INVITATION FOR BIDS
CCK-2271-18
Grain Center of Excellence at
Princeton, KY.
ADDENDUM #1
Project 2458.0
12/22/2017

ATTENTION: This is not an order. Read all instructions, terms and conditions carefully.

IMPORTANT: BID AND ADDENDUM MUST BE RECEIVED BY 1/18/2017 @ 3:00 P.M. LEXINGTON, KY TIME

Bidder must acknowledge receipt of this and any addendum as stated in the Invitation for Bids.

Please refer to and incorporate into the Offer the attached Addendum 1 from JRA Architects dated 12/20/2017.

OFFICIAL APPROVAL
UNIVERSITY OF KENTUCKY

Mike Madd

Contracting Officer / (859) 257-5409

SIGNATURE

________________________________________
Typed or Printed Name
FOR THE PROJECT TITLED:

GRAIN CENTER OF EXCELLENCE AT PRINCETON, KY
PROJECT # 2458.0
CCK-2271-18
University of Kentucky
Lexington, Kentucky

To: Prospective Bidders

From: JRA Architects
3225 Summit Square Place, Suite 200
Lexington, KY 40509

Project Contact: D. Robert Deal, AIA, LEED AP

The Addendum will form a part of the Contract Documents and modifies the original Bidding Documents dated November 2017.

Bidders must acknowledge receipt of this Addendum in the space provided on the Form of Proposal. Failure to do so may subject the bidder to disqualification.

Bidding Documents, including the Drawings and Specifications, are amended as described herein.

ARCHITECTURAL ITEMS:

ITEM NO. 1.01
Refer to Specification Section 102800 – “Toilet, Bath, and Laundry Accessories”. Add to Section 2.3.B.1 the following:

g. Saniflow Corp – BabyMedi.

ITEM NO. 1.02
Refer to Specification Section 081416 – “Flush Wood Doors”. Add to Section 2.1.A the following:

5. Oshkosh.

ITEM NO. 1.03
Reissue drawing A-111A – First Floor Dimensions – Area A. Refer to revised dimensions for Window Type B, K & L to work with Fiber Cement Panel Spacing.

ITEM NO. 1.04

ITEM NO. 1.05
Refer to Specification Section 054000 “Cold-Formed Metal Framing”. Add the following to Section 2.4:

J. Z-Shaped Furring: face flange of 2-1/2 inches, wall attachment flange of 2” inch, 18 gauge for exterior applications. Custom fabrications are acceptable.
K. Metal Plate: 18 gauge flat stock metal plate fabricated to fit corner. For extruded aluminum fiber cement corner trim attachments.

ITEM NO. 1.06
Refer to details N/A-501 and N/A-502. Provide continuous 18 ga. metal plate for extruded aluminum corner trim attachment.

ITEM NO. 1.07
Reissue drawing A-505 – Plan Details – Expansion Joints. Detail A and B have been revised. Provide continuous 18 ga. metal plate for extruded aluminum corner trim attachment.
ITEM NO. 1.08
Refer to Specification Section 074646 – “Fiber-Cement Siding”. Add to Section 1.2.B the following:

2. Section 054000 “Cold-Formed Metal Framing” for zee-furring and metal plate attachments.

ITEM NO. 1.09
Refer to detail D/A-501. Provide sealant joint at end of fiber cement panel, with a continuous caulk joint.
ITEM NO. 1.10
Refer to all wall sections and details in Area A. Provide weather barrier at all exterior gypsum sheathing that occurs behind fiber cement wall panels.
ITEM NO. 1.11
Refer to detail F/A-351. Delete sealant at coping on fiber cement side only.

ITEM NO. 1.12
Reissue drawing A-356 – Wall Sections - Area A. Refer to revised legend.
ITEM NO. 1.13
Refer to Specification Section 096723 – “Resinous Flooring”. Add to Section 2.2.A Manufacturers the following:

6. Tennant Coatings, Inc.

ITEM NO. 1.14
Reissue Specification Section 115313 – “Laboratory Fume Hoods”.

ITEM NO. 1.15
Reissue Specification Section 123553 – “Laboratory Casework”.

ITEM NO. 1.16
Refer to Drawing A-001B – First Floor Demolition Plan – Area B. Revise room name to BAE LAB.

ITEM NO. 1.17
Refer to Drawing A-001B – First Floor Demolition Plan – Area B. Add new Keynote #35 – Remove existing vehicle exhaust evacuation system and return to owner. Add Keynote #35 to Room BAE LAB on floor plan.

ITEM NO. 1.18
Refer to Specification Section 101100 – “Visual Display Units”. Add to Section 2.3.A Manufacturers the following:

15. Element Designs

ITEM NO. 1.19
Reissue Specification Section 115300 – “Laboratory Equipment”.

ITEM NO. 1.20
Refer to Enlarged Lab Plans. Tall cabinets keynoted 12 3553.A20 are to be Flammable Storage cabinets. Base cabinets located under Fume Hoods are to be Acid Storage.

ITEM NO. 1.21

ITEM NO. 1.22
Refer to Specification Section 230910 – “Laboratory Temperature and Airflow Control System”. Add to Section 2.1.A Manufacturers the following:

3. Price Critical Controls

ITEM NO. 1.23
Refer to Specification Section 092900 – “Gypsum Board”. Add to Section 2.4.A.1 Manufacturers the following:

f. USG

END OF ADDENDUM NO. 1.00
MECHANICAL CONSTRUCTION NOTES

1. Align all metal conduits with electrical conduit at the termination boxes for the installation of fire protection equipment.
2. Install all fire protection conduits in compliance with the applicable codes and standards.
3. Ensure all fire protection conduits are properly labeled and traced.
4. Fire protection conduits shall be installed in accordance with the drawings.
5. All fire protection conduits shall be tested for leakage and pressure integrity.
6. Fire protection conduits shall be supported at regular intervals as shown on the drawings.
7. Fire protection conduits shall be insulated as required by the codes and standards.
8. Fire protection conduits shall be marked with the appropriate identification symbols.
9. Fire protection conduits shall be installed in a manner that prevents obstruction of access to the building's mechanical systems.
10. Fire protection conduits shall be installed in a manner that prevents interference with the building's electrical systems.
11. Fire protection conduits shall be installed in a manner that prevents interference with the building's plumbing systems.
12. Fire protection conduits shall be installed in a manner that prevents interference with the building's structural systems.
13. Fire protection conduits shall be installed in a manner that prevents interference with the building's architectural features.
14. Fire protection conduits shall be installed in a manner that prevents interference with the building's finish materials.
15. Fire protection conduits shall be installed in a manner that prevents interference with the building's mechanical systems.
16. Fire protection conduits shall be installed in a manner that prevents interference with the building's electrical systems.
17. Fire protection conduits shall be installed in a manner that prevents interference with the building's plumbing systems.
18. Fire protection conduits shall be installed in a manner that prevents interference with the building's structural systems.
19. Fire protection conduits shall be installed in a manner that prevents interference with the building's architectural features.
20. Fire protection conduits shall be installed in a manner that prevents interference with the building's finish materials.

CONTRACTORS NOTE:

Install Upright Sprinklers in all accessible chases. Refer to architectural drawings for ceilings, bulkheads, floating ceilings, etc. Outline not used.

6" Fire Main from utility company main. See civil drawings for continuation and additional work.

Prepare, prime and paint all exposed piping, supports, etc. Color shall be selected by architect.

Install sprinkler wire guards in this area. Guards should be suitable to prevent accidental damage.

Install fire department key box surface-mounted at 60" A.F.F. to the top of the box.

Do not install piping over electrical panels.

Install electric alarm bell on exterior of building. Coordinate with architectural drawings.

Install high temperature sprinklers in this space.

Mechanical

Construction Documents

Grain & Forage Center of Excellence

University of Kentucky Research and Education Center

Lexington, Kentucky 40509

859.252.6781

Concessionaires

Area A

FP-101A

Construction Notes

Classification Assembly Legend

A

B

C

Key Plan

Floor Plan

Alternate #2

Alternate #3
REMOVE LABORATORY EQUIPMENT INCLUDING ALL LAB UTILITIES.

REMOVE FLOOR DRAIN.

REMOVE UNDERGROUND STORM WATER PIPING.

REMOVE FIRE PROTECTION ANTI-FREEZE LOOP.

REMOVE FIRE PROTECTION AND DOMESTIC WATER PIPING ABOVE CEILING.

REMOVE ALL LAB UTILITIES ABOVE CEILING AND BELOW SLAB AS DRAWINGS FOR MORE INFORMATION.

DRAWINGS FOR NEW LOCATION.

REMOVE MOP SINK AND ALL ASSOCIATED WATER SUPPLY PIPING, VALVES, DRAIN WASTE AND VENT PIPING, SUPPORTS, ETC.
INSTALL PLUMBING GUARDS ON PIPING BELOW ACCESSIBLE LAV.

PLUMBING LEGEND

PLUMBING NOTES

LAB WASTE AND VENT PIPING SYSTEMS

SPECIALTY ITEMS
### PLUMBING FIXTURE SCHEDULE

<table>
<thead>
<tr>
<th>Model</th>
<th>Picture</th>
<th>Brand</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>WASH STATION</td>
<td></td>
<td>American Standard</td>
<td>ADA single compartment wall hung conference sink, 60&quot; x 30&quot;</td>
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<tr>
<td>TYPHOON</td>
<td></td>
<td>Kohler</td>
<td>ADA conference sink, 48&quot; x 22&quot;</td>
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<tr>
<td>TROJAN</td>
<td></td>
<td>Eljer</td>
<td>ADA conference sink, 48&quot; x 22&quot;</td>
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<tr>
<td>BAY WASH</td>
<td></td>
<td>American Standard</td>
<td>ADA lavatory wash basin, 19&quot; x 15&quot;</td>
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<tr>
<td>LAVATORY</td>
<td></td>
<td>Kohler</td>
<td>ADA wall hung corner ADA sink, 24&quot; x 24&quot;</td>
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<tr>
<td>WATER CLOSET</td>
<td></td>
<td>Zurn</td>
<td>ADA water closet, rim height 17&quot; max. above finished floor</td>
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<tr>
<td>FLUSH VALVE</td>
<td></td>
<td>Sloan</td>
<td>ADA sensor-activated flush valve, low consumption</td>
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<tr>
<td>CONCENTRIC VENT</td>
<td></td>
<td>Zurn</td>
<td>ADA concentric vent kit thru roof, see drawings for configuration required</td>
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<tr>
<td>STAINLESS STEEL LAY-IN SINKS</td>
<td></td>
<td>Just Mfg., Elkay, American Standard or approved equal</td>
<td>ADA stainless steel lay-in sinks, just model J-35 stainless steel cup strainer</td>
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<tr>
<td>DIRECT VENTING (SEALED COMBUSTION)</td>
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<td>Zurn</td>
<td>ADA direct venting, see drawings for configuration required</td>
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<tr>
<td>FILLING STATION</td>
<td></td>
<td>Delta</td>
<td>ADA electronic filling station, wall mounted combination eye / barrier-false, vandal resistant bubbler, wall mounted low water cut-off valve, recessed wall mounted combination eye / barrier-false, ADA accessible.</td>
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<tr>
<td>LAB SINK</td>
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<td>Zurn</td>
<td>ADA high density composite lap in sink, 24&quot; x 24&quot; x 10&quot;</td>
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### WATER HEATER SCHEDULE

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<th>Size</th>
<th>Input</th>
<th>BTU/H</th>
<th>Output</th>
<th>BTU/H</th>
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<th>Temp</th>
<th>C.W.</th>
<th>H.W.</th>
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<td>THERMAL</td>
<td>50</td>
<td>125</td>
<td>191,999</td>
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**Water Closet, Lavatory, TOILET, SINK, BATH, and BASIN Schedule on Approved Eisa.**

Plastic 1/2", Schedule 40, 316 Stainless Steel or equivalent.

