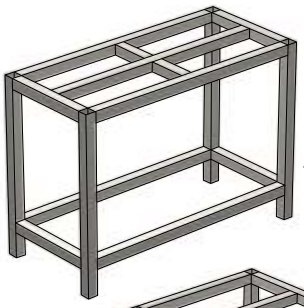


1-9/16" Overhang all sides

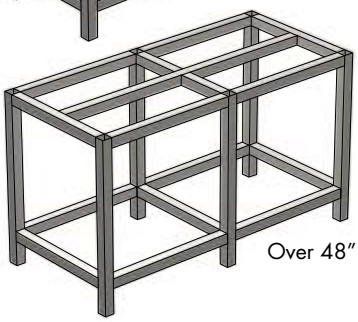
Width	24" Work Top Depth Standing Hgt.	24" Work Top Depth Sitting Hgt.	30" Work Top Depth Standing Hgt.	30" Work Top Depth Sitting Hgt
24"	STA2024	STA1024	STA4024	STA3024
36"	STA2036	STA1036	STA4036	STA3036
48"	STA2048	STA1048	STA4048	STA3048
60"	STA2060	STA1060	STA4060	STA3060
72"	STA2072	STA1072	STA4072	STA3072
96"	STA2096	STA1096	STA4096	STA3096

- Tables are 16 gauge, type 304 stainless steel work top, with a #4 finish.
- Tables have adjustable bottom shelf, cast aluminum corner brackets, and 1-5/8" stainless steel tubular adjustable bullet legs.
- Overall depth with work top is 24" or 30".
- Rated to hold 600 lbs evenly distributed.
- Tables 72" and larger are equipped with six legs.
- Ships partially assembled.

Heavy Duty "O" Frame Tables



48" wide table



Over 48" wide tables

Width	22" Deep Standing Hgt.	22" Deep Sitting Hgt.	28" Deep Standing Hgt.	28" Deep Sitting Hgt.
24"	TDC1124	TDC2124	TDC1224	TDC2224
30"	TDC1130	TDC2130	TDC1230	TDC2230
36"	TDC1136	TDC2136	TDC1236	TDC2236
42"	TDC1142	TDC2142	TDC1242	TDC2242
48"	TDC1148	TDC2148	TDC1248	TDC2248
60"	TDC1160	TDC2160	TDC1260	TDC2260
72"	TDC1172	TDC2172	TDC1272	TDC2272
96"	TDC1196	TDC2196	TDC1296	TDC2296
1000mm	TDC110B	TDC210B	TDC120B	TDC220B
1500mm	TDC110C	TDC210C	TDC120C	TDC220C

- All legs and framing are 2" x 2", 14 gauge square steel tubing.
- Frame, cross-bracing and legs are welded in place. Tables larger than 48" wide are manufactured with six legs. Table legs are supplied with leveling feet.
- Tables are available in sitting height (28-3/4") & standing height (34-3/4").
- Table legs are supplied with leveling bolts and PVC boots.
- All tables will support an 1800 lb load.
- If adding casters (Option 87), load rating is reduced to 1000lbs for 48" wide tables and 1500lbs for over 48" wide tables.
- Ships assembled.

STEEL TABLES

Crank-Operated Table Frames

Width	28″ Deep
36″	ACC2136
48″	ACC2148
60″	ACC2160
72″	ACC2172

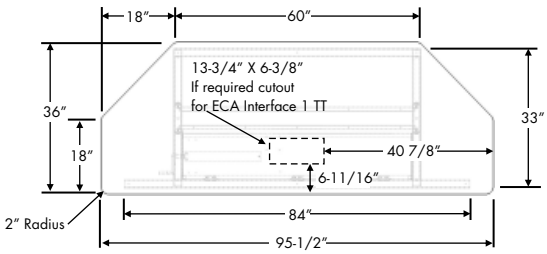
- Table legs are 2″ X 2″, 16 gauge square steel tubing.
- Crank-operated height adjustability from 28-3/4″ to 39-3/4″.
- Table frame complete with hanging rails to suspend lower cabinets.
- Legs are supplied with leveling feet.
- Table will support a 750 lb load.
- Table frame only, work surface not included.
- Shipped assembled.

23″ Deep table shown.

Table Frame Width	Adjustable From 25″- 33″ (8″ of Travel) 23″ Deep	29″ Deep	Adjustable From 29″- 41″ (12″ of Travel) 23″ Deep	29″ Deep
36″	ACT2036	ACT2136	ACT1036	ACT1136
48″	ACT2048	ACT2148	ACT1048	ACT1148
60″	ACT2060	ACT2160	ACT1060	ACT1160

- Tables are not suitable for hanging cabinets.
- Table complete with integral modesty panel and table legs are supplied with leveling feet.
- Crank-operated height adjustability from 25″ to 33″ or 29″ to 41″ .
- Table will support a 300 lb load.
- Table frame only, work surface not included.
- Shipped assembled.

Adjustable Height Science Tables



Work Surface Size	Item Number
60″ x 36″	SCT0160
72″ x 36″	SCT0172
96″ x 36″	SCT0196

- Hand crank height adjustment from 30″ to 40″ allows multiple uses.
- Dimensions may be adjusted to suit customer requirements.
- Load bearing capacity of 500lbs (including work surface).
- Work surface not included.
- 3 electrical cutouts and cover plates provided.
- If you require receptacles/wiring please contact Mott for pricing.
- Ships assembled.

Available Options:

- EM (Integral electric motor for height adjustment)
- CD (Provision for height adjustment by cordless power drill)
- CU (CPU holder below work surface of table)
- BH (Hook for book bags below work surface)
- MW (Wood Veneer modesty panels on table)

Typical Adjustable Height Science Table Work Surface

- Recommended work surface is as shown - notched to allow multiple tables to fit together.
- Drawing shown for 96″ wide unit.

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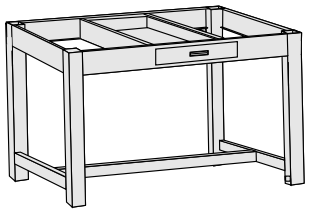
QUALITY BY DESIGN

STEEL TABLES 22" DEEP

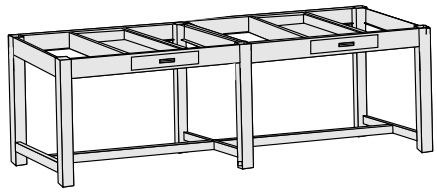
Standard "H" Frame Table



Width	Without Drawers Standing Hgt.	Sitting Hgt.	# Drws	With Drawers Standing Hgt.	Sitting Hgt.
24"	TAC1124	TAC2124	1	TAA1124	TAA2124
30"	TAC1130	TAC2130	1	TAA1130	TAA2130
36"	TAC1136	TAC2136	1	TAA1136	TAA2136
42"	TAC1142	TAC2142	1	TAA1142	TAA2142
48"	TAC1148	TAC2148	2	TAB1148	TAB2148
60"	TAC1160	TAC2160	2	TAB1160	TAB2160
72"	TAC1172	TAC2172	2	TAB1172	TAB2172
1000mm	TAC110B	TAC210B	1	TAA110B	TAA210B
1500mm	TAC110C	TAC210C	2	TAB110C	TAB210C

- When ordering a table with drawers to match Architectural Overlay design use option code "OL".

Six Leg Combination Table

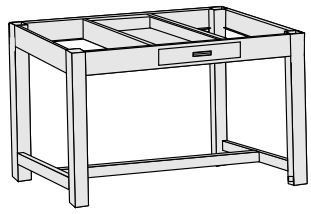


Width	Without Drawers Standing Hgt.	Sitting Hgt.	# Drws	With Drawers Standing Hgt.	Sitting Hgt.
72"	TCC1172	TCC2172	2	TCB1172	TCB2172
84"	TCC1184	TCC2184	2	TCB1184	TCB2184
96"	TCC1196	TCC2196	4	TCB1196	TCB2196
2000mm	TCC110D	TCC210D	2	TCB110D	TCB210D

- When ordering a table with drawers to match Architectural Overlay design use option code "OL".

STEEL TABLES 28" DEEP

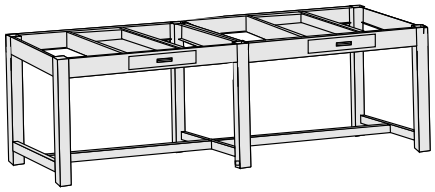
Standard "H" Frame Table



Width	Without Drawers Standing Hgt.	Sitting Hgt.	# Drws	With Drawers Standing Hgt.	Sitting Hgt.
24"	TAC1224	TAC2224	1	TAA1224	TAA2224
30"	TAC1230	TAC2230	1	TAA1230	TAA2230
36"	TAC1236	TAC2236	1	TAA1236	TAA2236
42"	TAC1242	TAC2242	1	TAA1242	TAA2242
48"	TAC1248	TAC2248	2	TAB1248	TAB2248
60"	TAC1260	TAC2260	2	TAB1260	TAB2260
72"	TAC1272	TAC2272	2	TAB1272	TAB2272
1000mm	TAC120B	TAC220B	1	TAA120B	TAA220B
1500mm	TAC120C	TAC220C	2	TAB120C	TAB220C

- When ordering a table with drawers to match Architectural Overlay design use option code "OL".

Six Leg Combination Table



Width	Without Drawers Standing Hgt.	Sitting Hgt.	# Drws	With Drawers Standing Hgt.	Sitting Hgt.
72"	TCC1272	TCC2272	2	TCB1272	TCB2272
84"	TCC1284	TCC2284	2	TCB1284	TCB2284
96"	TCC1296	TCC2296	4	TCE1296	TCE2296
2000mm	TCC120D	TCC220D	2	TCE120D	TCE220D

- When ordering a table with drawers to match Architectural Overlay design use option code "OL".

WOOD TABLES 22" DEEP

Standard "H" Frame Table

Width	Without Drawers Standing Hgt.	Sitting Hgt.	# Drws	With Drawers Standing Hgt.	Sitting Hgt.
24"	TAC1124W	TAC2124W	1	TAA1124W	TAA2124W
30"	TAC1130W	TAC2130W	1	TAA1130W	TAA2130W
36"	TAC1136W	TAC2136W	1	TAA1136W	TAA2136W
42"	TAC1142W	TAC2142W	1	TAA1142W	TAA2142W
48"	TAC1148W	TAC2148W	2	TAB1148W	TAB2148W
60"	TAC1160W	TAC2160W	2	TAB1160W	TAB2160W
72"	TAC1172W	TAC2172W	2	TAB1172W	TAB2172W
1000mm	TAC110BW	TAC210BW	1	TAA110BW	TAA210BW
1500mm	TAC110CW	TAC210CW	2	TAB110CW	TAB210CW

- When ordering a table with drawers to match Architectural Overlay design use option code "OLP"to add flush overlay panel.

Six Leg Combination Table

Width	Without Drawers Standing Hgt.	Sitting Hgt.	# Drws	With Drawers Standing Hgt.	Sitting Hgt.
72"	TCC1172W	TCC2172W	2	TCB1172W	TCB2172W
84"	TCC1184W	TCC2184W	2	TCB1184W	TCB2184W
96"	TCC1196W	TCC2196W	4	TCB1196W	TCB2196W
2000mm	TCC110DW	TCC210DW	2	TCB110DW	TCB210DW

- When ordering a table with drawers to match Architectural Overlay design use option code "OLP"to add flush overlay panel.

WOOD TABLES 28" DEEP

Standard "H" Frame Table

Width	Without Drawers Standing Hgt.	Sitting Hgt.	# Drws	With Drawers Standing Hgt.	Sitting Hgt.
24"	TAC1224W	TAC2224W	1	TAA1224W	TAA2224W
30"	TAC1230W	TAC2230W	1	TAA1230W	TAA2230W
36"	TAC1236W	TAC2236W	1	TAA1236W	TAA2236W
42"	TAC1242W	TAC2242W	1	TAA1242W	TAA2242W
48"	TAC1248W	TAC2248W	2	TAB1248W	TAB2248W
60"	TAC1260W	TAC2260W	2	TAB1260W	TAB2260W
72"	TAC1272W	TAC2272W	2	TAB1272W	TAB2272W
1000mm	TAC120BW	TAC220BW	1	TAA120BW	TAA220BW
1500mm	TAC120CW	TAC220CW	2	TAB120CW	TAB220CW

- When ordering a table with drawers to match Architectural Overlay design use option code "OLP"to add flush overlay panel.

Six Leg Combination Table

Width	Without Drawers Standing Hgt.	Sitting Hgt.	# Drws	With Drawers Standing Hgt.	Sitting Hgt.
72"	TCC1272W	TCC2272W	2	TCB1272W	TCB2272W
84"	TCC1284W	TCC2284W	2	TCB1284W	TCB2284W
96"	TCC1296W	TCC2296W	4	TCE1296W	TCE2296W
2000mm	TCC120DW	TCC220DW	2	TCE120DW	TCE220DW

- When ordering a table with drawers to match Architectural Overlay design use option code "OLP"to add flush overlay panel.

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QUALITY BY DESIGN

WOOD TABLES

Hybrid Wood Table With Welded Steel Frame

Width	22″ Deep	28″ Deep
48″	TAH2148	TAH2248
60″	TAH2160	TAH2260
72″	TAH2172	TAH2272

- Heavy-duty steel apron is clad with your choice of veneer and is designed to support 1000 lbs.
- 2-1/2″ x 2-1/2″ wood legs with telescoping stainless steel inserts that are height-adjustable from 28-3/4" to 38-3/4" high. Legs are pin adjustable in 1" increments.
- The table has 7" modesty rails on three sides with a 2" front rail.
- Ships partially assembled.