ELECTRIC Heated water: water heater, drain, waste, and vent PIPE SCHEDULE.

Materials: Schedule 40, 316 Stainless Steel or equivalent. Just approved Eisa.

*Note: All plumbing fixtures and water heaters must be installed in accordance with the International Plumbing Code (IPC) and the National Fuel Gas Code (NFPA 54) and all local codes. All plumbing fixtures and water heaters must be installed by a licensed plumber and must meet the specifications and requirements as outlined in the project drawings and specifications. Failure to comply may result in non-compliance with local codes and regulations."
CONSTRUCTION DOCUMENTS
GRAN & FORAGE CENTER OF EXCELLENCE
UNIVERSITY OF KENTUCKY RESEARCH AND EDUCATION CENTER
PRINCETON, KENTUCKY
LEXINGTON, KENTUCKY 40509
3225 Summit Square Place, Suite 200
859.252.6781

CLASSIFIED ASSEMBLY LEGEND

DESCRIPTION

ALTERNATE #2

MECHANICAL
CONSTRUCTION NOTES

FLOOR PLAN

ALTERNATE #3

PLUMBING

KEY PLAN

1. PROVIDE TEMPORARY POINTS OF CONNECTION IN EXISTING DOMESTIC WATER ROOM C110 TO MECHANICAL ROOM A110.

2. STRUCTURAL AND ARCHITECTURAL DRAWINGS.

3. NEW UNDERGROUND 2 PSIG NATURAL GAS PIPING ROUTED FROM MECHANICAL STRUCTURE, ETC.

4. Piping to maintain service to all areas of the building during each phase of construction. Contractor shall field verify existing piping size, location and quantity prior to installation.

5. SAWCUT CONCRETE SLAB AND INSTALL NEW SANITARY SEWER PIPING. REPAIR, SIZE, LOCATION AND QUANTITY PRIOR TO INSTALLATION.

6. PATCH AND FINISH CONCRETE FLOOR TO MATCH SURROUNDING AREA.

7. ROUTE DOMESTIC WATER PIPING ABOVE LAY-IN CEILING AS HIGH AS POSSIBLE.

8. ROUTE SEAMLESS NO-JOINT TUBING BELOW SLAB FROM TRAP PRIMER.

9. INSTALL TRAP PRIMER IN AN ACCESSIBLE LOCATION ON WALL.

10. SEE CIVIL DRAWINGS FOR CONTINUATION.

11. SLEEVE THRU FOUNDATION AS REQUIRED. ROUTE BELOW SLAB.

COORDINATE WITH DUCTWORK, PIPING, LIGHT FIXTURES, CONDUIT, BUILDING STRUCTURE, ETC.

COORDINATE WITH ARCHITECTURAL DRAWINGS.

PATCH AND FINISH CONCRETE FLOOR TO MATCH SURROUNDING AREA.

INSTALL 4" VENT PIPE IN WALL AND EXTEND THRU ROOF. COORDINATE WITH ARCHITECTURAL DRAWINGS.

INSTALL SHUT-OFF VALVES IN AN ACCESSIBLE AREA ABOVE LAY-IN CEILING.

SAWCUT CONCRETE SLAB AND INSTALL NEW SANITARY SEWER PIPING. REPAIR, SIZE, LOCATION AND QUANTITY PRIOR TO INSTALLATION.

PHASE OF CONSTRUCTION. CONTRACTOR SHALL FIELD VERIFY EXISTING PIPING SIZE, LOCATION AND QUANTITY PRIOR TO INSTALLATION.

NEW UNDERGROUND 2 PSIG NATURAL GAS PIPING ROUTED FROM MECHANICAL STRUCTURE, ETC.

INSTALL SHUT-OFF VALVES IN AN ACCESSIBLE AREA ABOVE LAY-IN CEILING.

STRUCTURAL AND ARCHITECTURAL DRAWINGS.

ROUTE DOMESTIC WATER PIPING ABOVE LAY-IN CEILING AS HIGH AS POSSIBLE.

ROUTE SEAMLESS NO-JOINT TUBING BELOW SLAB FROM TRAP PRIMER.

INSTALL TRAP PRIMER IN AN ACCESSIBLE LOCATION ON WALL.

SEE CIVIL DRAWINGS FOR CONTINUATION.

SLEEVE THRU FOUNDATION AS REQUIRED. ROUTE BELOW SLAB.

COORDINATE WITH DUCTWORK, PIPING, LIGHT FIXTURES, CONDUIT, BUILDING STRUCTURE, ETC.

COORDINATE WITH ARCHITECTURAL DRAWINGS.

PATCH AND FINISH CONCRETE FLOOR TO MATCH SURROUNDING AREA.

INSTALL 4" VENT PIPE IN WALL AND EXTEND THRU ROOF. COORDINATE WITH ARCHITECTURAL DRAWINGS.

INSTALL SHUT-OFF VALVES IN AN ACCESSIBLE AREA ABOVE LAY-IN CEILING.

SAWCUT CONCRETE SLAB AND INSTALL NEW SANITARY SEWER PIPING. REPAIR, SIZE, LOCATION AND QUANTITY PRIOR TO INSTALLATION.

PHASE OF CONSTRUCTION. CONTRACTOR SHALL FIELD VERIFY EXISTING PIPING SIZE, LOCATION AND QUANTITY PRIOR TO INSTALLATION.

NEW UNDERGROUND 2 PSIG NATURAL GAS PIPING ROUTED FROM MECHANICAL STRUCTURE, ETC.

INSTALL SHUT-OFF VALVES IN AN ACCESSIBLE AREA ABOVE LAY-IN CEILING.

SAWCUT CONCRETE SLAB AND INSTALL NEW SANITARY SEWER PIPING. REPAIR, SIZE, LOCATION AND QUANTITY PRIOR TO INSTALLATION.

PHASE OF CONSTRUCTION. CONTRACTOR SHALL FIELD VERIFY EXISTING PIPING SIZE, LOCATION AND QUANTITY PRIOR TO INSTALLATION.

NEW UNDERGROUND 2 PSIG NATURAL GAS PIPING ROUTED FROM MECHANICAL STRUCTURE, ETC.
ACID WASTE PIPING DIAGRAM

WATER HEATER PIPING SCHEMATIC - AREA 'C'

PROPERTY OF J.M.P. CO. 10-13-97

PROPERTY OF J.M.P. CO.

NOTE:

TYPICAL EXPANSION TANK

THAN OR EQUAL TO 140.

UTILIZING SUPPLY WATER TEMPERATURE GREATER

CONCRETE

RAISED

NOTE:

ET-2B

VALVE

WH-2B

RELIEF

WH-2A

PRESSURE

TEMP &

GAUGE

TYPICAL

TEMPERATURE

TEMP.

GAUGE

TEMP.

AQUASTAT

RE-CIRC PUMP

HOT WATER

TYPICAL CHECK VALVE

BALL VALVE

SENSOR ON EXTERIOR OF

CIRCUIT SETTER

PROPERTY OF J.M.P. CO.

110 HW TO BUILDING

110 HW

FROM BUILDING

110 HWR

FROM BUILDING

110 HWR
ASSURE COORDINATION OF GRAB-BAR AND CONTROL VALVE ROUGH-IN HEIGHTS TO MITIGATE INTERFERENCES.

3. HAND HELD SHOWER AND CONTROL AREA SHALL BE LOCATED ON OPPOSITE WALL OF FOLD-UP SEAT.

NOTE: EXPLODED VIEW OF METAL STUDS & FRAMING STUDS

NOTE: COMPRESSION AIR DROP DETAIL

NOTE: COMPRESSED AIR DROP DETAIL

NOTE: FLEXIBLE COMPRESSED AIR DROP DETAIL

NOTE: SHOWER VALVE / FAUCET INSTALLATION DETAIL

NOTE: 200 GALLON DILUTION PIT DETAIL

NOTE: OVERFLOW STORM DRAIN DETAIL

NOTE: GAS PIPING SUPPORT DETAIL

NOTE: WTR HTR VENT/COMBUSTION AIR TERMINATION DETAIL

NOTE: PLUMBING DETAILS

NOTE: CONSTRUCTION DOCUMENTS

NOTE: UNIVERSITY OF KENTUCKY RESEARCH AND EDUCATION CENTER

NOTE: GRAIN & FORAGE CENTER OF EXCELLENCE

NOTE: REQUIREMENTS.
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<td></td>
<td><strong>SIDEWALL RETURN AIR GRILLE</strong></td>
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<td></td>
<td><strong>HUMIDITY SENSOR</strong></td>
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<td><strong>MAKE-UP WATER CONTROL VALVE</strong></td>
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<td><strong>OCCUPANCY DEMAND VENTILATION CONTROL SYSTEM</strong></td>
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<td></td>
<td><strong>INTAKE HOOD</strong></td>
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<td>**OUTDOOR PACKAGED ROOFTOP WITH NATURAL GAS HEAT</td>
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<td><strong>HIGH VOLUME LOW SPEED FAN</strong></td>
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<td><strong>FAN COIL</strong></td>
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<td></td>
<td><strong>DUCTLESS SPLIT SYSTEM INDOOR UNIT</strong></td>
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<td><strong>BOILER</strong></td>
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<td></td>
<td><strong>EXHAUST VENTILATION FAN</strong></td>
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<td><strong>HVAC LEGEND</strong></td>
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SUPPLY Valve with Reheat Controls Schematic

Fume Exhaust Fan (FHEF-1A, 1B, 1C) Controls Schematic

Fume Exhaust Valve Controls Schematic

AHU-1 Controls Schematic
Provide at least 24" of clearance on controller side of air terminal unit. The clearance area shall extend the full length of the controller and encompass the access door.

Provide at least 24" of clearance on controller side of air terminal unit, with clearance area extending the full length of the controller and encompassing the access door (typical for both terminal units).

Provide a minimum of 3'-0" of straight duct upstream of inlet flow sensor for inlet sizes 12" diameter and below.

Provide a minimum of 3x the inlet diameter of straight duct upstream of the inlet flow sensor for inlet sizes above 12" diameter. (Typical for both terminal units.)

Supply air terminal unit with reheat coil detail

Laboratory fume hood exhaust fan detail

General and equipment exhaust venturi air valve detail

Supply venturi air valve detail

Fume hood exhaust venturi air valve detail

General and equipment exhaust venturi valve detail

Supply air terminal unit with reheat coil detail
NOTES:

1. THIS INSTALLATION IS REQUIRED FOR FAN COIL UNIT CHILLED WATER AND HOT WATER REHEAT COIL.

2. 2-WAY MODULATING CONTROL VALVE SHALL BE FAST OPENING AND SLOW CLOSING. VALVE SHALL BE ENGINEERED FOR EACH APPLICATION AND FACTORY SET TO OPERATE WITHIN ± 5% OF REQUIRED FLOWRATE. REQUIRE FLOWRATE. 2-60 PSID ALLOWABLE OPERATION RANGE AT REQUIRED FLOWRATE. INCLUDE FULL PORT HOSE CONNECTION AND PRESSURE RATED HOSE CAP.

3. VALVE SHALL BE ENGINEERED FOR EACH APPLICATION AND FACTORY SET TO OPERATE WITHIN ± 5% OF.

4. 24" MAXIMUM LENGTH HOSE KIT. HOSE KIT SHALL BE SIZED PER DRAWINGS, NOT EQUIPMENT CONNECTION SIZE.

5. PROVIDE HOSE KIT SUBMITTAL INCLUDING EQUIPMENT SERVED, HOSE KIT SIZE, AND PRESSURE DROP.

6. 3/4" DRAIN VALVE WITH 3/4" UNION (TYP.) INSTALL IN LOW POINT OF HEADER OR SUPPLY PIPE TO ALLOW COMPLETE DRAIN DOWN OF COIL.

7. BALANCING VALVE, 1/4" BALL VALVE. INSTALL IN LOW POINT OF HEADER OR RETURN PIPE TO ALLOW COMPLETE VENTING OF AIR.

8. TEMPERATURE CONTROLS SHALL BE ENGINEERED FOR EACH APPLICATION.

9. CHECK WITH WIRING OF ECLP.

10. IN-LINE LIMITING VALVE.

11. THIS INSTALLATION IS REQUIRED FOR FAN COIL UNIT CHILLED WATER AND HOT WATER REHEAT COIL.

12. INSTALL IN LOW POINT OF HEADER OR RETURN PIPE TO ALLOW COMPLETE DRAIN DOWN OF COIL.

13. BALANCING VALVE, 1/4" BALL VALVE. INSTALL IN LOW POINT OF HEADER OR RETURN PIPE TO ALLOW COMPLETE VENTING OF AIR.

14. TEMPERATURE CONTROLS SHALL BE ENGINEERED FOR EACH APPLICATION.

15. CHECK WITH WIRING OF ECLP.

16. IN-LINE LIMITING VALVE.

17. THIS INSTALLATION IS REQUIRED FOR FAN COIL UNIT CHILLED WATER AND HOT WATER REHEAT COIL.

18. INSTALL IN LOW POINT OF HEADER OR RETURN PIPE TO ALLOW COMPLETE DRAIN DOWN OF COIL.

19. BALANCING VALVE, 1/4" BALL VALVE. INSTALL IN LOW POINT OF HEADER OR RETURN PIPE TO ALLOW COMPLETE VENTING OF AIR.

20. TEMPERATURE CONTROLS SHALL BE ENGINEERED FOR EACH APPLICATION.

21. CHECK WITH WIRING OF ECLP.

22. IN-LINE LIMITING VALVE.

23. THIS INSTALLATION IS REQUIRED FOR FAN COIL UNIT CHILLED WATER AND HOT WATER REHEAT COIL.

24. INSTALL IN LOW POINT OF HEADER OR RETURN PIPE TO ALLOW COMPLETE DRAIN DOWN OF COIL.

25. BALANCING VALVE, 1/4" BALL VALVE. INSTALL IN LOW POINT OF HEADER OR RETURN PIPE TO ALLOW COMPLETE VENTING OF AIR.

26. TEMPERATURE CONTROLS SHALL BE ENGINEERED FOR EACH APPLICATION.

27. CHECK WITH WIRING OF ECLP.

28. IN-LINE LIMITING VALVE.

29. THIS INSTALLATION IS REQUIRED FOR FAN COIL UNIT CHILLED WATER AND HOT WATER REHEAT COIL.

30. INSTALL IN LOW POINT OF HEADER OR RETURN PIPE TO ALLOW COMPLETE DRAIN DOWN OF COIL.

31. BALANCING VALVE, 1/4" BALL VALVE. INSTALL IN LOW POINT OF HEADER OR RETURN PIPE TO ALLOW COMPLETE VENTING OF AIR.

32. TEMPERATURE CONTROLS SHALL BE ENGINEERED FOR EACH APPLICATION.

33. CHECK WITH WIRING OF ECLP.

34. IN-LINE LIMITING VALVE.

35. THIS INSTALLATION IS REQUIRED FOR FAN COIL UNIT CHILLED WATER AND HOT WATER REHEAT COIL.

36. INSTALL IN LOW POINT OF HEADER OR RETURN PIPE TO ALLOW COMPLETE DRAIN DOWN OF COIL.

37. BALANCING VALVE, 1/4" BALL VALVE. INSTALL IN LOW POINT OF HEADER OR RETURN PIPE TO ALLOW COMPLETE VENTING OF AIR.

38. TEMPERATURE CONTROLS SHALL BE ENGINEERED FOR EACH APPLICATION.

39. CHECK WITH WIRING OF ECLP.

40. IN-LINE LIMITING VALVE.

41. THIS INSTALLATION IS REQUIRED FOR FAN COIL UNIT CHILLED WATER AND HOT WATER REHEAT COIL.

42. INSTALL IN LOW POINT OF HEADER OR RETURN PIPE TO ALLOW COMPLETE DRAIN DOWN OF COIL.

43. BALANCING VALVE, 1/4" BALL VALVE. INSTALL IN LOW POINT OF HEADER OR RETURN PIPE TO ALLOW COMPLETE VENTING OF AIR.

44. TEMPERATURE CONTROLS SHALL BE ENGINEERED FOR EACH APPLICATION.

45. CHECK WITH WIRING OF ECLP.

46. IN-LINE LIMITING VALVE.
PROVIDE UNIT WITH PREMIUM EFFICIENCY ECM DIRECT DRIVE MOTORS ON THE AIRFOIL SWSI SUPPLY AND EXHAUST FAN(S).

COMBINATION OF BOTH. THE HVAC CONTRACTOR IS RESPONSIBLE FOR COORDINATION BETWEEN HVAC CONTROLS CONTRACTOR AND EQUIPMENT PROVIDER TO ASSURE ALL REQUIREMENTS OF THE SEQUENCE OF OPERATIONS ARE MET.

PROVIDE UNIT WITH AIRSIDE ECONOMIZER WITH COMPARITIVE ENTHALPY CONTROL. IN ECONOMIZER OPERATION UNIT COMPRESSORS SHALL BE OFF.

SCHEDULES

PROVIDE UNIT WITH THERMAL OVERLOAD PROTECTION.

JRA ARCHITECTS HAS RETAINED AN

PROVIDE UNIT WITH AT MINIMUM 1" DOUBLE WALL CONSTRUCTION.

COOLING CAPACITIES ARE BASED STANDARD AHRI/ASHRAE CONDITIONS ON 95°F db/78°F wb AMBIENT AIR TEMPERATURE, 75°F db/62°F wb INDOOR AIR TEMPERATURE.

PROVIDE UNIT WITH UNIT-MOUNTED, NON-FUSED ELECTRICAL DISCONNECT SWITCH WITH SINGLE-POINT ELECTRICAL CONNECTION.

PROVIDE UNIT WITH MODULATING HOT GAS REHEAT COIL FOR DEHUMIDIFICATION CYCLE WITH A SPACE MOUNTED HUMIDITY SENSOR.

PROVIDE UNIT WITH MODULATING NATURAL GAS HEAT, MINIMUM 10:1.

PROVIDE UNIT WITH HINGED ACCESS PANELS WITH LOCKABLE HANDLES.

HEATING CAPACITIES ARE BASED STANDARD AHRI/ASHRAE CONDITIONS ON 0°F db AMBIENT AIR, 68°F db AND 57°F wb INDOOR AIR TEMPERATURE.

HEATING CAPACITIES ARE BASED STANDARD AHRI/ASHRAE CONDITIONS ON 95°F db /78°F wb AMBIENT AIR.

AAON, DAIKIN, JCI, TRANE, YORK, OR APPROVED EQUAL

PROVIDE UNIT WITH FACTORY MOUNTED END DEVICES AND TERMINAL STRIPS FOR CONTROLS FOR INTEGRATION INTO BUILDING AUTOMATION SYSTEM. TEMPERATURE CONTROLS CONTRACTOR SHALL PROVIDE FIELD MOUNTED CONTROL PANEL, REFER TO DRAWINGS FOR LOCATION.

PROVIDE UNIT WITH ENERGY RECOVERY SCHEDULE

REPLACE WITH ABOVE.

PROVIDE UNIT WITH TERMINAL STRIP FOR FIELD TERMINATIONS BY HVAC CONTROLS CONTRACTOR. EQUIPMENT PROVIDER SHALL FURNISH POINTS LIST AT TIME OF EQUIPMENT SHOP DRAWING SUBMITTAL FOR FULL TRANSPARENCY AND NECESSARY INFORMATION FOR CONTROLS DESIGN.

PROVIDE UNIT WITH MOTOR/BLOWER VIBRATION ISOLATION.

PROVIDE UNIT WITH 10" BASE RAIL (OR HIGHER TO SUIT NECESSARY PIPING ARRANGEMENT).

MAINTAIN MINIMUM MANUFACTURER'S RECOMMENDED CLEARANCES AND ACCESS TO FILTERS AND COILS.
### SINGLE DUCT AIR TERMINAL UNIT WITH HOT WATER HEAT SCHEDULE

<table>
<thead>
<tr>
<th>UNIT</th>
<th>MFR</th>
<th>CAPACITY</th>
<th>VOLTAGE</th>
<th>P.H.P.</th>
<th>いったん</th>
<th>LOCATION</th>
<th>ROWS</th>
<th>DESCRIPTION</th>
<th>VENTS</th>
<th>VENTS SIZE</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>JCI</td>
<td>2,000</td>
<td>115V / 1</td>
<td>375</td>
<td>-</td>
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<tr>
<td>2</td>
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### DUCTLESS SPLIT HEAT PUMP EQUIPMENT SCHEDULE

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### VENTILATING FAN SCHEDULE

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### LOUVER SCHEDULE

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### intAKE HOOD SCHEDULE

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</table>
### Laboratory Fume Hood Exhaust Fan Schedule

<table>
<thead>
<tr>
<th>Description</th>
<th>Revision</th>
<th>TRANE</th>
<th>DAIKIN</th>
<th>YORK</th>
<th>APPROVED EQUAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROVIDE FAN WITH VFD FOR SYSTEM BALANCING. MAINTAIN TOTAL FAN CFM AT ALL TIMES.</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROVIDE UNIT WITH ANT-VIBRATION MONITORING SYSTEM FOR INTEGRATION INTO BAS.</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FAN ASSEMBLY SHALL WITHSTAND WIND LOADS UP TO 125 MPH WITHOUT ADDITIONAL STRUCTURAL SUPPORT.</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHERS WITHOUT THE PRIOR WRITTEN PERMISSION OF THE MANUFACTURER SHALL NOT BE ACCEPTED.</td>
<td>4</td>
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</table>

### Electrical Data

<table>
<thead>
<tr>
<th>Description</th>
<th>Revision</th>
<th>TRANE</th>
<th>DAIKIN</th>
<th>YORK</th>
<th>APPROVED EQUAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>INDEPENDENT AUTOMATIC FLOW LIMITER (BELL AND GOSSETT CIRCUIT SENTRY OR APPROVED EQUAL). REFER TO DETAIL.</td>
<td>5</td>
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<tr>
<td>NAMEPLATE DATA SHALL BE LIGHT GRAY.</td>
<td>6</td>
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</table>

### Supply Air Valve Schedule

<table>
<thead>
<tr>
<th>Description</th>
<th>Revision</th>
<th>TRANE</th>
<th>DAIKIN</th>
<th>YORK</th>
<th>APPROVED EQUAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROVIDE FAN SHAFT CONSTRUCTED OF 1040 STEEL COATED WITH CORROSION RESISTANT COATING. SHAFT BEARINGS SHALL BE SIZED FOR L-10 LIFE OF 200,000 HOURS. PROVIDE STAINLESS STEEL EXTENDED LUBE LINES WITH ZERK FITTINGS FOR SHAFT BEARINGS.</td>
<td>7</td>
<td></td>
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<tr>
<td>ANY UNITEMTEDWISE BE MENTIONED AS CUSTOMER MANUFACTURED ITEMS MUST BE AS FURTHER AGREED.</td>
<td>8</td>
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</table>