STEEL TABLES

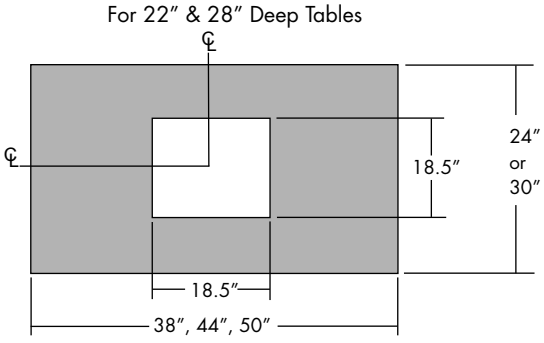
Vibration Isolation Table

Width	22″ Deep Standing Hgt.	22″ Deep Sitting Hgt.	28″ Deep Standing Hgt.	28″ Deep Sitting Hgt.
36″	VIT1136	VIT2136	VIT1236	VIT2236
42″	VIT1142	VIT2142	VIT1242	VIT2242
48″	VIT1148	VIT2148	VIT1248	VIT2248

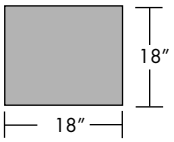
The Vibration Isolation Table is designed to provide stable working conditions for devices that are sensitive to vibration and shocks. Table consists of an outer table frame that supports the main work surface which is not isolated from vibration and an inner table frame that is entirely separate and supports the inner isolated work surface. This ensures vibrations are not transmitted to the isolated inner work surface.

- Outer Table Frame consists of two 18 gauge hollow vertical pedestals. Each pedestal has removable inner panels for access the anchor bolts and levelers. Pedestals are connected with 16 gauge steel rails. A flange is provided around the perimeter of the pedestals for mounting of the non-isolated work surface.
- Inner Table Frame consists of a rectangular hollow steel welded frame with each leg supplied with levelers and provisions for anchoring. Legs are joined by 11 gauge steel angles which support the isolated platform.
- Isolated Platform consists of a formed 18 gauge steel tray that is to be filled with ballast (such as sand or concrete - not included). The platform is supported by four rubber shock absorbing isolators. A flange is provided around the perimeter of the tray for mounting the isolated work surface.
- Available in either type 304 stainless steel or powder coated steel.
- Work surface not included.
- Ships assembled.

Typical Non-Isolated 1″ Thick Work Surface
For 22″ & 28″ Deep Tables



Typical Inner Isolated 1″ Thick Work Surface
For 22″ & 28″ Deep Tables



- Work surface shown with 1″ overhang on all sides for freestanding installations.
- When in an elevation of casework, adjust overhang as needed.

STEEL TABLES

Construction Specifications For Steel: TAC, TAA, TAB, TCC, TCB, TCE Tables

Construction: All tables and sizes are supplied with lower "H" frames unless otherwise specified. All legs are 2" x 2", 16 gauge steel tubing. All lower frames are 1" x 2", 16 gauge steel tubing. All legs are bolted in place. Table legs are supplied with leveling bolts and PVC boots. Tables shipped unassembled.
Load Rating: All tables are supplied with a lower "H" or "U" frame, and will support a 600lb load evenly distributed. Tables supplied without a lower "H" or "U" frame can support a 600lb load if all legs are bolted securely to the floor. (ie: seismic design).
Apron: Standard apron height is 3-3/4" high. If HU option is added, apron is 3" high.
Drawers: Drawer is 15" wide unless otherwise specified.
Hanging Cabinets: 22" deep tables will only accommodate 18" deep hanging cabinets. 28" deep tables (will accommodate 18" or 22" deep hanging cabinets. All tables manufactured to accommodate hanging cabinets have a lower "U" frame (option code HU). All tables 72" and wider that are manufactured to accommodate hanging cabinets have heavy duty upper aprons.

WOOD TABLES

Construction Specifications For Wood: TAC, TAA, TAB, TCC, TCB, TCE Tables

Construction: All tables and sizes are supplied with lower "H" frames unless otherwise specified. Frames are 3-3/4" high and 3/4" thick lumber. Legs are 2-1/8" X 2-1/8" solid lumber with 4" high shoes. Apron frames are bracketed and securely bolted together, legs are shipped unassembled (unless otherwise noted).
Load Rating: All tables are supplied with a lower "H" or "U" frame, and will support a 600lb load evenly distributed. Tables supplied without a lower "H" or "U" frame can support a 600lb load if all legs are bolted securely to the floor. (ie: seismic design).
Apron: Standard apron height is 3-3/4" high.
Drawers: Drawer is 15" wide unless otherwise specified.

Table Options	
06	One fixed shelf to create an "O" frame table (cannot be used with option HU - "U" frame table with floating rail)
17	Nylon levelers
48	Keyboard tray (replaces drawer)
49	Pin adjustable height stainless steel inserts, apply option code to sitting height tables. Legs are adjustable in 1" increments, from 28-3/4" high to 34-3/4" high (work surface not included).
87	Mobile table with locking swivel casters. Mobile tables of all sizes are supplied with a lower "H" frame, excluding mobile tables that accommodate hanging cabinets. A mobile table manufactured to accommodate hanging cabinets is specified with both options 87 and HU.
88	Mobile table with customer specified casters (provide complete specification and source for casters).
91	No lower frame (Tables may be supplied without a lower H or U frame if the table width is 48" or less, and/or the required load is 200lbs or less. All tables may be supplied without a lower "H" or "U" frame and support a 600lb load if all legs are bolted securely to the floor. (example: seismic design).
92	"U" frame style table with rear & side supports
93	Left side table legs only (no right side supports)
94	Right side table legs only (no left side supports)
95	Front table legs only (no back leg supports)
BA	Bolt adjustable height legs with stainless steel inserts
BAP	Bolt adjustable height legs with powder coated steel inserts
C33	Mobile table with 330lb leveling casters. Mobile tables of all sizes are supplied with a lower "H" frame, excluding mobile tables that accommodate hanging cabinets. A mobile table manufactured to accommodate hanging cabinets is specified with both options C33 and HU.
C66	Mobile table with 660lb leveling casters. Mobile tables of all sizes are supplied with a lower "H" frame, excluding mobile tables that accommodate hanging cabinets. A mobile table manufactured to accommodate hanging cabinets is specified with both options C66 and HU.
HU	"U" frame table with floating rail to hang cabinets on tables without drawers (TAC, TCC)
OL	Use when ordering a table with drawers to match cabinets with Architectual Overlay Design
WA	Welded table assembly
WF	Wood fronts - see specifications

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QUALITY BY DESIGN

TABLE OPTIONS

Table Option Code Availability

Option Code	STEEL WELDED TABLES			STEEL BOLTED TABLES			WOOD BOLTED TABLES			MISCELLANEOUS TABLES			
	STA	TDC	TDA	TAC & TCC	TAA,TCB & TCE	TAB	TAC & TCC	TAA,TCB & TCE	TAB	ACT	ACC	SCT	TAH
06	Std	●	●	●	●	●	●	●	●	-	●	-	-
17	-	●	●	●	●	●	●	●	●	●	-	●	●
48	-	●	●	-	●	●	-	●	●	●	●	●	●
49	-	●	Std	●	●	●	●	●	●	-	-	-	Std
87	●	●	●	●	●	●	●	●	●	●	-	●	-
88	●	●	●	●	●	●	●	●	●	●	●	●	-
91	-	-	-	●	●	●	●	●	●	-	-	-	●
92	-	-	Std	●	●	●	●	●	●	-	Std	-	●
93	-	-	-	●	●	●	●	●	●	-	-	-	-
94	-	-	-	●	●	●	●	●	●	-	-	-	-
95	-	-	-	●	●	●	●	●	●	-	-	-	-
BA	-	●	●	●	●	●	●	●	●	-	-	-	●
BAP	-	●	●	●	●	●	●	●	●	-	-	-	●
C33	●	●	●	●	●	●	●	●	●	-	-	-	-
C66	●	●	●	●	●	●	●	●	●	-	-	-	-
HU	-	●	Std	●	-	-	-	-	-	-	Std	-	-
OL	-	-	-	-	●	●	-	-	-	-	-	-	-
OLP	-	-	-	-	-	-	●	●	●	-	-	-	-
WA	-	Std	Std	●	●	●	-	-	-	-	Std	-	-
WF	-	-	-	-	●	●	-	-	-	-	-	-	Std

Std Option is standard for this item (option code not required)
● Valid option for this item
- Not a valid option for this item

Item No. 052

SECTION 238219 - FAN COIL UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Division 23 Section "Common Work Results for Mechanical”

1.2 SUMMARY

A. Section includes fan coil units and accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rated capacities, dimensions, operating characteristics, and furnished specialties and accessories.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fan coil units to include in emergency, operation, and maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish 1 spare filter for each filter installed.

1.6 QUALITY ASSURANCE

A. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

B. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Factory-packaged and -tested units rated according to AHRI 440, ASHRAE 33, and UL 1995.

1.7 COORDINATION

A. Coordinate layout and installation of fan coil units and suspension system components with other construction that penetrates or is supported by ceilings, including light fixtures, HVAC equipment, fire-suppression-system components, structural steel, partition assemblies, and other construction.

B. Units must be installed with proper service access.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carrier
2. Daikin
3. Greenheck
4. Titus.
5. Trane
6. YORK; a Johnson Controls company.
7. Williams
8. Multi-Aqua

2.2 GENERAL

A. Provide elastomeric or spring vibration hangers and flexible duct connections.

B. Fancoils shall be 4-pipe, with separate heating and cooling coils.

2.3 CEILING CASSETTE FANCOIL UNITS

A. General:

1. Indoor, downward discharge 4-pipe low-profile in-ceiling fan coil. Units shall come complete with cooling coil, hot water coil, fan, fan motor, piping connectors, electrical controls, condensate pump, and hanging brackets.
2. Units shall be certified by UL (Underwriters Laboratories).

B. Unit Cabinet:

1. Cabinet shall be constructed of galvanized sheet steel. Cabinet shall have filter tracks and cleanable filters which shall be accessible from below. Adjacent room cooling to be provided by a simple knockout in the cabinet side panel, and cabinet shall have provisions to accommodate a limited amount of ductwork, if desired.

2. Fan shall be a centrifugal, direct-drive blower type with air intake in center of the unit and discharge on the perimeter. Air louvers shall be adjustable for 2, 3 or 4-way discharge. Air outlet vanes shall be fully insulated aluminum to prevent condensation from forming. Vanes shall be manually adjustable.
3. Fascia shall be constructed of high impact polystyrene.
4. Insulation and adhesive shall meet NFPA-90A (National Fire Protection Association) requirements for flame spread and smoke generation. Insulation shall be rated to UL94 VO.

C. Coils:
1. Coils shall have ½-in. copper tubes, aluminum fins bonded to the tubes by mechanical expansion, and a working pressure of 325 psig.
2. Each coil shall have a manual air vent on upper connection, a drain port on the lower connection.
3. Each coil shall be factory tested for leakage at 325 psig air pressure with coil submerged in water.

D. Motors: Motor shall be enclosed and with thermal overload protection, sealed for life lubricated bearings, and external rotor allowing good heat dissipation. Fan motor shall be 3-speed.

E. Controls: Controls shall be 24V. A normally closed float control shall be in the condensate sump to shut unit down in case of pump malfunction. All equipment wiring shall comply with NEC (National Electrical Code) requirements.

F. Alarm Interlock Relay: Alarm interlock relay shall include a relay for unit failure notification. Normally open/normally closed contacts shall be provided.

G. Filters: Unit shall have a filter track with factory-supplied cleanable filters or MERV 8 disposable filters.

2.4 HORIZONTAL CONCEALED FAN COIL UNITS

A. The unit includes a chassis, HW & CHW coils, fan wheel, fan casing, fan board and motor(s). Units also include a noncorrosive, ABS main drain pan, positively sloped in every plane and insulated with closed-cell insulation. Horizontal units and all units with standard piping packages also include a thermoplastic auxiliary drain pan. Steel parts exposed to moisture shall be galvanized. The fan board assembly and both drain pans shall be easily removable. The fan board assembly includes a quick disconnect motor plug. The chassis construction is 18-gauge galvanized steel, and continuous throughout the unit. The unit is acoustically and thermally insulated with closed-cell insulation. All panels shall be made rigid by channel forming.

B. Unit Finish All cabinet parts and exposed recessed panels shall be cleaned, bonderized, phosphatized, and painted with a baked powder finish available in six decorator colors. Standard finish meets ASTM B117 specifications (salt spray test).

C. The galvanized metal fan wheels shall be centrifugal forward-curved and double-width. Fan wheels and housings shall be corrosion resistant. Fan housing construction is formed sheet metal. Low vertical units utilize an aluminum tangential wheel design.

D. Motors shall be brushless DC (BLDC)/electronically commutated motors (ECM) factory-programmed and run-tested in assembled units. The motor controller is mounted in a touch-safe

control box with a built-in integrated user interface and LED tachometer. If adjustments are needed, motor parameters can be adjusted through momentary contact switches accessible without factory service personnel on the motor control board. Motors shall soft-ramp between speeds to lessen the acoustics due to sudden speed changes. Motors can be operated at three speeds or with a field-supplied variable speed controller. The motor will choose the highest speed if there are simultaneous/conflicting speed requests. All motors have integral thermal overload protection with a maximum ambient operating temperature of 104°F and shall be permanently lubricated. Motors shall be capable of starting at 50 percent of rated voltage and operating at 90 percent of rated voltage on all speed settings. Motors can operate up to 10 percent over voltage.

E. Provide a control interface intended to be compatible with the BAS system. The control box shall contain a relay board which includes a line voltage to 24-volt transformer. All end devices shall be wired to a low-voltage terminal block and shall be run-tested, so the only a power connection and thermostat connection is needed to commission the unit.

F. Water coils shall be proof-tested at 300 psig (air) and leak-tested at 100 psig (air under water). Maximum main coil working pressure is 300 psig. Maximum entering water temperature is 200°F. Tubes and u-bends shall be 3/8-inch OD copper. Fins shall be aluminum and shall be mechanically bonded to the copper tubes. Coil stub-outs shall be 5/8-inch OD copper tubing. Hot water maximum working pressure is 300 psig, and the maximum entering water temperature is 200°F. The reheat coils shall be constructed of single circuit 5/8-inch copper tubes with aluminum fins. Piping connections shall be expanded to accept standard copper tubing 5/8-inch OD.

G. Filters shall be concealed from sight and easily removable. Filters shall be located behind an integral access door. Filters shall be 1-inch MERV 8.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, to receive fan coil units for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for piping and electrical connections to verify actual locations before fan coil unit installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install fan coil units level and plumb.

B. Install fan coil units to comply with NFPA 90A.

C. Suspend fan coil units from structure with elastomeric hangers.

D. Install new filters in each fan coil unit within two weeks after Substantial Completion.

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties. Specific connection requirements are as follows:

1. Install piping adjacent to machine to allow service and maintenance.
2. Connect piping.
3. Connect condensate drain to indirect waste. Install condensate trap of adequate depth to seal against fan pressure. Install cleanouts in piping at changes of direction.
4. Carefully insulate cold surfaces, and provide a complete vapor barrier to prevent condensation.

B. Connect supply-air and return-air ducts to fan coil units with flexible duct connectors.

C. Ground equipment according to Division 26.

D. Connect wiring according to Division 26.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

B. Remove and replace malfunctioning units and retest as specified above.

C. Prepare test and inspection reports.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain fan coil units.

END OF SECTION 238219

Item No. 055

SECTION 01 91 13

GENERAL COMMISSIONING REQUIREMENTS

PART 1 GENERAL

PART 2 SUMMARY

A. Section Includes:
1. Commissioning description.
2. Submittals.
3. Commissioning services.
4. Commissioning responsibilities.
5. Commissioning meetings.
6. Commissioning reports.
7. Test equipment.
8. Verification check and startup procedures.
9. Functional performance test procedures.
10. Function performance test methods.
11. Deficiencies and test approvals.
12. Demonstration.

B. Related Sections:
1. Division 22 – Plumbing: Plumbing systems commissioning requirements.
2. Division 23 - HVAC Commissioning: Mechanical systems commissioning requirements.
3. Division 26 – Electrical: Electrical systems commissioning requirements.

2.2 REFERENCES

A. Associated Air Balance Council:
1. AABC - AABC Commissioning Guideline.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
1. ASHRAE Guideline 1 - The HVAC Commissioning Process.

C. National Environmental Balancing Bureau:
1. NEBB - Procedural Standards for Building Systems Commissioning.

2.3 COMMISSIONING DESCRIPTION

A. Commissioning: Systematic process of ensuring systems perform interactively per design intent and Owner’s operational needs. Commissioning process encompasses and coordinates system documentation, equipment startup, control system calibration, testing and balancing, performance testing and training, and verification of actual performance.

B. Commissioning Intent:
1. Verify equipment and systems are installed in accordance with manufacturer’s instructions, industry accepted minimum standards, and Contract Documents.
2. Verify equipment and systems receive adequate operational checkout by Contractor.

3. Verify and document proper performance of equipment and systems.
4. Verify complete operation and maintenance documentation is delivered to Owner.
5. Verify Owner's operating personnel are adequately trained.

C. Equipment and Systems to Be Commissioned: Refer to Division 22 – Plumbing, Division 23 – HVAC and Division 26 - Electrical for equipment and system lists.

D. Commissioning does not relieve Contractor of responsibility to provide finished and fully functioning Project.

E. Commissioning Process Overview and General Order of Commissioning Tasks:
1. Commissioning begins with initial commissioning meeting.
2. Conduct progress commissioning meetings throughout construction, to plan, scope, coordinate, schedule future activities and resolve problems.
3. Equipment documentation is submitted to Commissioning Authority during normal submittals, with detailed start-up procedures.
4. Commissioning Authority works with Contractor and equipment and system installers to develop startup plans and startup documentation formats, including verification checklists to be completed by installers, during verification check and startup process.
5. In general, checkout and performance verification proceeds from simple to complex; from component level to equipment to systems and intersystem levels with verification checklists being completed before functional testing.
6. Equipment and system installers execute and document verification checklists and perform verification check and startup. Commissioning Authority documents checklists and startup were completed according to approved plans.
7. Commissioning Authority develops specific equipment and system functional performance test procedures. Contractor and equipment and system installers review procedures.
8. Equipment and system installers execute procedures under direction of, and documented by Commissioning Authority.
9. Items of non-compliance in material, installation or setup are corrected at Contractor's expense and system retested.
10. Commissioning Authority reviews operation and maintenance documentation for completeness.
11. Commissioning is completed before Substantial Completion.
12. Commissioning Authority reviews, approves and coordinates training provided by equipment and system installers and verifies training was completed.
13. Deferred testing is conducted, as specified.

2.4 SUBMITTALS

A. Section 01 60 00 - Submittal Procedures: Requirements for submittals.

B. Qualifications Data: Submit the following prior to start of Work:
1. Commissioning Authority firm name, address, and telephone number, and name of responsible officer.
2. Name of full time individualassigned to Project and assuming role as Commission Authority.
3. Detailed description of 3similar commissioning projects completed by full time individual assigned to Project within past [5] fiveyears. Include names and telephone numbers of owner's project manager and general contractor's site superintendent.

2.5 COMMISSIONING SUBMITTALS

A. Furnish one copy of Contract Documents including addenda, change orders, requests for interpretation, and meeting minutes, to Commissioning Authority.

B. Furnish one copy of submittals directly to Commissioning Authority for review and approval in accordance with procedures specified in Section 01330.
   1. Make submittals for each piece of equipment or system indicated to be commissioned.
   2. Make submittals to Commissioning Authority concurrent with submittals to Architect/Engineer.
   3. Distribute one copy of approved submittals to Commissioning Authority.

C. Furnish one copy of preliminary operation and maintenance data manuals to Commissioning Authority for each piece of equipment or system indicated to be commissioned.
   1. Submit required manuals within 30 thirty days after submittals for each piece of equipment or system required under Section 01 60 00 are approved.

D. Make additional submittals requested by Commissioning Authority for each piece of equipment or system indicated to be commissioned. Incorporate requested submittal information into related operation and maintenance manuals. Include the following:
   1. Manufacturer's printed detailed installation and start-up, operating, troubleshooting and maintenance procedures.
   2. Equipment performance curves.
   3. Factory test reports.
   4. Full sequence of operation and control diagrams.
   5. Proposed testing, adjusting, and balancing procedures.
   6. Complete warranty information, with Owner responsibilities to keep warranty in force identified.
   7. Lists of installation and checkout materials shipped with equipment.
   8. Manufacturer's field checkout forms to be used by factory or field technicians.
   9. Other documentation necessary for commissioning process.

E. Furnish one copyof verification check and startup plan to Commissioning Authority for review and approval. Include the following as minimum:
   1. Commissioning Authority's verification checklists with party responsible for each item indicated.
   2. Manufacturer’s standard startup procedures copied from installation manuals.
   3. Manufacturer’s standard field checkout sheets.
   4. Supplemental procedures and checklists prepared by equipment and system installers to accommodate Project conditions.
   5. Sensor and actuator calibration procedures.
   6. Include boxes or lines for recording and documenting checking and inspections of each procedure and summary statement with signature block at end of plan.

F. Submit written training plan to Commissioning Authority for review and approval prior to conducting training including the following:
   1. Equipment included in training session.
   2. Intended audience.
   3. Location of training.
   4. Objectives.
   5. Subjects covered.
   6. Duration of training on each subject.
   7. Instructor for each subject.

8. Instructional methods to be used.

G. Commissioning Authority will review and approve submittals for conformance to Contract Documents as related to commissioning process for primary purpose of aiding development of functional testing procedures and secondarily to verify compliance with equipment specifications.

2.6 CLOSEOUT SUBMITTALS

A. Section 01 78 00 – Project Closeout: Requirements for submittals.

B. Operation and Maintenance Data: Submit operation and maintenance manuals as specified in individual equipment and system specifications.
1. Submittals made to Commissioning Authority do not constitute compliance with operation and maintenance manual documentation.

C. Commissioning Record: Commissioning Authority will submit one copyof commissioning record for inclusion in operation and maintenance manuals. Furnish records in following format, arranged by system, with each part separated by tabbed flyleafs:
1. Commissioning Plan.
2. Final Commissioning Report.
3. System 1: Provide the following separated by tabbed flyleafs:
   a. Design narrative and criteria, sequences, approvals.
   b. Startup plan and report, approvals, corrections, and blank verification checklists. Separate data for each equipment type with colored separators.
   c. Completed, functional tests, trending and analysis, approvals and corrections, training plan, record and approvals, blank functional test forms, and recommended recommissioning schedule.
4. System 2: As specified for System 1.

D. Final Commissioning Report: Commissioning Authority will submit one copy of final commissioning report including the following:
1. Executive summary with list and roles of participants, brief Project description, overview of commissioning and testing scope, and general description of testing and verification methods.
2. For Each Piece of Commissioned Equipment: Include statement regarding compliance with Contract Documents in the following areas:
   a. Equipment specifications.
   b. Equipment installation.
   c. Functional performance and efficiency.
   d. Equipment documentation and design intent.
   e. Operator training.
3. Include recommendations for improvement to equipment or operations, future actions, and commissioning process changes.
4. List outstanding deficiencies referenced to specific functional test, inspection, trend log, or other record where deficiency is documented.
5. Include brief description of verification method used, observations and conclusions from testing for each commissioned piece of equipment and system.

2.7 QUALITY ASSURANCE

A. Perform Work in accordance with ASHRAE Guideline 1

B. Perform Work in accordance with State of New Hampshire Department of Administrative Services, Division of Public Works Design and Construction Design Guidelines; Current Edition.

2.8 QUALIFICATIONS

A. Commissioning Authority Firm: Company specializing in performing work of this section with minimum (10) Ten years documented experience.
   1. Responsible for successfully commissioning facilities of similar complexity and systems within the past [5] Five years.
   2. Independent of Owner, Architect/Engineer, Contractor.

B. Commissioning Authority: Individual employed by Commissioning Authority firm specializing in performing work of this section with minimum (10) Ten years documented experience.
   1. Licensed as Professional Engineer, with mechanical,electrical, and plumbing engineering specialty.
   2. Experienced in operation and troubleshooting mechanical,electrical, plumbing systems, energy management control systems and lighting controls systems.
   3. Knowledgeable in test and balance of air and water systems.
   4. Experienced in monitoring and analyzing system operation using energy management control system trending or stand-alone data logging equipment.
   5. Excellent verbal and written communication skills, highly organized and able to work with both management and installers.

2.9 COMMISSIONING SERVICES

A. Employ and pay for services of an independent firm as Commissioning Authority acceptable to Owner to perform specified commissioning.

2.10 COMMISSIONING RESPONSIBILITIES

A. Responsibilities indicated for Owner, Architect/Engineer, and Commissioning Authority are provided only to clarify commissioning process.

B. Architect/Engineer Responsibilities:

   1. Perform site observation of each system just before system startup.
   2. Furnish design narratives and sequences documentation requested by Commissioning Authority.
   3. Clarify operation and control of commissioned equipment when specifications, control drawings, or equipment documentation are not sufficient for writing detailed testing procedures.
   4. Coordinate resolution of design issues affecting system performance identified during commissioning.
   5. Coordinate resolution of system deficiencies identified during commissioning, according to Contract Documents.
   6. Prepare and submit final design intent documentation, reflecting installed conditions, for inclusion in operation and maintenance manuals.
   7. Review and approve operation and maintenance manuals.