### Hot Water Reheat Coil Schedule

<table>
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<tr>
<th>Description</th>
<th>Revision</th>
<th>TRANE</th>
<th>DAIKIN</th>
<th>YORK</th>
<th>APPROVED EQUAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROVIDE FAN WITH MATCHING DIA OF CORR-PROOF COILS. PRIOR TO INSTALLATION, ALL FAN SYSTEM COMPONENTS SHALL BE PROVIDED WITH A CORROSION RESISTANT COATING WITH A POWDER COAT OF 70% ZINC-RICH EPOXY APPLICATION, AND A POWDER COAT OF HI-PRO POLYESTER RESIN. HERESITE P-413C SHALL ALSO BE ACCEPTABLE. COATING SYSTEM</td>
<td>9</td>
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<td></td>
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</tr>
<tr>
<td>PROVIDE UNIT WITH MATCHING DIA OF COOL-PROOF COILS. PRIOR TO INSTALLATION, ALL FAN SYSTEM COMPONENTS SHALL BE PROVIDED WITH A CORROSION RESISTANT COATING WITH A POWDER COAT OF 70% ZINC-RICH EPOXY APPLICATION, AND A POWDER COAT OF HI-PRO POLYESTER RESIN. HERESITE P-413C SHALL ALSO BE ACCEPTABLE. COATING SYSTEM</td>
<td>10</td>
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</tr>
<tr>
<td>PROVIDE UNIT WITH MATCHING DIA OF DRY-PROOF COILS. PRIOR TO INSTALLATION, ALL FAN SYSTEM COMPONENTS SHALL BE PROVIDED WITH A CORROSION RESISTANT COATING WITH A POWDER COAT OF 70% ZINC-RICH EPOXY APPLICATION, AND A POWDER COAT OF HI-PRO POLYESTER RESIN. HERESITE P-413C SHALL ALSO BE ACCEPTABLE. COATING SYSTEM</td>
<td>11</td>
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</tr>
<tr>
<td>PROVIDE UNIT WITH MATCHING DIA OF VAPOR-PROOF COILS. PRIOR TO INSTALLATION, ALL FAN SYSTEM COMPONENTS SHALL BE PROVIDED WITH A CORROSION RESISTANT COATING WITH A POWDER COAT OF 70% ZINC-RICH EPOXY APPLICATION, AND A POWDER COAT OF HI-PRO POLYESTER RESIN. HERESITE P-413C SHALL ALSO BE ACCEPTABLE. COATING SYSTEM</td>
<td>12</td>
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</tbody>
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*Note: The table and the rest of the text may contain technical specifications and requirements specific to laboratory fume hood exhaust fan systems, detailing the necessary components and conditions to ensure proper operation and safety.*
**COOLER / FREEZER EVAPORATOR AND CONDENSING UNIT EQUIPMENT SCHEDULE**

<table>
<thead>
<tr>
<th>Model</th>
<th>Make</th>
<th>Description</th>
<th>HP</th>
<th>Amps</th>
<th>Voltage</th>
<th>Phase</th>
<th>Size</th>
<th>Nominal</th>
<th>RATED</th>
<th>Weight</th>
<th>Model</th>
<th>Number</th>
<th>Remarks</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHU-1</td>
<td>GLYCOL LOOP BELL &amp; GOSSETT</td>
<td>40 GLYCOL TANK</td>
<td>7.5</td>
<td>4</td>
<td>460V</td>
<td>3Ø</td>
<td>14&quot; X 8&quot;</td>
<td>520</td>
<td>1,750</td>
<td>318</td>
<td>E-1510</td>
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**CONDENSING BOILER SCHEDULE**

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<th>Capacity</th>
<th>kW</th>
<th>Power</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Area Served</th>
<th>MFR.</th>
<th>Model</th>
<th>Number</th>
<th>Remarks</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>FREEZER C116</td>
<td>8,500</td>
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<td>1,750</td>
<td>1,750</td>
<td>FREEZER C116</td>
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<td>3.6</td>
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**HYDRONIC PUMP SYSTEM SCHEDULE**

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<th>kW</th>
<th>EER</th>
<th>I.P.L.V.</th>
<th>R.H.</th>
<th>STAGES</th>
<th>Size</th>
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<tbody>
<tr>
<td>BELL &amp; GOSSETT</td>
<td>200</td>
<td>98.0</td>
<td>3</td>
<td>0.3</td>
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<td>4.0</td>
<td>57.2 / 54.9</td>
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<td>COOLER C114</td>
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**GLYCOL MAKE-UP UNIT SCHEDULE**

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**DIFFUSER AND GRILLE SCHEDULE**

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**BUFFER TANK SCHEDULE**

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**HYDRONIC FLOW METER SCHEDULE**

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MECHANICAL DEMOLITION NOTES

1. REMOVE EXISTING PLUMBING VENT IN ITS ENTIRETY. REFER TO ARCHITECTURAL DRAWINGS FOR ROOF WORK.

2. REMOVE EXISTING ROOF DRAIN IN ITS ENTIRETY. REFER TO ARCHITECTURAL DRAWINGS FOR ROOF WORK.

3. REMOVE EXISTING EXHAUST FAN AND CURB IN ITS ENTIRETY. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF ROOF TO MATCH EXISTING.

4. EXISTING ROOF HATCH

ELECTRICAL DEMOLITION NOTES

1. REMOVE ELECTRICAL CONDUITS, WIRING, DISCONNECT, ETC. IN ITS ENTIRETY.
MECHANICAL
DEMOLITION NOTES

1 REMOVE EXISTING PLUMBING VENT IN IT'S ENTIRETY. REFER TO
ARCHITECTURAL DRAWINGS FOR ROOF WORK.

2 REMOVE EXISTING ROOF DRAIN IN IT'S ENTIRETY. REFER TO
ARCHITECTURAL DRAWINGS FOR ROOF WORK.

3 REMOVE EXISTING EXHAUST FAN AND CURB IN ITS ENTIRETY. REFER TO
ARCHITECTURAL DRAWINGS FOR PATCHING OF ROOF TO MATCH EXISTING.

4 REMOVE EXISTING BOILER FLUE IN IT'S ENTIRETY. REFER TO
ARCHITECTURAL DRAWINGS FOR ROOF WORK.

5 REMOVE EXISTING OUTSIDE AIR DUCT, SUPPORTS, INSULATION, ETC. IN ITS
ENTIRETY.

6 REMOVE EXISTING UTILITY EXHAUST FAN AND CURB IN ITS ENTIRETY.
REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF ROOF TO MATCH
EXISTING.

7 EXISTING WEATHER STATION SHALL REMAIN. PROJECT DURING
CONSTRUCTION. REMOVE AND REINSTALL AS NECESSARY.

ELECTRICAL
DEMOLITION NOTES

1 REMOVE ELECTRICAL CONDUITS, WIRING, DISCONNECT, ETC. IN ITS
ENTIRETY.

DEMO ROOF PLAN - AREA B

KEY PLAN

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JRA ARCHITECTS HAS RETAINED AN
ELECTRONIC VERSION OF THESE
DRAWINGS. THE CLIENT AGREES NOT TO
REUSE THESE DRAWINGS - IN ELECTRONIC
OR ANY OTHER FORMAT - IN WHOLE, OR IN
PART, FOR ANY PURPOSE OTHER THAN FOR
THE PROJECT. THE CLIENT AGREES NOT TO
TRANSFER THESE ELECTRONIC FILES TO
OTHERS WITHOUT THE PRIOR WRITTEN
CONSENT OF THE ARCHITECT. THE CLIENT
FURTHER AGREES TO WAIVE ALL CLAIMS
AGAINST THE ARCHITECT RESULTING IN ANY
WAY FROM ANY UNAUTHORIZED CHANGES
TO OR REUSE OF THE ELECTRONIC FILES
FOR ANY OTHER PROJECT BY ANYONE
OTHER THAN THE ARCHITECT.


**Construction Documents**

**Mechanical Construction Notes**

- **SD-1**
- **RF204**
- **RF205**

**Electrical Construction Notes**

- **SD-1**
- **RF204**
- **RF205**

**Mechanical**

- **MECH-1**
- **MECH-2**
- **MECH-3**

**Electrical**

- **ELEC-1**
- **ELEC-2**
- **ELEC-3**

**Construction Notes**

- **CONSTR-1**
- **CONSTR-2**
- **CONSTR-3**

**Field Notes**

- **FIELD-1**
- **FIELD-2**
- **FIELD-3**

**Technical Notes**

- **TECH-1**
- **TECH-2**
- **TECH-3**

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**Mechanical Notes**

- **MECH-1**
- **MECH-2**
- **MECH-3**

**Electrical Notes**

- **ELEC-1**
- **ELEC-2**
- **ELEC-3**

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**Field Notes**

- **FIELD-1**
- **FIELD-2**
- **FIELD-3**

**Technical Notes**

- **TECH-1**
- **TECH-2**
- **TECH-3**

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**Construction Notes**

- **CONSTR-1**
- **CONSTR-2**
- **CONSTR-3**

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**Notes**

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- **NOTE-2**
- **NOTE-3**

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**Details**

- **DET-1**
- **DET-2**
- **DET-3**

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**Sections**

- **SEC-1**
- **SEC-2**
- **SEC-3**

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**Notes**

- **NOTE-4**
- **NOTE-5**
- **NOTE-6**

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**Details**

- **DET-4**
- **DET-5**
- **DET-6**

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**Sections**

- **SEC-4**
- **SEC-5**
- **SEC-6**
### STANDBY EMERGENCY GENERATOR SYSTEM

- CAT6 DATA VOICE CABLES SHALL BE TERMINATED ON PATCH PANELS IN MDF/IDF'S.
- PATCH PANELS AND ATTACHED TO THE TOP LEFT HAND CORNER OF EACH PATCH PANEL DEPICTING THE WIRING CLOSET.

### ELECTRICAL DEMOLITION NOTE

- UON FOR DROPS CONCEALED IN WALLS.
- FURNISH REQUIRED VIDEO DISTRIBUTION AMPLIFIER(S), CONNECTORS, CIRCUIT BREAKERS, GFI, FUSED DISCONNECT SWITCH, FOR DROPS CONCEALED IN WALLS.
- THE PROJECT.  THE CLIENT AGREES NOT TO
- SHALL BE SUPERIOR MODULAR, ORTRONICS OR LEVITON.  THE QUANTITY AND SIZE OF THE PATCH PANEL(S) (5) - REFER TO ARCHITECTURAL DOOR HARDWARE SPECIFICATIONS.

### FIRE DOCUMENT BOX

- THE FIRE DOCUMENT BOX (FDB) SHALL BE CONSTRUCTED OF 16 GAUGE COLD ROLLED STEEL (CRS); IT SHALL BE PAINTED WITH A DURABLE.
- OVER RIDE PAGING SYSTEM AND MUTE SOUND.
- 1.5.2.3 ELECTRICAL
- 1.5.2.2 ECHO SYSTEM
- 1.4 LIGHT FIXTURE NOTE:
- 1.3.5 SYSTEM
- LIGHT FIXTURE NOTE:
- LEAD: BATTERIES IN EMERGENCY LUMINAIRES, EXIT SIGNS, FIRE ALARM PANELS, SECURITY
- PCBS: OIL-FILLED TRANSFORMERS; POTTING MATERIAL AND/OR CAPACITORS IN LIGHTING BALLASTS;
- ASBESTOS: PIPE INSULATION, ELECTRICAL INSULATION
- 10/20/2017

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### SEQUENCE OF WORK

#### VOICE AND DATA SYSTEMS GENERAL REQUIREMENTS

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#### ABBREVIATIONS

- CR: COLD ROLLED STEEL
- CRS: COLD ROLLED STEEL
- MCB: MAIN CIRCUIT BREAKER
- SPA: SERVICE PANEL
- D#-INDICATES NUMBER OF DATA PORTS AND CABLES DROPS.
- NSC: NON-METAL CONDUIT
- NSP: NON-METAL CONDUIT PANEL
- WSD: WALL SCONCEDED DISTRIBUTION
- WSD-PDT-SA-(COLOR OPTIONS) WALL VACANCY SENSOR SWITCH.
- WSD-PDT-CT-(COLOR OPTIONS) WALL CONTROL SWITCH.
- WSC: WALL SCONCEDED DISTRIBUTION
- WSD-PDT-SA-(COLOR OPTIONS) WALL VACANCY SENSOR SWITCH.
- WSD-PDT-CT-(COLOR OPTIONS) WALL CONTROL SWITCH.
- WSD-PDT-SA-(COLOR OPTIONS) WALL VACANCY SENSOR SWITCH.
- WSD-PDT-CT-(COLOR OPTIONS) WALL CONTROL SWITCH.
- WSD-PDT-SA-(COLOR OPTIONS) WALL VACANCY SENSOR SWITCH.
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- WSD-PDT-SA-(COLOR OPTIONS) WALL VACANCY SENSOR SWITCH.
- WSD-PDT-CT-(COLOR OPTIONS) WALL CONTROL SWITCH.
ELECTRICAL DEMO LIGHTING
FIRST FLOOR PLAN - AREA A

GENERAL NOTES:
1. DISCONNECT AND REMOVE ALL LIGHT FIXTURES, WIRING, AND CONDUIT BACK TO SOURCE.
2. DISCONNECT AND REMOVE ALL SWITCHING DEVICES AND WIRING. ABANDON CONDUIT IN WALLS THAT SHALL REMAIN. PATCH WALL FOR ANY SWITCH LOCATION THAT IS NOT RE-USED IN CONSTRUCTION PHASE.

DISCONNECT AND REMOVE WALL MOUNTED LIGHT FIXTURE ALL ASSOCIATED WIRING AND CONDUIT BACK TO SOURCE. PATCH WALL AS REQUIRED.

DISCONNECT AND REMOVE EXTERIOR LIGHT FIXTURE REMOVE WIRING BACK TO SOURCE. ABANDON CONDUIT AND PROTECT FOR RE-USE.

CONSTRUCTION DOCUMENTS
GRAIN & FORAGE CENTER OF EXCELLENCE
UNIVERSITY OF KENTUCKY RESEARCH AND EDUCATION CENTER
PRINCETON, KENTUCKY

3225 Summit Square Place, Suite 200
Lexington, Kentucky 40509
859.252.6781

DMN
DMU

DE-101A
ELECTRICAL
DEMO LIGHTING
FIRST FLOOR
PLAN - AREA A

KEY PLAN

FLOOR PLAN
ELECTRICAL DEMOLITION NOTES

1. DISCONNECT AND REMOVE ALL RECEPTACLES, CONDUIT, AND WIRING BACK TO SOURCE.
2. DISCONNECT AND REMOVE ALL COMMUNICATION DEVICES, CONDUIT, AND CABALLING BACK TO SOURCE.
3. DISCONNECT AND REMOVE ALL CLOCK POWER CONNECTIONS, CONDUIT, AND WIRING BACK TO SOURCE. PROVIDE BLANK COVER PLATE.
4. DISCONNECT AND REMOVE ALL POWER CONNECTIONS TO MECHANICAL EQUIPMENT, CONDUIT, AND WIRING BACK TO SOURCE.
5. DISCONNECT AND REMOVE ALL FIRE ALARM DEVICES IN ITS ENTIRETY.
1. Disconnect and remove all electrical panels in their entirety back to source.

2. Disconnect and remove all communication devices, conduit, and caballining during construction. Disconnect shall be removed and replaced.

3. Disconnect and remove all power connections to mechanical equipment, back to source. Provide blank cover plate.

4. Disconnect and remove door holds. Patch and repair floor as required.

5. Disconnect and remove switch gear.

6. Point of connection for power shall be reconnected.

Lexington, Kentucky 40509

859.252.6781
1. Copper grounding bar, ⌀ 1/4" minimum to panelboard bars.
2. Grounding connection, ⌀ 1/4" minimum.
3. Ground bar, ⌀ 1/4" minimum.
4. Earth connection, ⌀ 1/4" minimum.
5. Cable tray bonding detail.

COMMUNICATIONS GROUND BAR DETAIL

GROUNDING SYSTEM DIAGRAM

CABLE TRAY BONDING DETAIL

MINIMUM CABLE TRAY CLEARANCES

1. Copper grounding bar, ⌀ 1/4" minimum to panelboard bars.
2. Grounding connection, ⌀ 1/4" minimum.
3. Ground bar, ⌀ 1/4" minimum.
4. Earth connection, ⌀ 1/4" minimum.
5. Cable tray bonding detail.

GROUNDING ELECTRODE FOUNDATION CONNECTION DETAIL

1. Copper grounding bar, ⌀ 1/4" minimum to panelboard bars.
2. Grounding connection, ⌀ 1/4" minimum.
3. Ground bar, ⌀ 1/4" minimum.
4. Earth connection, ⌀ 1/4" minimum.
5. Cable tray bonding detail.

MINIMUM CABLE TRAY CLEARANCES

1. Copper grounding bar, ⌀ 1/4" minimum to panelboard bars.
2. Grounding connection, ⌀ 1/4" minimum.
3. Ground bar, ⌀ 1/4" minimum.
4. Earth connection, ⌀ 1/4" minimum.
5. Cable tray bonding detail.

MINIMUM CABLE TRAY CLEARANCES

1. Copper grounding bar, ⌀ 1/4" minimum to panelboard bars.
2. Grounding connection, ⌀ 1/4" minimum.
3. Ground bar, ⌀ 1/4" minimum.
4. Earth connection, ⌀ 1/4" minimum.
5. Cable tray bonding detail.
SEQUENCE OF OPERATIONS

1. Up Upon occupant entry, all lights must be turned on automatically to full. Fan must be turned on automatically.

2. Manual on: occupant enters turns lights on manually at wall switch. Sensor off: all lights automatically shut off 30 minutes after all occupants exit. Dimming:

   - Daylight: lights automatically dimmed to occupants preference or programmed at two preset levels at wall box switch.

3. Manual on: occupants enter turns lights on manually at wall switch. Sensor off: all lights automatically shut off 30 minutes after all occupants exit. Dimming:

   - Daylight: lights automatically dimmed to occupants preference or programmed at two preset levels at wall box switch.


PARTIAL COMMUNICATIONS UTILITY AND LAN BACKBONE
CABLE ROUTING (AREA "A" SEQUENCE) DETAIL

10/20/2017

PARTIAL COMMUNICATIONS UTILITY AND LAN BACKBONE
CABLE ROUTING (AREA "B" & "C" SEQUENCE) DETAIL

10/20/2017
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<td>FOR ANY OTHER PROJECT BY ANYONE JRA ARCHITECTS HAS RETAINED AN SPARE RCP.</td>
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**Electrical A1 Schedule**

**Electrical B1 Schedule**

**Electrical C1 Schedule**

**Electrical EA1 Schedule**

**Electrical EB1 Schedule**

**Electrical EC1 Schedule**
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<th>Circuit No.</th>
<th>Area Served</th>
<th>Panel Size:</th>
<th>MCB</th>
<th>Min SCC:</th>
<th>Tray</th>
<th>Volts/Phase/Wire:</th>
<th>Receptacles (0 - 10 KVA):</th>
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**Note:** The table contains detailed information about electrical systems and components, including circuit numbers, areas served, panel sizes, MCBs, minimum SCCs, and specific electrical parameters such as volts/phase/wire and receptacles.
SECTION 115300 - LABORATORY EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Snorkel exhaust.
   2. Gas cylinder racks.
   3. Vacuum Pumps
   4. Installation of Owner-furnished equipment in accordance with Equipment Schedule.

B. Related Sections include the following:
   1. Section 061053 "Miscellaneous Rough Carpentry" for wood blocking and nailers.
   2. Section 115313 "Laboratory Fume Hoods."
   3. Division 22 and 26 Sections for plumbing and electrical Work associated with installation of laboratory equipment.

1.3 SUBMITTALS

A. Shop Drawings: Identify all materials, gages, and finishes. Indicate all dimensions and fabrication and installation details, including methods of attachment to adjoining work. Indicate location and types of all required utility connections. Indicate location and types of any required concealed anchorages.

B. Product Data: Submit manufacturer's specifications, catalog sheets, brochures, diagrams, performance charts, installation instructions, and any other descriptive literature.
   1. Clearly mark each copy to identify pertinent materials, products or models. Delete information not applicable to the Project.
   2. Indicate dimensions and required clearances.
   3. Clearly identify discrepancies between the specification requirements and submitted product, if any.

C. Operating and Maintenance Data: Prepare and submit data for incorporating into the Project Maintenance Manuals, including:
   1. Maintenance and operating instructions for each item of equipment, including parts lists.
   2. Indicate capability of servicing equipment by local factory authorized service agencies listing:
      a. Firm name.
      b. Firm address.
      c. Firm telephone number.
1.4 QUALITY ASSURANCE
   A. Manufacturer's Qualifications: Equipment manufacturers specified in this Section shall have a minimum of 5 years' experience in the manufacture of laboratory equipment of types required.
   B. Product Standards: Provide equipment that UL listed and labeled for compliance with appropriate standards.

1.5 DELIVERY AND HANDLING
   A. Deliver equipment in manufacturer's original unopened containers or packaging with identifying labels intact and legible, clearly identifying product, scheduled to arrive at time of installation sequence requirements.
   B. Containers or packaging showing indication of damage that may affect condition of contents will not be accepted.
   C. Store equipment in original packaging, under cover, in accordance with manufacturer's recommendations in a manner that prevents damage from water or construction activities.
   D. Handle equipment in a manner that prevents physical damage to products or finishes.

1.6 PROJECT CONDITIONS
   A. Verify all required dimensions at job site. Make known any discrepancies affecting the work specified to the Architect. The Architect will clarify the discrepancies in writing before work proceeds.

PART 2 - PRODUCTS

2.1 EQUIPMENT
   A. The intent of these specifications is to require equipment that matches equipment installed in other portions of the existing building.
   B. Refer to Drawings to coordinate the locations of the listed items of equipment.

2.2 SNORKEL EXHAUST
   A. Ceiling Mounted Snorkel Exhaust
   B. Size and Characteristics
      1. Standard Version
      2. Provide with external gas spring for better stability.
      3. Dome Hood
      4. Standard 360 degree Ceiling Bracket
2.3 GAS CYLINDER RACKS

A. Painted Steel Floor Mounted Tank Restraint:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Painted Steel Floor Mounted Tank Restraint by Flexstrut or comparable product.
   2. Fabrication: 2 inch by 2 inch, 11 gauge welded steel tube.
   3. Color: As selected by Architect from manufacturer’s full range.
   4. Safety Chain: Provide non-kink zinc plated safety with thumb clasps for each cylinder per rack configuration.
   5. Configuration: As indicated on Drawings, one safety chain per cylinder.
      a. Height: 30 inches high.
      b. Capacity: Holds up to 10 inch diameter cylinders.
   6. Accessories: Provide each rack with 16 gauge Type 304 stainless-steel plate mounted to bottom of each rack bottom. Plate shall be between the floor finish and rack; used to protect flooring from cylinder.

B. Stainless Steel Wall Mounted Tank Restraint:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Custom Wall Mounted Tank Restraint by New England lab or comparable product.
   2. Fabrication: Stainless steel welded round steel tube.
   3. Color: #4 finish.
   4. Safety Chain: Provide non-kink zinc plated safety with thumb clasps for each cylinder per rack configuration.
   5. Configuration: As indicated on Drawings, one safety chain per cylinder.
      a. Height: 30 inches high.
      b. Capacity: Holds up to 10 inch diameter cylinders.
   6. Accessories: Provide each rack with 16 gauge Type 304 stainless-steel plate mounted to bottom of each rack bottom. Plate shall be between the floor finish and rack; used to protect flooring from cylinder.

2.4 VACUUM PUMP

A. Point of use Vacuum Pump (Plant Microbiology & Clean Labs only)

B. Characteristics:
   1. 70 mbar ultimate vacuum
   2. 2.3 CFM max pumping speed
   3. Power cord
   4. 2 AK Pump
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and building utility services to receive laboratory equipment. Verify dimensions and locations of services.