C. Commissioning Authority Responsibilities:

1. Basic Responsibilities:
   a. Coordinate, direct, and approve commissioning work.
   b. Develop and coordinate execution of commissioning plan. Revise commissioning plan to suit Project conditions.
   c. Schedule commissioning work with Contractor for inclusion in Project schedule.
   d. Plan and conduct commissioning meetings.
   e. Request and review commissioning submittals required to perform commissioning tasks.
   f. Write and distribute verification tests and checklists.
   g. Develop verification check and startup plan in cooperation with Contractor and equipment and system installers.
   h. Write functional performance test procedures in cooperation with Contractor and equipment and system installers.
   i. Review test and balance execution plan.
   j. Attend selected Project progress and preinstallation meetings. Review meeting minutes. Resolve potential conflicts with commissioning activities.
   k. Observe equipment and system installations.
   l. Document equipment and systems are installed and perform in accordance with design intent and Contract Documents.
   m. Notify Owner, and Architect/Engineer of deficiencies.
   n. Coordinate and supervise required seasonal or deferred testing and deficiency corrections.
   o. Oversee and approve content and adequacy of Owner's personnel training.
   p. Review and approve operation and maintenance manuals.
   q. Compile commissioning record and testing data manual.
   r. Provide final commissioning report.
2. Detailed Responsibilities:
   a. Witness and document each piping, ductwork, electrical system testing, cleaning, and flushing. Include documentation in operation and maintenance manuals.
   b. Approve verification tests and checklist completion by reviewing verification checklist reports, site observation, and spot checking.
   c. Approve systems startup by reviewing startup reports and site observation.
   d. Oversee functional testing of control system. Approve control system for use for test and balance operations.
   e. Approve air and water systems balancing by reviewing completed reports, site observation, and spot testing.
   f. Analyze functional performance trend logs and monitor data to verify performance.
   g. Coordinate, witness and approve manual functional performance tests performed by equipment and system installers.
      1) Coordinate retesting until satisfactory performance is achieved.
      2) Perform actual functional testing on equipment as specified in applicable Divisions.
   h. Maintain deficiency and resolution log and separate testing record. Submit progress reports and test results with recommended actions to Owner.
   i. Review equipment warranties to ensure Owner's responsibilities are defined.

j. Return to site minimum [2] two months before expiration of warrantyperiod.
   1) Review current equipment and system operation and condition of outstanding issues related to original and seasonal commissioning with Owner's personnel.
   2) Interview Owner's personnel to identify problems or concerns regarding equipment and system operation.
   3) Make suggestions for improvements and for recording changes in operation and maintenance manuals.
   4) Identify deficiencies covered by warranty or original construction contract.
   5) Assist Owner's personnel to develop reports, documents and requests for services to remedy outstanding problems.

3. Commissioning Authority may not:
   a. Release, revoke, alter, or enlarge on requirements of Contract Documents.
   b. Approve or accept any portion of the Work.
   c. Assume duties of Contractor or Architect/Engineer.
   d. Stop the Work.

D. Owner Responsibilities:
1. Arrange for Owner's personnel to attend commissioning activities and training sessions according to commissioning plan.
2. Approve commissioning work completion.
3. Ensure seasonal or deferred testing and deficiency issues are addressed.

E. Contractor Responsibilities:
1. Include requirements for commissioning submittal data, operation and maintenance data, commissioning tasks and training in each purchase order and subcontract for equipment and systems indicated to be commissioned.
2. Facilitate coordination of commissioning work by Commissioning Authority.
3. Attend commissioning meetings.
4. Cooperate with Commissioning Authority, and provide access to the Work and to manufacturers' facilities.
5. Require equipment and system installers to execute test to review and provide comments on functional test procedures.
6. Require manufacturers to review commissioning test procedures for equipment installed by manufacturer.
7. Furnish proprietary test equipment required by manufacturers to complete equipment and system tests.
8. Provide temporary facilities as required for Commissioning Authority's exclusive use for documentation and instrument storage and preparation of reports.
9. Furnish qualified personnel to assist in completing commissioning.
10. Ensure equipment and system installers execute commissioning responsibilities according to Contract Documents and schedule.
11. Ensure equipment and system installers execute seasonal and deferred functional performance testing, witnessed by Commissioning Authority.
12. Ensure equipment and system installers correct deficiencies and make necessary adjustments to operation and maintenance manuals and Record Documents for issues identified in seasonal testing.

2.11 COMMISSIONING MEETINGS

A. Section 01 30 00 - Administrative Requirements: Progress meetings.

B. Commissioning Authority will make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings.

C. Initial Commissioning Meeting:
   1. Commissioning Authority will schedule meeting within 60days after Notice of Award.
   2. Attendance Required: Commissioning Authority, Owner, Architect/Engineer, Contractor, subcontractors, test, adjust and balance agency. Require attendance by installers of the following equipment and systems indicated to be commissioned including:
      a. Mechanical equipment and systems.
      b. Plumbing equipment and systems.
      c. Electrical equipment and systems.
      d. Temperature controls equipment and systems.
   3. Agenda:
      a. Designation of personnel representing parties for commissioning activities.
      b. Review commissioning process and responsibilities.
      c. Review commissioning plan development procedures.
      d. Review required commissioning submittals.
      e. Present initial commissioning schedule.

D. Progress Meetings:
   1. Commissioning Authority shall attend the bi monthly project meetings upon the start of associated work until which time such work is complete.
   2. Agenda:
      a. Commissioning summary on progress of work.
      b. Review of Commissioning Reports.

E. Commissioning Authority will record meeting minutes and distribute copies within two days after meeting to participants and those affected by decisions made.

2.12 COMMISSIONING REPORTS

A. Commissioning Authority Reports: Submit reports regularly to Owner, Architect/Engineer, and Contractor. Include the following.
   1. Progress reports.
   2. Scheduling changes.
   3. Observation reports of specific commissioning activities.
   4. Testing progress and approvals.
   5. Deficiency and deficiency resolution reports.

B. Commissioning Authority Functional Performance Test Procedures: Develop test procedures including forms with following information. Include completed documentation in operation and maintenance manuals.
   1. System and equipment or component names.
   2. Equipment location and identification number.
   3. Unique test identification number, and reference to unique verification checklist and startup documentation identification numbers for piece of equipment.
   4. Date.
   5. Project name.

6. Participating parties.
7. Copy of specification section describing test requirements.
8. Copy of specific sequence of operations or other specified parameters being verified.
9. Formulas used in calculations.
10. Required pre-test field measurements.
11. Instructions for setting up test.
12. Special cautions, alarm limits, and safety concerns.
13. Specific step-by-step procedures to execute test, in clear, sequential and repeatable format.
14. Acceptance criteria of proper performance with Yes / No check box to allow for marking whether or not proper performance of each part of test was achieved.
15. Section for comments.
16. Signatures and date block for Commissioning Authority.

2.13 SEQUENCING

A. Requirements for sequencing.

B. Sequence work to complete commissioning, except for functional testing and Owner's personnel training, before Substantial Completion.

C. Sequence work to achieve Functional Completion before Final Completion. Complete the following for each piece of equipment and system indicated to be commissioned to achieve Functional Completion:
1. Complete and sign startup and verification checklist documentation.
2. Submit trend log data.
3. Submit final approved test and balance report.
4. Complete functional testing.
5. Complete training of Owner personnel.
6. Submit approved operation and maintenance data manuals.
7. Correct identified deficiencies or obtain approval by Owner to exclude deficiencies from Functional Completion.

D. For equipment or systems requiring seasonal operation, perform commissioning for other season within sixmonths of Substantial Completion.

2.14 SCHEDULING

A. Schedule work to allow adequate time for commissioning activities.

B. Identify commissioning milestones, activities, and durations on Project schedule.
1. Identify the following for each piece of equipment and system including:
   a. Operation and maintenance manual submittal.
   b. Verification check and startup.
   c. Functional performance test.
   d. Functional completion.
   e. Demonstration and training sessions.
   f. Commissioning completion.

3.1 TEST EQUIPMENT

A. Testing Equipment: Calibrated within last year; of sufficient quality and accuracy to test and measure system performance within the following tolerances unless otherwise specified for individual equipment or systems.
   1. Temperature Sensors and Digital Thermometers: 0.5 degrees F (0.25 degrees C) accuracy and plus or minus 0.1 degrees F (0.05 degrees C) resolution.
   2. Pressure Sensors: Accuracy of plus or minus 2.0 percent of measured value range.

B. Recalibrate test equipment according to manufacturer's recommended intervals and when dropped or damaged.
   1. Affix calibration tags to test equipment or furnish certificates upon request.

C. Equipment Furnished by Contractor and Remaining Property of Contractor:
   1. Standard testing equipment required to perform verification check and startup and required functional performance testing.
   2. Two way radios for personnel performing commissioning.

D. Equipment furnished by Commissioning Authority and remaining property of Commissioning Authority:
   1. Data logging equipment and software.

PART 4 EXECUTION

4.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify equipment and systems are installed in accordance with individual specification sections.

C. Verify utility and power connections are complete and services operational.

4.2 VERIFICATION CHECK AND STARTUP PROCEDURES

A. Notify Commissioning Authority and schedule verification check and startup activities with each party required to complete verification check and startup minimum [4] Four weeks in advance.

B. Allow Commissioning Authority to witness verification check and startup.
   1. Primary Equipment: Commissioning Authority will witness procedures for each piece of equipment. For multiple units, Commissioning Authority will witness procedures on 20 percent, but not less than [4]four, of each type unit.
   2. Secondary Equipment: Commissioning Authority will witness sampling on 20 percent, but not less than [4] Four, of each type unit.

C. Verification Check and Startup:
   1. Perform verification check and startup in accordance with approved verification check and startup plan.

2. Complete entire plan for each piece of equipment or system indicated to be commissioned.
3. Complete each procedure in sequence performed by party assigned to each procedure.
4. Record completion of each procedure. Indicate results of procedure where required. Sign and date plan by individual performing procedure.
5. Identify items not completed successfully.
6. Sign and date plan indicating completion of entire plan.
7. Submit executed plan to Commissioning Authority within [2]Two days of completion.

D. Deficiencies and Approvals:
1. Commissioning Authority will review verification check and startup reports and issue deficiency report or approval.
2. Correct deficiencies and resubmit updated verification check and startup report with statement indicating corrections made for Commissioning Authority approval.
3. Repeat process until verification check and startup report is approved.
4. Costs for incomplete verification check and startup items that later cause deficiencies or delays during functional tests will be charged to party responsible for incomplete item.

4.3 FUNCTIONAL PERFORMANCE TEST PROCEDURES

A. Complete the following before performing functional tests:
1. Verification check and startup.
2. Control system testing with approval by Commissioning Authority for use for test and balance operations.
3. Air system balancing and water system balancing.

B. Notify Commissioning Authority of completion of verification check and startup activities.

C. Commissioning Authority will direct, witness, and document results of functional performance tests.

D. Conduct functional performance tests as specified within applicable Divisions.

E. Demonstrate each piece of equipment and system is operating according to documented design intent and Contract Documents.
1. Conduct testing proceeding from components to subsystems, to systems.
2. Bring equipment and systems to condition capable full dynamic operation.
3. Verify performance of individual components and systems.
4. Verify performance of interactions between systems.
5. Identify and correct areas of deficient performance.

F. Operate each piece of equipment and system through each specified mode of operation including seasonal, occupied, unoccupied, warm up, cool down, partial load and full load conditions.
1. Verify each sequence in sequences of operation.
2. Test for proper responses to power failure, freezing, overheating, low oil pressure, no flow, equipment failure, and other abnormal conditions.

4.4 FUNCTIONAL PERFORMANCE TEST METHODS

A. Perform testing and verification by using manual testing or by monitoring performance and analyzing results using control system trend log capabilities or by stand-alone data loggers as specified for each piece of equipment or system.
   1. Commissioning Authority may require alternate or additional method, other than specified method.
   2. Commissioning Authority will determine test method when method is not specified.

B. Simulated Conditions: Simulating conditions, not by overwritten values, is permitted. Timing tests to use real conditions is encouraged wherever practical.

C. Overwritten Values: Overwriting sensor values to simulate conditions may be used with caution and avoided when possible.

D. Simulated Signals: Using signal generator to create simulated signals to test and calibrate transducers automatic temperature controls is generally recommended over using sensors as signal generators with simulated conditions or overwritten values.

E. Altering Setpoints: Rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints to test specific sequence is acceptable. Reset setpoint after completing test.

F. Indirect Indicators: Using indirect indicators for responses or performance is permitted only after visually and directly verifying and documenting indirect readings through control system representing actual conditions and responses over tested parameter range.

G. Perform each function and test under conditions simulating actual conditions as close as is practically possible.
   1. Provide materials, system modifications, and other things necessary to produce flows, pressures, temperatures, and other responses to execute test according to specified conditions.
   2. At completion of test, return modified equipment and systems to pretest condition.

4.5 DEFICIENCIES AND TEST APPROVALS

A. Deficiencies:
   1. Commissioning Authority will record and report deficiencies to Owner.
   2. Minor deficiencies may be corrected during tests at Commissioning Authority's discretion. Deficiency and resolution will be documented on procedure form.
   3. Failure to attend scheduled verification check, startup, or functional performance test will be considered deficiency.
   4. When deficiency is identified, Commissioning Authority will discuss issue with party executing test.
      a. When party executing test accepts responsibility to correct deficiency:
         1) Commissioning Authority documents deficiency and executing party's response.
         2) Commissioning Authority submits deficiency report to Owner, Contractor, and party executing test.
         3) Party executing test corrects deficiency, signs statement of correction on deficiency form certifying equipment is ready retesting and submits form to Commissioning Authority.

4) Commissioning Authority reschedules test and test is repeated until satisfactory performance is achieved.

b. When party executing test disputes deficiency or responsibility for deficiency:
   1) Commissioning Authority documents deficiency and executing party's response.
   2) Commissioning Authority submits deficiency report to Owner, Contractor, and party executing test and party believed to be responsible for deficiency.
   3) Commissioning Authority negotiates resolution with parties involved and refers continuing disputes to Architect/Engineer for resolution in accordance with Contract Documents.
   4) Commissioning Authority documents resolution process.
   5) When resolution is decided, appropriate party corrects deficiency, signs statement of correction on deficiency form certifying equipment is ready for retesting and submits form to Commissioning Authority.
   6) Commissioning Authority reschedules test and test is repeated until satisfactory performance is achieved.

B. Retesting Costs:
   1. When verification check and startup or functional performance test deficiency is discovered requiring rescheduling or retesting:
      a. Additional testing compensation will be the responsibility of the Contractor.

C. Provide written report to Commissioning Authority before each scheduled commissioning meeting concerning status of each deficiency. Include explanations of disagreements with resolution proposals for each discrepancy.
   1. Commissioning Authority will retain original deficiency forms until end of Project.

D. Manufacturing Defects: When [10] Tenpercent, but not less than [3] Three identical pieces of equipment or equipment with only small size or capacity differences fail to perform to Contract Document requirements due to manufacturing defect, all identical units may be considered defective by Owner.
   1. Within one week of notice from Owner, examine all other identical units and record findings. Submit findings to Owner within two weeks of original notice.
   2. Within two weeks of original notification, provide signed and dated, written explanation of problem, cause of defect, and proposed solutions meeting Contract Document requirements. Include equipment submittals supporting solution.
   3. Owner will determine whether replacement or repair of all identical units is required.
   4. Install two examples of proposed solution. Owner will test installations for up to one week, before deciding solution is acceptable.
   5. Upon acceptance, replace or repair all identical items, at Contractor's expense. Extend warranty accordingly, when original equipment warranty had begun.
   6. Complete repairs or replacements with reasonable speed beginning within one week from when parts can be obtained.

E. Test Approval: Commissioning Authority notes each satisfactorily demonstrated function on functional performance test form.
   1. Commissioning Authority recommends acceptance of each test to Owner using standard form.

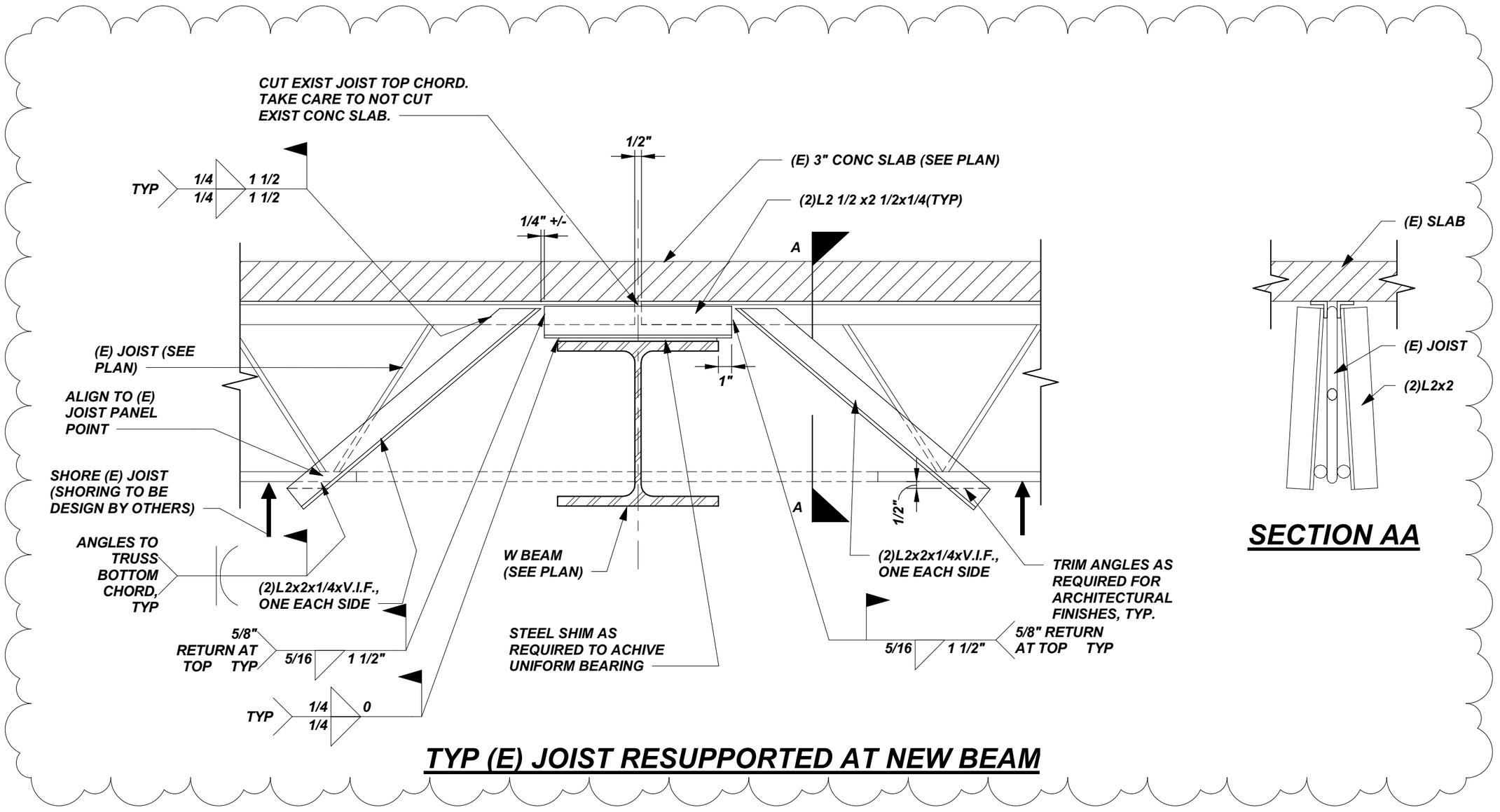
2. Owner gives final approval for each test using same form, providing signed copy to Commissioning Authority and Contractor.

4.6 DEMONSTRATION

A. Section 01 78 00 – Project Close Out: Requirements for demonstration and training.

END OF SECTION

Item No. 065



TYP (E) JOIST RESUPPORTED AT NEW BEAM

SECTION AA

REF: S5.2

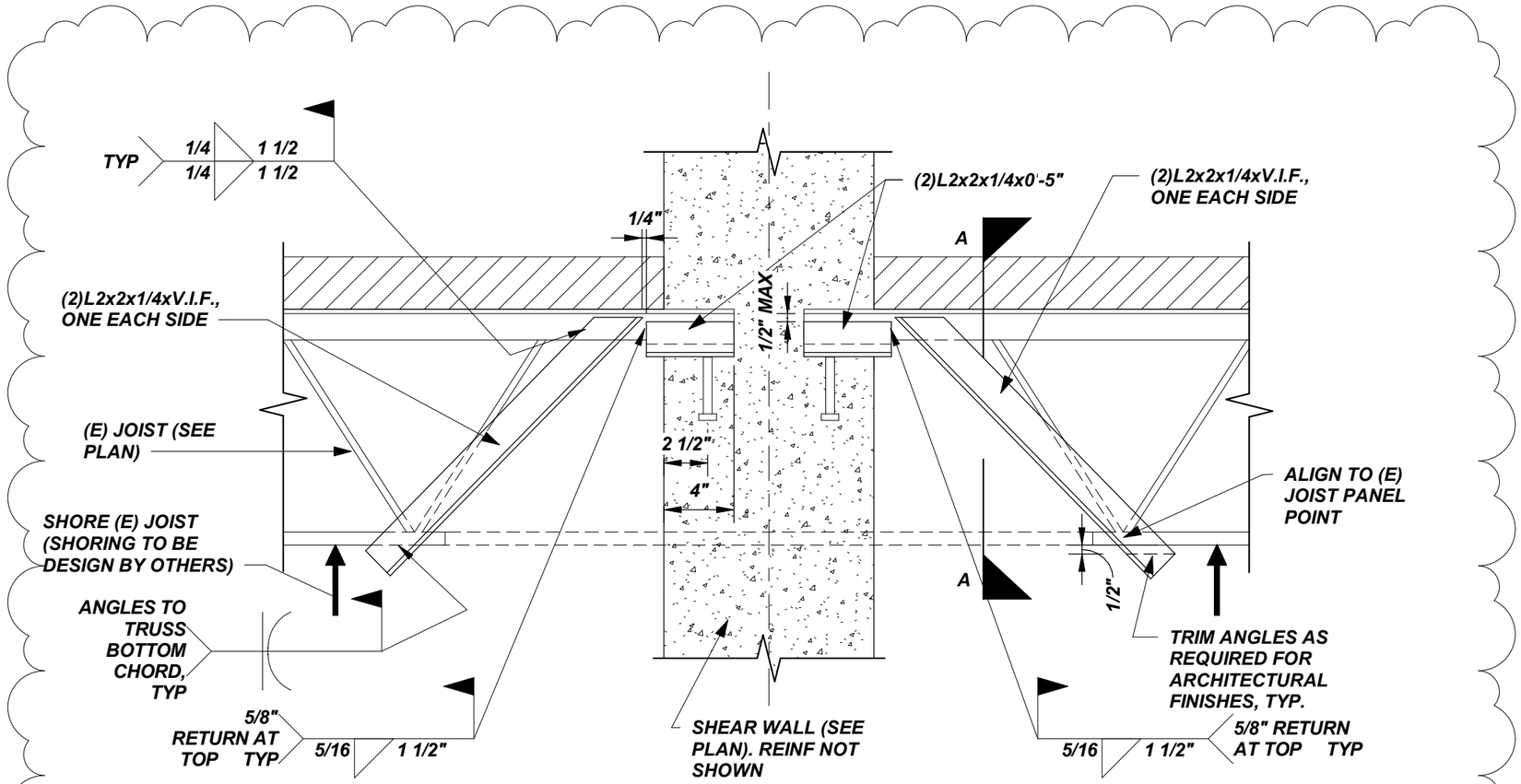
BECKER
STRUCTURAL ENGINEERS
75 York Street, Portland, Maine 04101
207.879.1838 ▪ beckerstructural.com

GREENLAW BUILDING

47 Independence Dr.
Augusta, ME 04330

Designed	Scale
CAB	AS NOTED
Drawn	Date
BSE	5/20/2019
Checked	Becker Job Number
EAR	3802.1

SKS-001a



TYP (E) JOIST RESUPPORTED AT NEW SHEARWALL

REF: S5.2

BECKER
STRUCTURAL ENGINEERS
75 York Street, Portland, Maine 04101
207.879.1838 ▪ beckerstructural.com

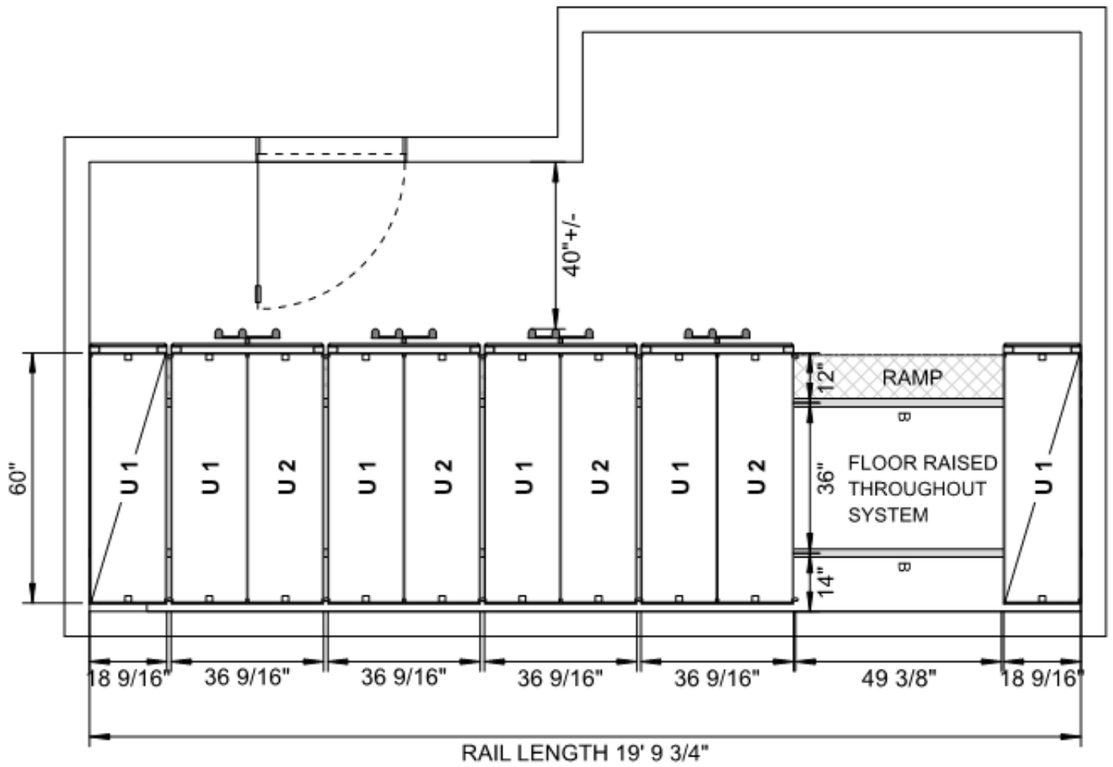
GREENLAW BUILDING

47 Independence Dr.
Augusta, ME 04330

Designed	Scale
CAB	AS NOTED
Drawn	Date
BSE	5/20/2019
Checked	Becker Job Number
CAB	3802.1