B. Verify built-in anchorages and reinforcements required for installation of equipment are properly installed and located.

C. Coordinate with mechanical and electrical trades for location, size and type of service required.

D. Notify Architect, in writing, of any deviations or unacceptable conditions. Do not proceed with installation of equipment until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Engage qualified craftsmen with experience installing laboratory equipment.

B. Set equipment items plumb, square, true to line and level. Securely anchor each item.

C. Install, connect and test each item of equipment in accordance with the manufacturer's instructions and approved shop drawings. Eliminate all crevices, cracks and spaces in areas that would be difficult to clean or keep free of rodents, insects or other pests; seal such cracks, crevices and spaces with approved metal trim fillers or elastomeric sealant.

D. Where connections are made between dissimilar metals, provide dielectric fittings to prevent electrolytic corrosion.

E. Scribe to walls, use proper type anchoring devices for materials and intended usage.

F. Sequence installations to ensure utility service connections are affected in an orderly and expeditious manner.

G. Disconnect existing equipment and legally cap all connected service lines. Restore finishes where damaged by removal of existing equipment.

3.4 ADJUST AND CLEAN

A. After completion of installation, repair, or remove and replace, any defective work or materials as directed by Architect.
B. Clean all visible surfaces, including interior surfaces of components, removing dust, dirt, refuse, and debris. Use only manufacturer recommended or approved cleaning methods and materials.

3.5 PROTECTION

A. Advise Contractor of procedures and precautions for protection of materials, surfaces, and equipment, from damage by other construction activities.

END OF SECTION 115300
SECTION 115313 – LABORATORY FUME HOODS AND RELATED PRODUCTS

PART 1: DESCRIPTION OF WORK

1.00 SUMMARY

A. Section Includes:
   Based on Kewaunee Scientific Corporation’s Supreme Air Venturi Series fume hood design, furnish and install all fume hoods, work tops, and understructures. Furnishing and installing all filler panels, knee space panels and scribes as shown on drawings.

B. Furnishing and delivering all service outlets, accessory fittings, electrical receptacles and switches, as listed in these specifications, equipment schedules or as shown on drawings. Plumbing fittings mounted on the fume hood superstructures shall be pre-plumbed per section 2.01.I. Electrical fixtures shall be prewired per section 2.01.J. The fume hood superstructure shall be listed to UL Standards for Safety by Underwriters Laboratories Inc. (UL). Final plumbing and electrical connections are the responsibility of those contractors fulfilling requirements of Divisions 15 and 16.

C. Removal of all debris, dirt and rubbish accumulated as a result of the installation of the fume hoods to an on-site container provided by others, leaving the premises clean and orderly.

D. Related Divisions:
   1. Division 12: Laboratory Casework
   2. Division 22: Plumbing
   3. Division 23: HVAC
   4. Division 26: Electrical

E. Related Publications:
   2. NIH03-112C - National Institute of Health Specification
   3. UL - Underwriters Laboratories
   4. ASTM D552 - Bending Test
   5. NFPA-45 - National Fire Protection Association

1.01 BASIS OF WORK

A. It is the intent of this specification to use Kewaunee Scientific Corporation, Statesville, North Carolina, as the standard of construction for laboratory fume hoods. The construction standards of the Kewaunee Supreme Air Venturi fume hood shall provide the basis for quality and functional installation.

B. Supply all equipment in accordance with this specification. The offering of a product differing in materials and construction from this specification requires written approval. This approval must be obtained seven (7) days before the proposal deadline.

C. General Contractors should secure a list of approved fume hood manufacturers from the architect as a protection against non-conformance to these specifications.

D. The owner/architect reserves the right to reject qualified or alternate proposals and to award based on product value where such action assures the owner greater integrity of product.

E. Submittals:
   1. Manufacturer's Data:
      Submit manufacturer's data and installation instructions for each type of fume hood. Provide data
indicating ASHRAE Standard 110.2016 has been successfully completed per section 1.02 C along with manufacturers "As Manufactured" testing procedure.

2. Samples:
   Samples if called for will be reviewed for color, texture, and pattern only. Submit the following:
   a. Hood interior lining, 6 by 6 inches.
   b. Hood enclosure, 6 by 6 inches, of color selected.
   c. Operation sign(s).

3. Shop Drawings:
   a. Submit shop drawings for fume hoods showing plans, elevations, ends, cross-sections, service run spaces, location and type of service fittings:
   b. Coordinate shop drawings with other work involved.
   c. Provide roughing-in drawings for mechanical and electrical services when required.
   d. Provide face opening, air volume, and static pressure drop data.

4. Non-Specified Manufacturer's Samples:
   A sample from each non-specified manufacturer will be required and reviewed per specification. This sample shall be delivered, at no cost to the architect or owner to a destination set forth by the architect or owner. The sample must then be tested per section 1.02.C by an independent test agency hired by the submitting company and approved by the owner/architect. A passing test and owner/architect approval of the prototype must be written and approved seven (7) days before quotation deadline as a condition of acceptance for any quotation participant.

1.02 STANDARD FUME HOOD PERFORMANCE REQUIREMENTS

A. Fume hoods shall be Kewaunee’s Supreme Air Venturi model with belted counterweight sash design, electronic sash stop and adjustable LED lighting. Sash and air entry framework of the hood shall minimize eddying of air currents at the hood face, and vertical rear baffle system shall minimize turbulence and vortexes in all portions of the hood interior.

B. Standard Venturi Fume Hood Types

Variable Air Volume (VAV) Fume Hood:
1. VAV Fume Hood
2. Notched belt and sprocket sash system
3. Electronic sash stop at 18”
4. LED lighting, with (10) variable intensity and (3) color range
5. Unobstructed viewing height to be minimum 38.5”

C. Containment:
   1. The purpose of this specification is to pre-qualify the performance of the bidder's laboratory fume hood before award of contract. At their option, owners or their representatives may require the same tests to be performed and the same performance be achieved before acceptance of the hood after award of contract. The owner or their representative shall witness the tests. Failure to meet the performance specified shall be cause for rejection of the bidder.

2. Test Method:
   The hood shall be tested per the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Standard 110-2016.

3. Location of Tests and Test Facility:
   All tests referenced herein shall be performed in the bidder's fume hood test facility. Field-testing is described in Section 3.01.F.
   The test facility shall meet the following requirements:
a. The test facility shall have sufficient area so that a minimum of 5 feet of clear space is available in front of and on both sides of the hood for viewing tests.
b. The facility's ventilation system shall have adequate heating and air conditioning so that room air temperatures can be maintained within the desired ranges.
c. Standard room air currents in the test area shall be less than 15 FPM.
d. The hood exhaust system shall be properly calibrated so that the desired exhaust air volumes can be easily attained.
e. Make-up air to the test room shall be ceiling-supplied as in a standard chemical laboratory.

4. Instrumentation, Equipment and Test Personnel:
   Qualified personnel to perform the tests shall be supplied by the bidder. Instrumentation and equipment required shall be supplied by the bidder at their expense. Required instrumentation shall include but not be limited to the following items:
   a. Thermal anemometer capable of measuring air velocities from 10 to 600 ft./minute
   b. One-half minute smoke candles or other source of high volume smoke
   c. Smoke tubes or other source of localized smoke
   d. Miran 103 analyzer calibrated to indicate concentration of sulfur hexafluoride or equivalent.
   e. Flowmeter - 15 L/minute capacity
   f. Tank of sulfur hexafluoride with a two-stage regulator or other tracer gas suitable for detector to be used
   g. Adjustable mannequin, 5' 0' to 5'8" in height, with reasonable human proportions and arms hanging at its side
   h. ASHRAE 110-2016 tracer gas ejector

5. ASHRAE Test (Choose One):
   Standard 110-2016 Test
   Hood shall be tested with a face velocity of 50 FPM with the sash at the maximum opening, 28". The hood shall have a performance rating in the static portion of ASHRAE 110-2016 (Section 7.1-7.10) of AM 0.01 or better wherein:
   AM = as manufactured

6. ASHRAE 110-2016 Perimeter, Sash Movement Tests, and Cross Draft Requirements:
   a. The hood shall have a maximum perimeter reading (Section 7.11) of 0.01 PPM or less.
   b. The hood shall have a maximum sash movement value (Section 7.12) of 0.05 PPM or less.

7. Twisting Manikin Test
   A manikin mounted to a twisting base will be placed in standard ASHRAE 110 position. Arms will be altered to hold objects similar in dimension to two 600 ml beakers inside the hood. Manikin twist angle will be such that at the extreme right and left rotational positions, one “beaker” is outside the sash plane. At a rotation rate of 4 cycles per minute, a four-minute run will be undertaken with a sensor in the manikin breathing zone. Average breathing zone concentration shall remain less than 0.05 PPM.

1.03 QUALITY ASSURANCE

A. The laboratory fume hood manufacturer shall provide fume hood work tops and casework all manufactured or shipped from the same geographic location to assure proper staging, shipment and single source responsibility.
B. General Performance: Provide certification that fume hoods meet the performance requirements described in section 1.02.C.

PART 2 - PRODUCTS

2.00 MANUFACTURERS

A. The basis of this specification is the Supreme Air Venturi fume hood as manufactured by Kewaunee Scientific Corporation, 2700 West Front Street, Statesville, North Carolina.

B. All laboratory equipment covered by the specification shall be the product of one manufacturer and be fabricated at one geographic location to assure shipping continuity and single-source responsibility. All quotations from a manufacturer other than Kewaunee Scientific shall contain a review of the following capabilities:
   1. List of shop facilities
   2. List of engineering and manufacturing personnel
   3. Proof of financial ability to fulfill the contract
   4. List of a minimum of ten installations over the last five years of comparable scope
   5. Proof of project management and installation capabilities

C. The selected manufacturer must warrant for a period of one-year starting (date of acceptance or occupancy, whichever comes first) that all products sold under the contract referenced above shall be free from defects in material and workmanship. Purchaser shall notify the manufacturer's representative immediately of any defective product. The manufacturer shall have a reasonable opportunity to inspect the goods. The purchaser shall return no product until receipt by purchaser of written shipping instructions from the manufacturer.

2.01 MATERIALS AND CONSTRUCTION

A. Fume Hood Superstructure Frame:
   A structure of steel support members shall be provided to support exterior panels and interior liner and baffle panels. To allow for maintenance and replacements, the baffle panels shall be removable without disassembly of the frame structure and outer steel panels. Likewise, the exterior steel panels shall be removable without disassembly of the frame structure and inner liner panels.

B. Fume Hood Side Walls:
   Double wall ends, not more than 4.5" wide, with sash track flush with front vertical fascia, shall be provided to maximize interior working area. This fascia shall contain space for the required service controls and electrical devices. The front vertical fascia shall be in a plane 45° from the hood face and incorporate a Venturi port to provide accelerating air through the lower corners of the face opening.

C. Fume Hood Dimensions:
   Double wall end panel thickness shall not exceed 4.5". Interior clear working height shall be not less than 48" at any location in the interior of the hood on bench hoods. Interior depth from the back of the sash to the front of the rear baffle shall not be less than 24". The sash opening shall be not less than 28" in height above the worksurface on bench hoods.

D. Fume Hood Airfoil:
   A 12 gauge painted steel, convergence z-cross section airfoil shall be mounted flush to the worksurface immediately in front of the sash plane. It shall nest into the Venturi port on each side, and provide no open space between it and the top front edge of the worksurface. Raised airfoils, or flush designs that create openings within the hood chamber, are not acceptable.
E. Fume hood top panel shall incorporate a Venturi type dynamic barrier bypass providing a clean air stream behind the sash plane.