SKS-001b

Item No. 071



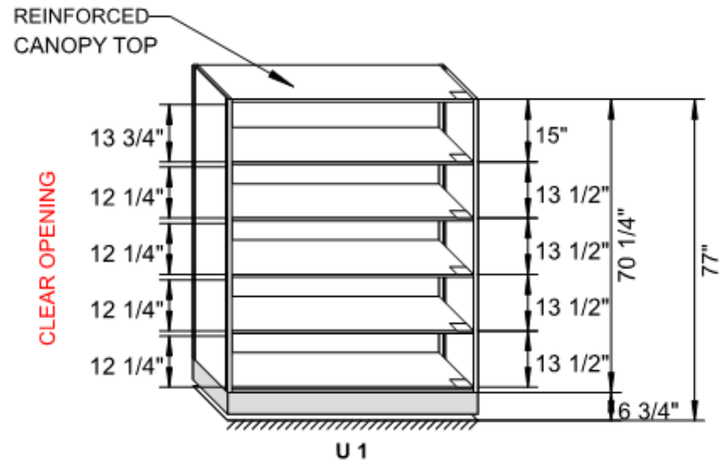
KEY

- SINGLE FACED STATIONARY SHELVING

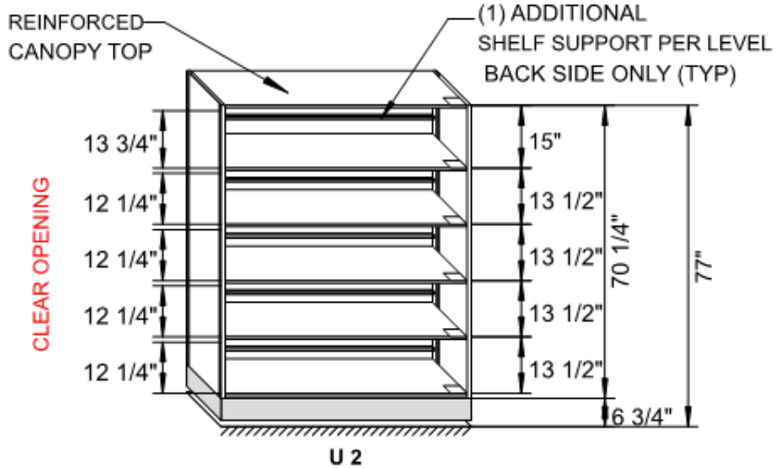
- BACK TO BACK MOBILE SHELVING

FLOOR PLAN

STATIONARY / MOBILE - 4-POST
60"W X 18"D



MOBILE - 4-POST
60"W X 18"D



FOR-CHEM 205 HIGH DENSITY STORAGE SYSTEM

PROJECT: STATE OF MAINE LABORATORIES
GREENLAW BUILDING RENOVATION

DATE: 05/22/19

PR NO: 15-074-00

SCALE: 12" = 1'-0"

ADD 3.5

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5/22/2019 2:29:09 PM

Item No. 074

Avant Garde Scientific, Inc.

Avant Garde Stainless Steel Modular Wall Systems

Product Description

Stainless steel insulated panels are manufactured to precise specifications utilizing state-of-the-art equipment designed specifically for the manufacture of high efficiency panels. The interior and exterior metal surfaces are fabricated in 18 or 20 gauges as specified. The metal is precision formed; the long side of each piece is roll formed to a 90º form with an additional 90º return for maximum strength; the end of each panel is die formed to 90 degrees. The metal panel surfaces, with gasket fitted to the end, are placed in a fixture for foaming, which is built to the exact size of the finished panel. The edges of these foaming fixtures are built to heavy aluminum extrusions, which serve to mold the foam edges to an exact tongue and groove configuration. Cam lock sets are mounted on these rail molds in order to have locks properly located in the finished panel without attachment to either interior or exterior metal surface. With metal locks in place, the temperature controlled fixtures are sealed under high pressure.

Polyurethane foam is injected into the sealed cavity by mixing two liquid components at a high pressure using a high impingement mixing process. The foam reacts chemically, expands to fill the full cavity at an even and controlled high density per cubic foot. When the reaction is complete, the foam is rigid and has a high structural strength. Panels are then removed from the fixture, cooled and combined with other panels similarly manufactured to give the specified wall panel configuration. Each panel is built to exact size and the insulating polyurethane is uniform at a density, which has been determined to be the most efficient including the panel edges.

Panels manufactured without the extensive equipment required for precision forming and molding of fully foamed-in-place panels typically require attaching wood or high density polyurethane (10 lb/cu. ft.) strips around the perimeter of the panels or by gluing metal to a core of styrene sheet stock.

Panels manufactured using either of these techniques are normally not built to the same exacting tolerance as fully foamed-in-place molded panels and are not as thermally efficient and soundproof.

Application

The Avant Garde stainless steel insulated modular wall system is used to bring separation from one lab area to another. Typically, the wall system is used to separate a working lab area from a service space. Harsh environments are typically contained in this service area. Glasswashers, cage washers and autoclaves generate tremendous amounts of heat and vapors, and these are best isolated from the lab or facility personnel. The panels and related fixtures are blended with the equipment's fascia panels in a seamless fashion. All trim work is provided as final finish.

Modular Concept

The versatile stainless steel insulated panel's modular concept offers many advantages.

- Tongue and groove sectional panels lock together quickly and simply to form virtually any desired size wall system.
- Modular panels are easily disassembled to enlarge or relocate for future requirements.
- To retain the sound deadening and thermal retention capability.

Tongue and groove panels are used in our modular constructions, assuring a tight, secure fit. PVC gaskets on the interior and exterior edge of the "tongue" rail are permanently foamed-in-place – won't pull out or "snake," forms are even panel joint. Double return bend of the metal interlocks foam and metal for added strength and rigidity.

The modular panels contain four inches of urethane insulation bonded to metal surfaces for maximum rigidity. No metal or wooden braces are required. The "Posi-Loc" locking assemblies are foamed-in-place in the panel tongue and groove edges. Panels are available in 11-1/2", 23", 34-1/2" and 46" widths.

Additional Modular Concepts

1. **Corner Panels** are 12" X 12" on the exterior sides, and the interior corner is fully coved. The interior and exterior metal surfaces match the finish of adjacent panels and contain four inches of foamed-in-place polyurethane insulation.

2. **Tee Walls** can be used in the construction of adjacent walled configurations. By providing a

complete break in the metal, they prevent thermal conduction from one section to another. These efficient Tee Wall panels eliminate the possibility of misalignment due to field cutting. All Tee walls contain fully coved corners.

3. **Posi-Loc locking assemblies** provide perfect alignment of stainless steel insulated panels and doorframes. The assemblies are permanently foamed-in-place in the tongue and groove edge of all panels. A clockwise turn of the hex wrench (provided) initiates a cam-type locking action. A locking "hook" is extended over and around a locking "pin" and then retracts to pull the panels tightly together for a secure fit.

4. **Panel Integrity** - these stainless steel insulated panels are strong enough to mount electrical disconnects. These electrical devices are typical for cage wash and autoclave installations. The inside service areas are the perfect location for mounting disconnects.

Exterior and Interior Walls

The "exterior" can be defined as the wall plane facing the outside area of the facility. This is the side that is flush with the cage wash or autoclave equipment front and back. The "interior" is the side only seen when inside the service enclosed area.

- 18 gauge type 304 Stainless Steel, # 4 finish
- 20 gauge type 304 Stainless Steel, # 4 finish

Panel Insulation

Every stainless steel insulated panel is filled with foamed-in-place polyurethane – the most advanced insulation material.

Polyurethane offers many advantages over conventional insulation.

The insulation value of four-inch thick polyurethane is equal to 8 ½ inches of fiberglass, polystyrene or Styrofoam.

Unlike batt-type, glass fiber and similar material, polyurethane insulation won't sag or mat to create air pockets between walls.

The polyurethane permanently bonds itself to the metal surfaces to produce a strong, rigid panel.

Fire retardant polyurethane has been classified according to ASTME-84 (UL723) with a flame spread rating of 25 or less, and is certified with a UL label (This rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.)

A 97% closed-cell structure of polyurethane provides moisture resistance.

Lightweight polyurethane makes sections easier to handle and faster to assemble.

Usable storage area is increased because of polyurethane's' superior insulation properties. Thinner walls, ceilings and floors can be used without sacrificing any temperature loss or strength.

The foamed-in-place polyurethane is dispensed into the panels using a high impingement dispensing system to assure foam density and uniform structure.

Variable Panel Height

The finished wall panels are available in twenty different heights, ranging in 12" increments, from the shortest height (5' 10-1/4"), to the tallest height (25' 10-1/4"). Additionally, custom heights can be precision cut to the exact measurement. In most vivarium applications, the stainless steel insulated panel height is approximately six inches higher than the room's ceiling height. This allows for the ceiling contractor to make an exact match up to the modular wall. The wall panels do not run up to the upper decking, so if air differential seals from lab to service areas are needed, then a drywall system would work best from the mod wall panel up to the decking.

U-Shaped Stainless Steel Channels

The stainless steel insulated panels are mounted into a four inch receiving channel, with matching material and finish. These receiving channels are attached to the finished or unfinished floor by way of lead anchors. All channel to floor seams are caulked with a compound that is approved by the vivarium.

Optional Accessories

- ☐ Extra corner protection; 3"x 3" 16 gauge ss angle
- ☐ View port (windows) for panels or doors
- ☐ Air passage louvered grills, stainless steel (specify size _____)
- ☐ Inside imbedded electrical receptacles and switches
- ☐ Intercom system for clean to dirty sides
- ☐ Voice passage ports (Terra Universal)

Access Door Details

Typical Access Panel Door

Available Door Sizes

- ☐ 24”wide x 80”high _____
- ☐ 26”wide x 80”high _____
- ☐ 30”wide x 80”high _____
- ☐ 34”wide x 80”high _____
- ☐ 36”wide x 80”high _____
- ☐ 42”wide x 80”high _____
- ☐ 48”wide x 80”high _____
- ☐ 54”wide x 80”high _____

Access Door Features

- Standard finish is 20 gauge stainless steel
- Durable FRP (Fiberglass Reinforced Plastic) door perimeter, jamb and threshold.
- Posi-seal closure to cushion door closing
- Durable, rust resistant hardware
- Interior safety release hardware to prevent entrapment
- Four inches of polyurethane insulation
- Flush fit magnetic gasket for air tight seal

The stainless steel insulated panel access doors are designed for the vivarium’s hearty environment. The door perimeter and jamb are made from Fiberglass Reinforced Plastic (FRP). This material resists impact from material handling carts and equipment. The material is rust resistant and will not dent or warp.

Doors are equipped with self closing hardware. The hardware includes a posi-seal close mechanism that catches the door and cushions the close movement. This provides noiseless closure and a firmly sealed fit. This closure mechanism incorporates an oil filled cylinder. The spring loaded plunger uses a check valve for easy opening and positive closing.

Typical Soiled Side Vivarium with Avant Garde Modular Wall System

Project Application Data:

Job Name:
Location:

Area for partitions:

Equipment to be within the partition:

Panel height:

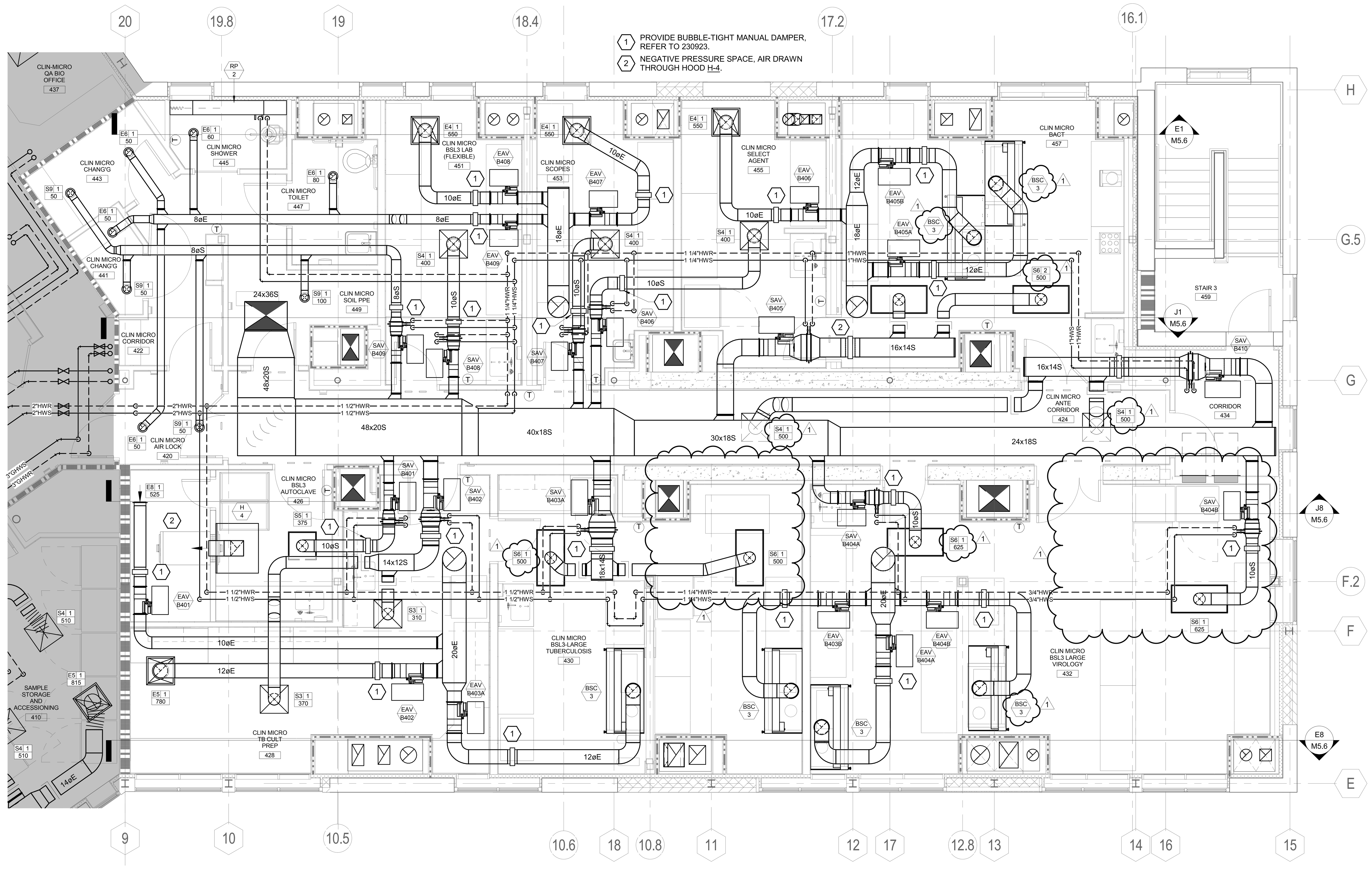
Ceiling height: (Identify as soiled side and unload side)

Will floor area be epoxy coated for otherwise finished at time of mod wall installation?
□ Yes □ No

Item No. 086

GENERAL MECHANICAL NOTES:

1. REFER TO SCHEDULES FOR INDIVIDUAL EQUIPMENT PIPE AND DUCT RUNOUT SIZES.
2. PROVIDE A VOLUME DAMPER AT ALL BRANCH DUCT RUNOUTS TO INDIVIDUAL GRILLES & DIFFUSERS.
3. COORDINATE LOCATIONS OF LAB EQUIPMENT WITH ARCHITECTURAL PLANS, ELEVATIONS AND DETAILS PRIOR TO ROUGH-IN.
4. DAMPERS AND SHUTOFF VALVES SHALL BE INSTALLED IN AN ACCESSIBLE LOCATION.
5. PROVIDE FIRE DAMPERS AT EACH RATED SHAFT PENETRATION EXCEPT AT FOR DUCTWORK SERVING GLOVE BOX & FUME HOODS.
6. COORDINATE EQUIPMENT ACCESS LOCATIONS WITH LAB EQUIPMENT AND FURNITURE, SEE ARCHITECTURAL DRAWINGS.



J1

FOURTH FLOOR HVAC PLAN - AREA B

1/4" = 1'-0"

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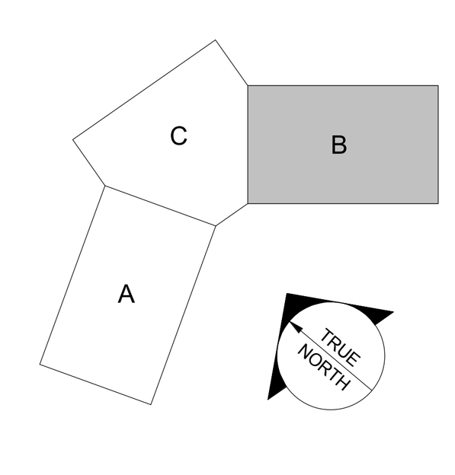
Web:www.allied-eng.com

STATE OF MAINE LABORATORIES

GREENLAW BUILDING RENOVATION

47 Independence Dr.
Augusta, ME 04330

NO.	DESCRIPTION	DATE
1	Addendum #3	05-24-19



KEYPLAN

CONTENT:
FOURTH FLOOR HVAC PLAN - AREA B

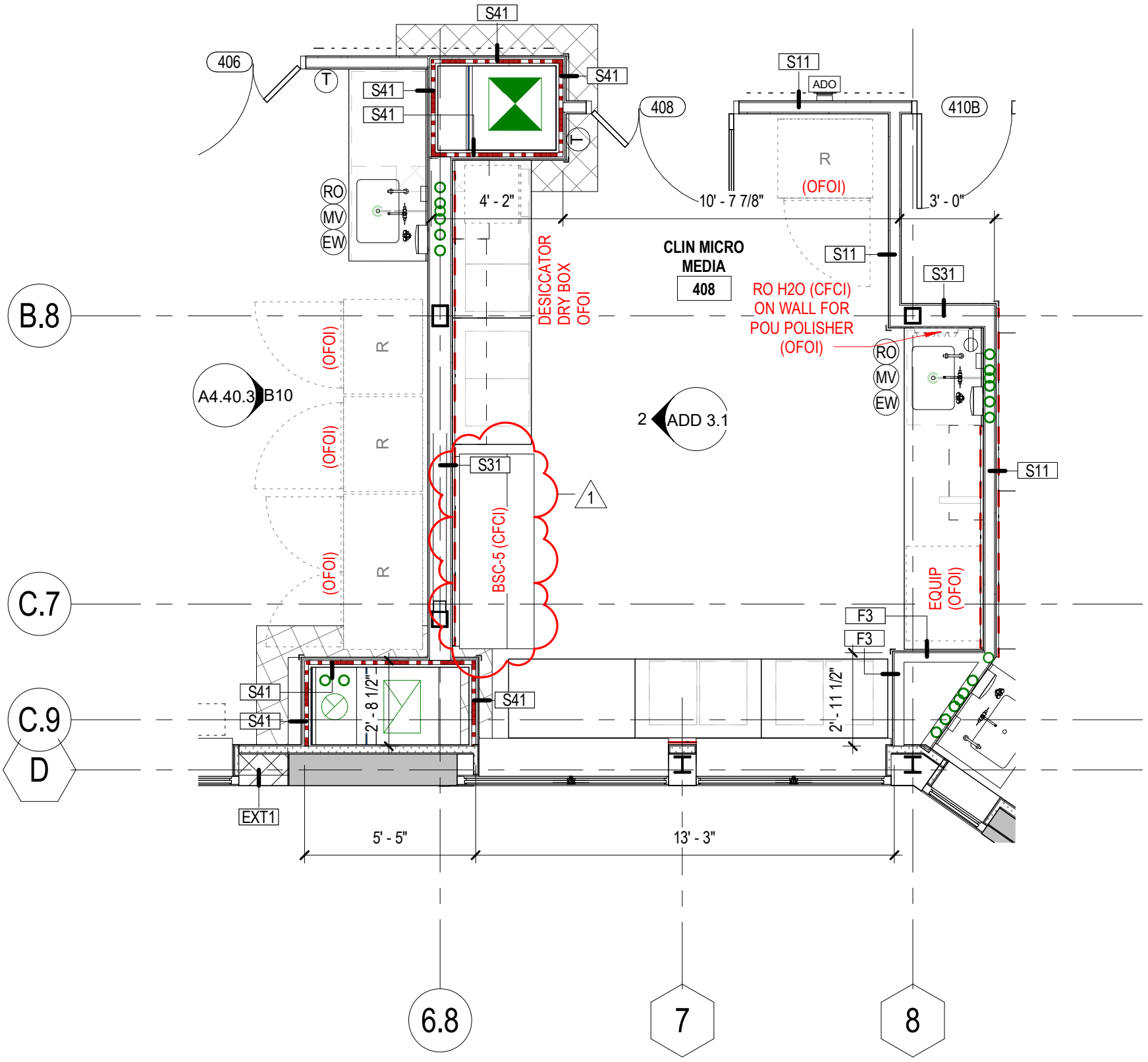
DRAWN BY: SMR
PROJECT NO: 15-074-00
DATE: 03/25/2019
REVISED:
SCALE: As indicated

M1.4B

Project Phase
100% BID DOCUMENTS

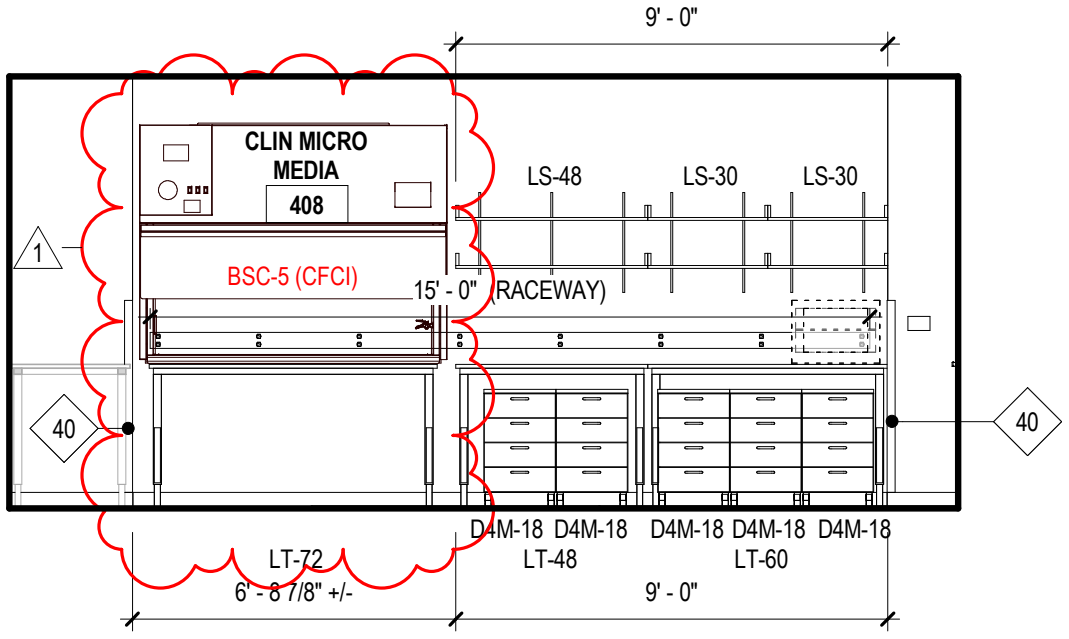
FOR ADDITIONAL INFORMATION, REFER TO PROJECT MANUAL.

Item No. 092



1 ADD 3.1 — CLIN MICRO MEDIA 408 - ENLARGED PLAN

1/4" = 1'-0"



2 ADD 3.1 — ROOM 408 - CLIN MICRO MEDIA - BSC 5

1/4" = 1'-0"

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CLIN MICRO MEDIA 408 - BSC CHANGE

PROJECT: STATE OF MAINE LABORATORIES
GREENLAW BUILDING RENOVATION

PR NO: 15-074-00 DATE: 05/22/19

SCALE: 1/4" = 1'-0"

ADD 3.1

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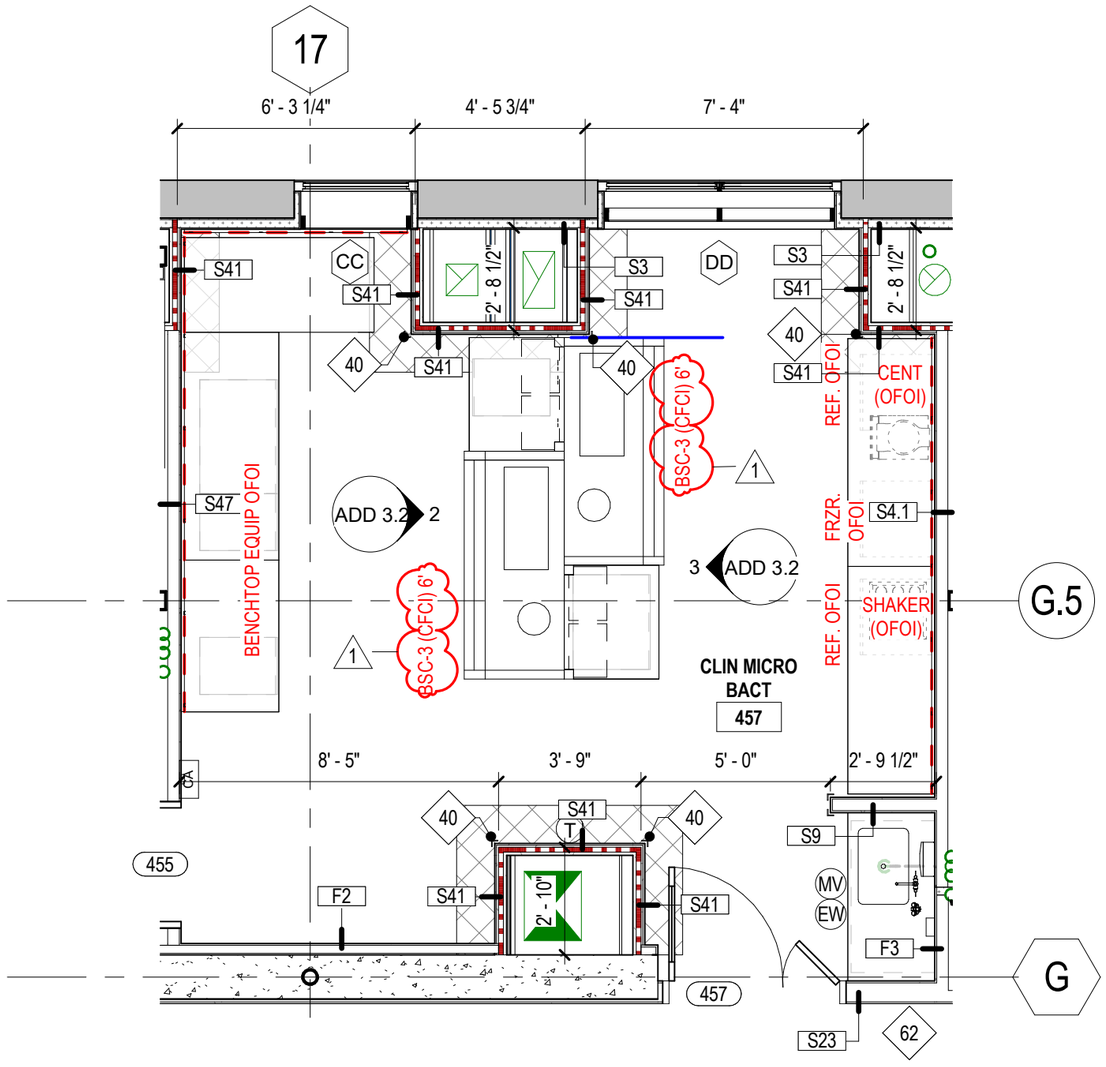