F. Fume Hood Baffles:
The fume hood baffles shall be fixed, and constructed of the same material as the hood lining. They shall consist of multiple sections with vertical slots and a continuous horizontal slot at the worksurface. Each baffle panel shall be easily removable from the interior, without the use of tools, or requiring liner disassembly. Mechanical or manually adjustable baffles are not acceptable.

G. Fume Hood Duct Collar:
Each fume hood up to six feet in length shall contain one (1) 12” diameter stainless steel duct collar in the hood roof for exhausting the hood. Fume hoods over six feet in length shall contain two (2).

H. Fume Hood Lighting:
An LED light fixture of the size given below shall be provided in the hood roof. The light shall provide (15) intensity adjustment levels, and (3) color options. Illumination at the worksurface shall be at 100 foot-candles at the full intensity setting. The light fixture shall be isolated from the hood interior by a 1/4” thick tempered glass panel sealed from the hood cavity. Fixture shall be UL listed.

I. Fume Hood Vertical Sash:
A vertical rising sash of 1/4” laminated safety glass shall be provided. The sash shall have a neutral colored polyvinyl chloride horizontal member at the top and a painted full-length aerodynamic aluminum support rail with integral finger pull at the bottom. The sash shall be counterbalanced with a single weight to prevent tilting and binding during operation. The sash shall be connected to the counterweight system with two, 1/2” wide steel-reinforced polyurethane notched belts that engage two sprocket shaft drives. The sash shall provide a 38-1/2” viewing height, with a maximum opening of 28”.

J. Fume Hood Services:
Front Mounted Remote Control Fittings:
Service fitting valves shall be needle valve design and mounted on the hood front vertical fascia with the working components of the valve accessible from the hood exterior. Valves shall be furnished with molded nylon hooded handles with color-coded index buttons and color-coded service outlet.

K. Fume Hood Electrical Fixtures
The hood superstructure shall be pre-wired and contain a UL label certifying acceptable wire gauge, connections, fixtures and wire color-coding. Electrical fixtures shall be specification grade and consist of two side-by-side duplex receptacles per vertical fascia, and a light switch. The receptacles shall be 20 Amp., 125 volt AC, and 3-wire polarized grounded. Each fascia shall be prewired to a single circuit and have a minimum of (1) ground fault interruption device. The light, light switches and electronic sash stop shall be low voltage. Final wiring and circuit dedication shall be by others.

Hood Worksurface"
Epoxy Resin: Raised (marine) edge with beveled or rounded edge and corners. (Kewaunee Slate Color)
Hood worksurface shall be 1-1/4” thick molded epoxy resin made in the form of a watertight pan, not less than 1/2” deep to contain spillage. Top shall be manufactured at the same manufacturing location as the fume hood to assure proper cutout alignment and coordinated shipping.

A cup drain flush with the recessed worksurface, or raised above the worksurface shall be provided when shown.
L. Interior Service Access:
Access to services shall be through a gasketed panel constructed of the same material as the liner. The panel shall be easily removable without the use of tools.

M. Fume Hood Liners
Provide either
KEMGLASS Fiberglass Reinforced Polyester Lining:
Interior liner panels shall be 1/4" thick fiberglass reinforced polyester sheet. Interior liner panels shall be fastened using stainless steel screws with plastic covered heads. The material shall have an ASTM E84 Class A flame spread rating (25 or less).

N. Fume Hood Base Cabinets
1. Standard Steel
   Unless otherwise indicated base units under hoods shall be fabricated of cold rolled prime grade roller leveled furniture steel. Gauges of steel used in construction shall be 18 gauge except as follows:
   a. Corner gussets for leveling bolts and apron corner braces, 12 gauge.
   b. Hinge reinforcements, 14 gauge.
   c. Top and intermediate front horizontal rails, apron rails and reinforcement gussets, 16 gauge.
   d. Door assemblies and adjustable shelves, 20 gauge.
   e. Performance of the painted surfaces shall match that of the fume hood outer panels.

2. Special Purpose Cabinets for Use Under Fume Hoods:
   a. Acid Storage Cabinets:
      Where indicated acid storage cabinets shall use the same gauges of steel and construction features as other base cabinets. In addition, they shall have a one-piece liner insert made of linear low-density polyethylene. The liner insert shall form a one-inch pan at the bottom to retain spillage. Each door will have a set of louvers at the top and bottom. The door shall be lined with a polyethylene sheet. Each cabinet shall be vented into the fume hood with a 1-1/2" flexible vent pipe, providing a positive airflow directly into the fume hood exhaust system.

   b. Solvent Storage Cabinets:
      Solvent storage cabinets shall be FM or UL labeled and specifically designed for the storage of flammable and combustible liquids. Construction shall be based upon the requirements listed by UFC, OSHA, and NFPA No. 30 - 2003. The bottoms, top, sides and doors shall be fabricated of 18-gauge steel and shall be all double panel construction with a 1-1/2" air space between panels. All joints shall be welded, or screwed, to provide a rigid enclosure. The doors shall swing on full-length stainless steel piano hinges and shall be fully insulated. The right hand door shall be equipped with a three point latching device and the left-hand door shall have a full height astragal. The doors shall be self-closing and synchronized so that both doors will always fully close. The right hand door shall be equipped with a three-point latching system that automatically engages when the doors close. Each door shall be equipped with a fusible-link hold-open feature that will ensure the door closes should the temperature outside the cabinet exceed 165 degrees Fahrenheit. Units 24” long shall have only one door, self-closing, and equipped with a three-point latching system and hold-open feature. A 2” deep liquid tight pan that covers the entire bottom of the cabinet shall be furnished to contain liquid leaks and spills. A full-depth adjustable shelf shall also be provided. The shelf shall be perforated to allow air circulation within the cabinet. Two diametrically opposed vents with spark screens shall be provided in the back of the cabinet as well as a grounding screw. The cabinet shall have an
interior finish the same as the exterior and shall be labeled: "FLAMMABLE - KEEP FIRE AWAY".

O. Fume Hood Finish:
After the component parts have been completely welded together and before finishing, they shall be given a pre-paint treatment to provide excellent adhesion of the finish system to the steel and to aid in the prevention of corrosion. Physical and chemical cleaning of the steel shall be accomplished by washing with an alkaline cleaner, followed by a spray treatment with a complex metallic phosphate solution to provide a uniform fine grained crystalline phosphate surface that shall provide both an excellent bond for the finish and enhance the protection provided by the finish against humidity and corrosive chemicals.

After the phosphate treatment, the steel shall be dried and all steel surfaces shall be coated with a chemical and corrosion-resistant, environmentally friendly, electrostatically applied powder coat finish. All components shall be individually painted, insuring that no area be vulnerable to corrosion due to lack of paint coverage. The coating shall then be cured by baking at elevated temperatures to provide maximum properties of corrosion and wear resistance.

The completed finish in standard colors shall meet the performance test requirements specified under Section 2.02 A. Steel Paint Finish Performance Test Results.

P. Seismic Performance: Provide bracing or support for Fume Hood capable of withstanding the effects of earthquake motions as required according to the building code in effect for this project.

2.02 PERFORMANCE REQUIREMENTS

A. Steel Paint Finish Performance Test Results (Chemical Spot Tests):

1. Testing Procedure:
   Chemical spot tests for non-volatile chemicals shall be made by applying 5 drops of each reagent to the surface to be tested and covering with a 1-1/4" dia. watch glass, convex side down to confine the reagent. Spot tests of volatile chemicals shall be tested by placing a cotton ball saturated with reagent on the surface to be tested and covering with an inverted 2-ounce wide mouth bottle to retard evaporation. All spot tests shall be conducted in such a manner that the test surface is kept wet throughout the entire test period, and at a temperature of 77° ±3° F. For both methods, leave the reagents on the panel for a period of one hour. At the end of the test period, the reagents shall be flushed from the surface with water, and the surface scrubbed with a soft bristle brush under running water, rinsed and dried. Volatile solvent test areas shall be cleaned with a cotton swab soaked in the solvent used on the test area. Immediately prior to evaluation, 16 to 24 hours after the reagents are removed, the test surface shall be scrubbed with a damp paper towel and dried with paper towels.

2. Test Evaluation:
   Evaluation shall be based on 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.
   After testing, panel shall show no more than three (3) Level 3 conditions.

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

* Where concentrations are indicated, percentages are by weight.

4. Performance Test Results (Heat Resistance):
Hot water (190°F - 205°F) shall be allowed to trickle (with a steady stream at a rate not less than 6 ounces per minute) on the finished surface, which shall be set at an angle of 45° from horizontal, for a period of five minutes. After cooling and wiping dry, the finish shall show no visible effect from the hot water treatment.
5. Performance Test Results (Impact Resistance):
A one-pound ball (approximately 2" diameter) shall be dropped from a distance of 12 inches onto the finished surface of steel panel supported underneath by a solid surface. There shall be no evidence of cracks or checks in the finish due to impact upon close eye-ball examination.

6. Performance Test Results (Bending Test):
An 18 gauge steel strip, finished as specified, when bent 180° over a 1/2" diameter mandrel, shall show no peeling or flaking off of the finish.

7. Performance Test Results (Adhesion):
Ninety or more squares of the test sample shall remain coated after the scratch adhesion test. Two sets of eleven parallel lines 1/16" apart shall be cut with a razor blade to intersect at right angle 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. Examine under 100 foot-candles of illumination. Note: This test is based on ASTM D2197-68, "Standard Method of Test for Adhesion of Organic Coatings".

8. Performance Test Results (Hardness):
The test sample shall have a hardness of 4-H using the pencil hardness test. Pencils, regardless of their brand are valued in this way: 8-H is the hardest, and next in order of diminishing hardness are 7-H, 6-H, 5-H, 4-H, 3-H, 2-H, F, HB, B (soft), 2-B, 3-B, 4-B, 5-B (which is the 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.

B. Fume Hood Liner Performance:

1. Chemical Spot Tests - 24 Hours:
Chemical spot test shall be made by applying 10 drops (approximately 1/2 cc) of each reagent to the surface to be tested. Each reagent (except those marked **) shall be covered with a 1-1/2" diameter watch glass, convex side down to confine the reagent. Spot tests of volatile solvents marked ** shall be tested as follows: A 1" or larger ball of cotton shall be saturated with the solvent and placed on the surfaces to be tested. The cotton ball shall then be covered by an inverted 2-ounce, wide mouth bottle to retard evaporation. All spot tests shall be conducted in such a manner that the test surface is kept wet throughout the entire 24-hour test period and at a temperature of 77 degrees F. + 3 degrees F. At the end of the test period, the reagents shall be flushed from the surfaces with water and the surface scrubbed with a soft bristle brush under running water, rinsed, and dried. Volatile solvent test areas shall be cleaned with a cotton swab soaked in the solvent used on the test area. Spots where dyes have dried shall be cleaned with a cotton swab soaked in alcohol to remove the surface dye. The test panel shall then be evaluated immediately after drying.

2. Legend / Ratings:
   1 - KMER (Kewaunee Modified Epoxy Resin) A = No effect or slight change in gloss
   2 - Glass Reinforced Polyester B = Slight change in gloss or color
   3 - Stainless Steel 304 C = Slight etching or severe staining
   4 - Stainless Steel 316 D = Swelling, pitting, or severe etching
   5 - Reinforced Phenolic Resin

3. RESULTS:
   1. Acetic Acid 98% A C B B A
   2. Acetone ** A A A A A

LABORATORY FUME HOODS 115313-9
<table>
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<th>No.</th>
<th>Chemical Name</th>
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<td>7</td>
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<td>Nitric 70%/Sulfuric Acid 77%*</td>
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*Equal parts of Nitric Acid 70% and Sulfuric Acid 77%.
**Indicates these solvents tested with cotton and jar method

PART 3 - EXECUTION
3.00 SITE EXAMINATION

A. The owner and/or his representative shall certify building conditions conducive to the installation of a finished goods product, including all critical dimensions.