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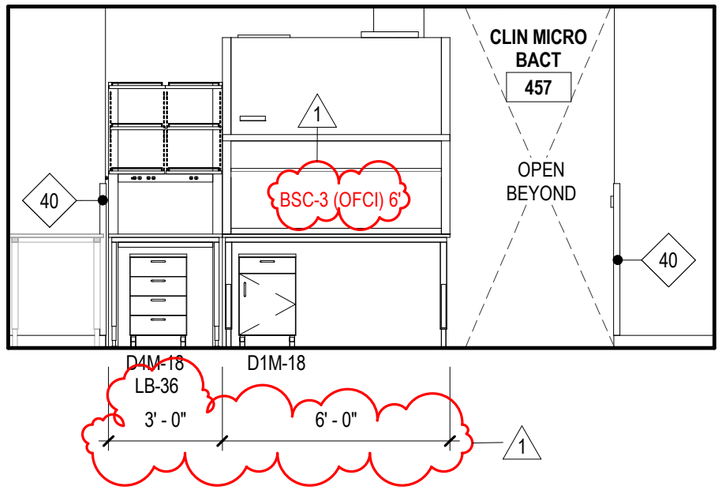

2 ADD 3.2 — ROOM 457 - CLIN MICRO BACT - ISLAND - BSC WALL

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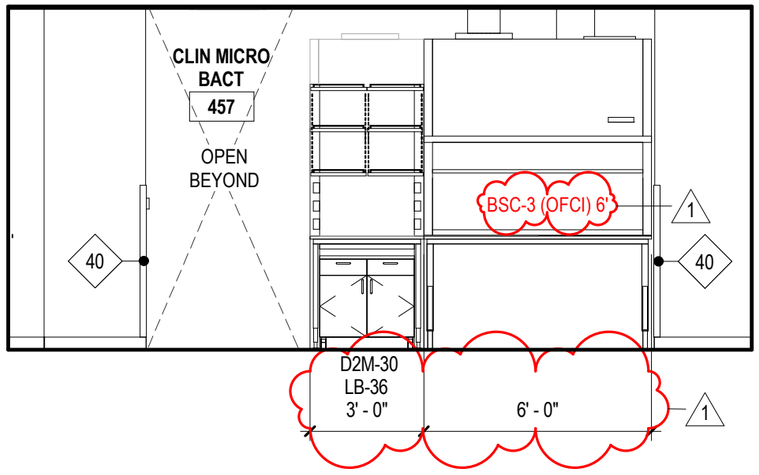

3 ADD 3.2 — ROOM 457 - CLIN MICRO BACT - ISLAND - BSC WALL

1/4" = 1'-0"

CLIN MICRO BACT - 457 - BSC CHANGES

PROJECT: STATE OF MAINE LABORATORIES
GREENLAW BUILDING RENOVATION

PR NO: 15-074-00

DATE: 05/22/19

SCALE: 1/4" = 1'-0"

ADD 3.2

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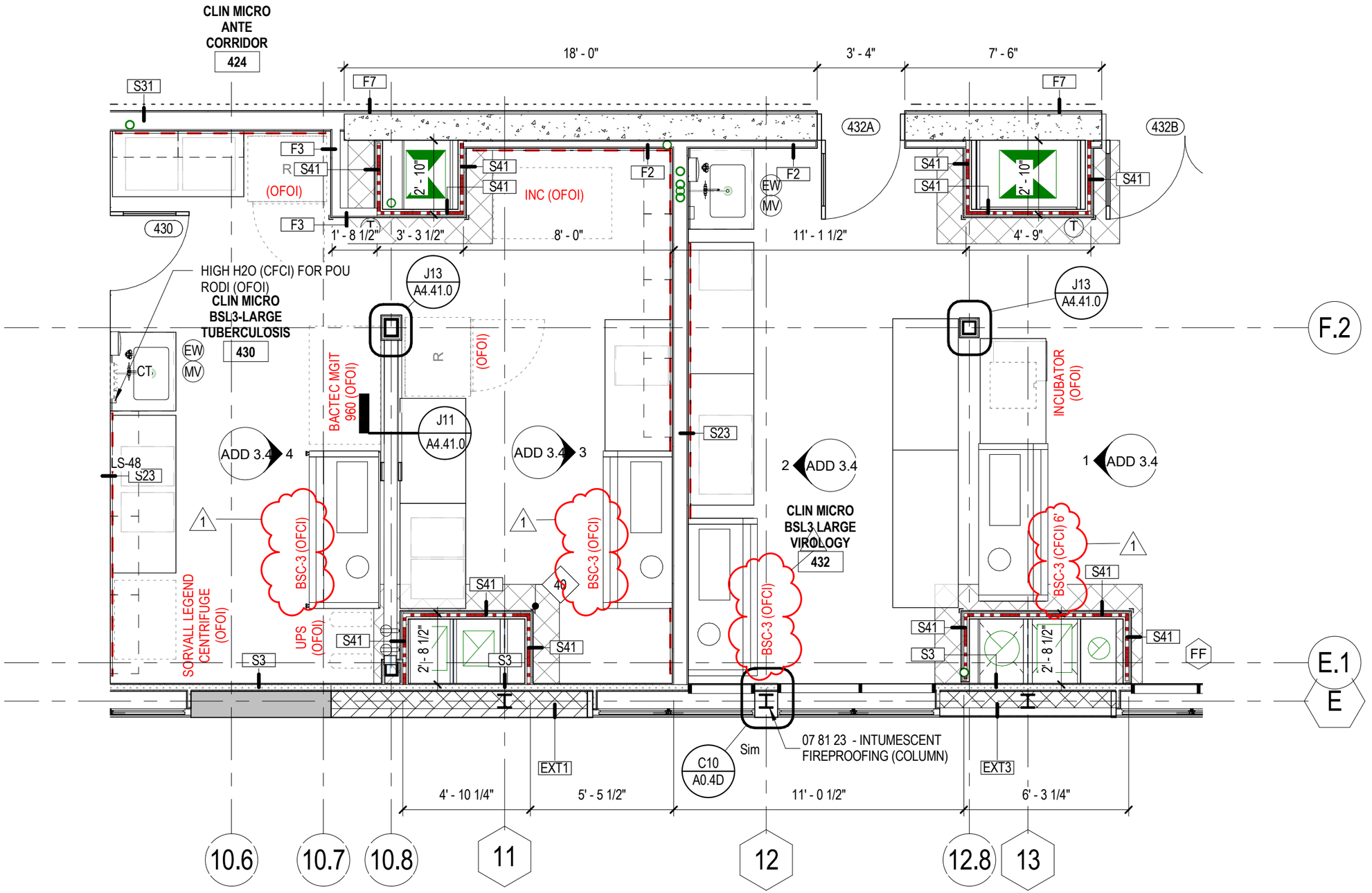

CLIN MICRO BSL3 - BSC CHANGES

PROJECT: STATE OF MAINE LABORATORIES
GREENLAW BUILDING RENOVATION

DATE: 05/22/19

PR NO: 15-074-00

SCALE: 1/4" = 1'-0"

ADD 3.3

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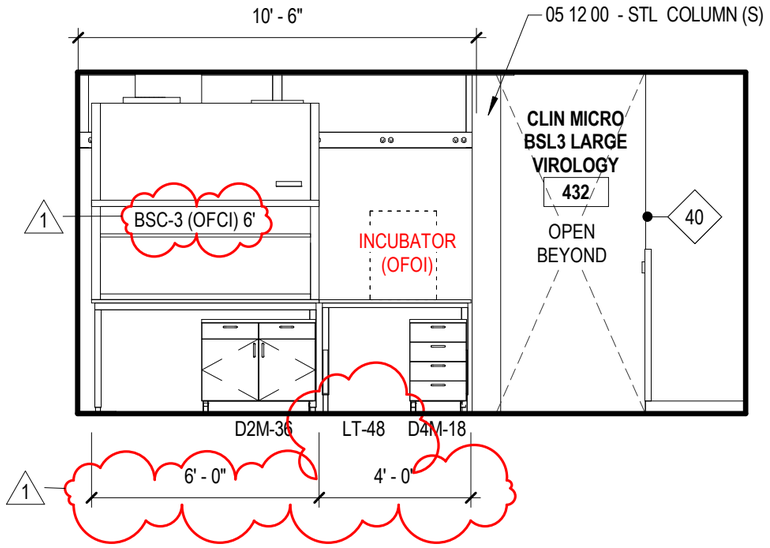

1 ADD 3.4 — CLIN MICRO BSL3 432 - BSC ELEVATION

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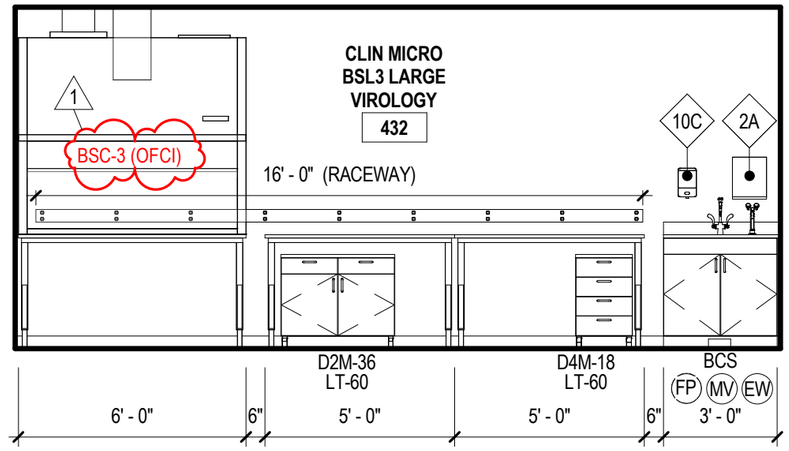

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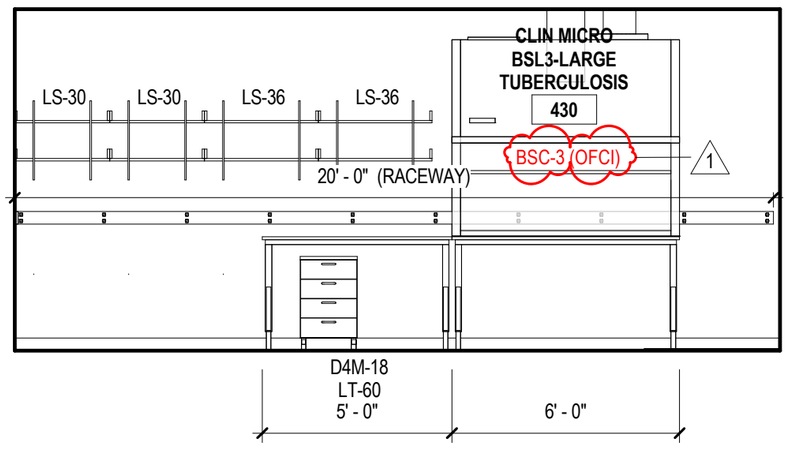

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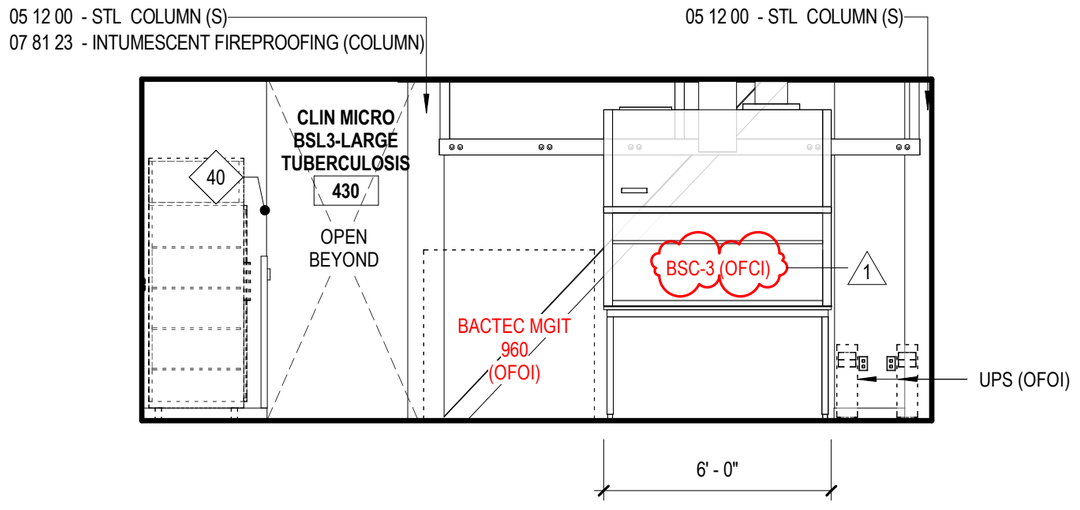

4 ADD 3.4 — CLIN MICRO BSL3 430 - BSC ELEVATION

1/4" = 1'-0"

CLIN MICRO BSL3 - ELEVATIONS

PROJECT: STATE OF MAINE LABORATORIES
GREENLAW BUILDING RENOVATION

DATE: 05/22/19

PR NO: 15-074-00

SCALE: 1/4" = 1'-0"

ADD 3.4

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