3.01 INSTALLATION

A. Preparation:
Prior to beginning installation of fume hood, check and verify that no irregularities exist that would affect quality of execution of work specified.

B. Coordination:
Coordinate the work of the Section with the schedule and other requirements of other work being performed in the area at the same time both with regard to mechanical and electrical connections to and in the fume hoods and the general construction work.

C. Performance:
Install fume hoods, plumb, level, rigid, securely anchored to building and adjacent furniture in proper location, in accordance with manufacturer's instructions and the approved shop drawings. Provide filler panels between top of hood and ceiling. Securely attach access panels but provide for easy removal and secure reattachment. Do not install any damaged units.

D. Adjust and Clean:
1. After installations are complete, adjust all moving parts for smooth operation.
2. Remove all packing materials and debris resulting from this work, and turn over the fume hoods to the Owner clean and polished both inside and out.
3. Repair or remove and replace defective work, as directed by owner and/or his representative upon completion of installation.

E. Protection:
1. Provide reasonable protective measures to prevent casework and equipment from being exposed to other construction activity.
2. Advise owner and/or his representative of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by work of other trades.
SECTION 123553 – STEEL LABORATORY CASEWORK AND RELATED PRODUCTS

PART 1 — DESCRIPTION OF WORK

1.00 SUMMARY AND SCOPE

A. Section Includes:
1. Using Kewaunee Scientific Corporation, RESEARCH COLLECTION Laboratory Furniture as a steel casework specification standard, furnish all cabinets and casework, including tops, ledges, supporting structures, and miscellaneous items of equipment as listed in these specifications, equipment schedules, and drawings. Include delivery to the building, set in place, level, and scribe to walls and floors as required. Furnish and install all filler panels, knee space panels and scribes as shown on drawings.

2. Furnish and deliver, for installation by the mechanical contractor, all laboratory sinks, cup sinks or drains, drain troughs, overflows and sink outlets with integral tailpieces, which occur above the floor, and where these items are part of the equipment or listed in these specifications, equipment schedules, and drawings. All tailpieces shall be furnished less the couplings required to connect them to the drain piping system.

3. Furnish service strip supports where specified, and set in place, service tunnels, service turrets, supporting structures and reagent racks of the type shown on the drawings.

4. Remove of all debris, dirt and rubbish accumulated as a result of the installation of the laboratory furniture to an onsite container provided by others, leaving the premises broom clean and orderly.

B. Related Divisions:
1. Divisions 5 & 6: Behind-the-Wall Blocking and Studs
2. Division 9: Base Molding
3. Division 11: Chemical Fume Hoods
4. Division 22: Plumbing
5. Division 26: Electrical Fittings and Connections
6. Division 27: Communications

C. Related Publications:
1. SEFA 3 - Scientific Equipment and Furniture Association
2. SEFA 8 - Scientific Equipment and Furniture Association
3. NFPA 30 - National Fire Protection Association
4. NFPA-45 - National Fire Protection Association
5. UL - Underwriters Laboratories
6. ASTM D522 - Bending Test

1.01 BASIS OF WORK

A. It is the intent of this specification to use Kewaunee Scientific Corporation – RESEARCH COLLECTION Laboratory Furniture as the standard of construction for laboratory furniture. The construction standards of this product line shall provide the basis for quality and functional installation.

B. Supply all equipment in accordance with this specification. The offering of a product differing in materials and construction from this specification requires written approval from the owner/architect. This approval must be obtained seven (7) days before the quotation deadline. Procedures for obtaining approval for an alternate manufacturer are defined in section 1.03.B in this specification.
C. General Contractors should secure a list of approved laboratory furniture manufacturers from the architect as a protection against non-conformance to these specifications.

D. Participants in the quotation process have the option of clarifying deviations to the specified design, construction, or materials. Without such clarifications, sealed quotations to the owner or owner representative will be construed as being in total conformance to the requirements of the specification.

E. The owner/owner’s representative reserves the right to reject qualified or alternate proposals and to award based on product value where such action assures the owner greater integrity of product.

1.02 QUALITY ASSURANCE

A. The steel laboratory furniture contractor shall also provide worktops and fume hoods all manufactured or shipped from the same geographic location to assure proper staging, shipment and single source responsibility.

B. General Performance: Provide certification that furniture shall meet the performance requirements described in SEFA 8.

C. Finish Performance: Provide independent test lab certification that furniture shall meet the performance requirements described in section 2.05 of these specifications.

1.03 SUBMITTALS

A. Manufacturer’s Data: Submit manufacturer’s data and installation instructions for each type of casework.

B. Samples:
Samples from non-specified manufacturers will be required and reviewed per specification. Samples shall be delivered, at no cost to the architect or owner, to a destination set forth by the architect or owner. This must be done seven (7) days before quotation deadline as a condition of approval of each bidder. Samples shall be full size, production type samples. Miniature or "Show Room" type samples are not acceptable. Furnish the following:

1. One 18" combination (1) drawer and (1) cupboard base unit showing complete construction details, including (1) shelf
2. One 36" acid storage base cabinet typical of specified elevations
3. One sample of all top materials shown or called for, of sufficient size to perform finish requirement tests
4. Sample of all mechanical service fittings, locks, door pulls, hinges, and interior hardware

The architect or owner will retain the above samples of the successful manufacture to insure that material delivered to jobsite conforms in every respect to the samples submitted.

C. Shop Drawings:
Submit shop drawings for furniture assemblies showing plans, elevations, ends, cross-sections, service run spaces, location and type of service fittings.

1. Coordinate shop drawings with other work involved
2. Provide roughing-in drawings for mechanical and electrical services when required

PART 2 — PRODUCTS

STEEL LABORATORY CASEWORK
2.00 MANUFACTURERS

A. The basis of this specification is steel casework manufactured according to the standards used by Kewaunee Scientific Corporation, 2700 Front Street, Statesville, North Carolina. The specified design is Research Collection. All laboratory equipment covered by the specification shall be the product of one manufacturer and be fabricated at one geographic location to assure shipping continuity and single-source responsibility. All quotations from a manufacturer other than Kewaunee Scientific Corporation shall contain a review of the following capabilities:

1. List of shop facilities
2. List of engineering and manufacturing personnel
3. Proof of financial ability to fulfill the contract
4. List of a minimum of ten (10) installations over the last five (5) years of comparable scope
5. Proof of project management and installation capabilities
6. SEFA member in Good Standing

B. The selected manufacturer shall warrant that all products be free of defects in material and workmanship for a period of one year. The period shall start at the date of acceptance or occupation, whichever comes first. Purchaser shall notify the manufacturer’s representative immediately of any defective product. The manufacturer shall have a reasonable opportunity to inspect the goods. The purchaser shall return no product until receipt by purchaser of written shipping instructions from the manufacturer.

2.01 CABINET MATERIAL

A. Steel:
Cabinet bodies, drawer bodies, shelves, drawer heads and door assemblies shall be fabricated from cold rolled steel.

2.02 DRAWER AND DOOR STYLE

A. Inset – Square Edge
Drawers and doors, when closed, shall be recessed to create an overall flush face with 1/8" reveals. The outer drawer and door head shall have a channel formation on all four sides to eliminate sharp raw edges of steel. The top front corners of the door shall be welded and ground smooth. All Doors to receive positive latch.

2.03 MATERIALS

A. General Requirements:
It is the intent of this specification to provide a high quality steel cabinet specifically designed for the laboratory environment.

B. Steel:
1. Cold Rolled Steel:
Cold rolled sheet steel shall be prime grade 12, 14, 16, 18 and 20 gauge U.S. Standard; roller leveled, and shall be treated at the mill to be free of scale, ragged edges, deep scratches or other injurious effects.

C. Hardware and Trim:
1. Drawer and Door Pulls:
   a. Drawer and door pulls shall be mounted on 4" centers, offering a comfortable hand grip, and be securely fastened to doors and drawers. They shall be manufactured from: (chose one)
Pull Style 1 – Anodized aluminum in a shallow rounded shape.

2. Hinges:
   a. Inset 5-Knuckle Hinges:
      Inset style cabinets shall use 5-Knuckle hinges made of Type 304 stainless steel .089 thick, 2-1/2" high, with brushed satin finish, and shall be the institutional type with a five-knuckle bullet-type barrel. Hinges shall be attached to both door and case with two screws through each leaf. Welding of hinges to door or case will not be accepted. Doors under 36" in height shall be hung on one pair of hinges, and doors over 36" in height shall be hung on three hinges.

3. Drawer Slide:
   a. Heavy duty, full extension, soft-close, self-closing, zinc plated, ball bearing slides, rated for 100 pound loads.

4. Locks:
   a. Pin Tumbler:
      Locks when shown or called for shall be a pin tumbler with heavy duty interchangeable cylinder. Exposed lock noses shall be dull nickel (satin) plated and stamped with identifying numbers. Locks shall have capacity of at least 2000 primary key changes, and the capacity to be Master Keyed, Grand-master Keyed, Sub-master Keyed, and Mason Keyed. 1 Master per lab.

5. Catches – For steel casework with 5-knuckle hinges:
   a. Positive Catch:
      A two-piece heavy-duty cam action positive catch Main body of the catch shall be confined within an integral cabinet top or divider rail, while latching post shall be mounted on the hinge side of door. Polyethylene roller type catches are not acceptable.

6. Elbow Catches:
   Elbow catches and strike plates shall be used on left hand doors of double door cases where locks are used, and are to be burnished cast aluminum, with bright brass finish.

7. Shelf Adjustment Clips:
   Shelf adjustment clips shall be die formed, nickel-plated steel.

8. Leg Shoes:
   Leg shoes shall be a pliable, black vinyl material and shall be provided on all table legs, unless otherwise specified, to conceal leveling device. Use of a leg shoe, which does not conceal leveling device, will not be acceptable.

9. Base Molding:
   Base molding shall be provided by others.

10. Sink Supports:
    Sink supports shall be the hanger type, suspended from end panels of sink cabinet by four 1/4" dia. rods, threaded at bottom end and offset at top to hang from two full-depth reinforcements, welded to the top of end panels. Two 3/4" x 1-1/2" x 12 gauge channels shall be hung on the threaded rods to provide an adjustable sink cradle for supporting sinks.

11. Support Struts:
    Support struts shall consist of two 16 gauge channel uprights fastened top and bottom by two adjustable 12 gauge "U" shaped spreaders, each, 1-1/2" x length required, formed from galvanized steel. Struts shall be furnished to support drain troughs, and to support worktop at plumbing space under fume hood superstructures or other heavy loads. Support struts can be furnished with hangers at extra cost when specified, to support mechanical service piping and drain lines.
2.04 CONSTRUCTION

A. Steel Cabinet Construction:

1. General:
   a. The steel furniture shall be of modern design and shall be constructed in accordance with
      the best practices of the Scientific Laboratory Equipment Industry. First class quality
      casework shall be insured by the use of proper machinery, tools, dies, fixtures and skilled
      workmanship to meet the intended quality and quantity for the project.
   b. All cabinet bodies shall be flush front construction with intersection of vertical and
      horizontal case members, such as end panels, top rails, bottoms and vertical posts in
      same plane without overlap. Exterior corners shall be spot welded with heavy back up
      reinforcements.
   c. Each cabinet shall be complete so that units can be relocated at any subsequent time
      without requiring field application of finished ends or other such parts.
   d. Case openings of Inset style cabinets shall be rabbeted on all four sides for both hinged
      and sliding doors to provide a dust resistant case.
   e. All cabinets shall have a cleanable smooth interior. Bottoms shall be formed down on
      sides and back to create easily cleanable corners with no burrs or sharp edges.
   f. Cabinets shall be designed using a standardized grid pattern to allow reconfiguration of
      doors and drawers.

2. Steel Gauges:
   Gauges of steel used in construction of cases shall be 18 gauge, except as follows:
   a. Leveling bolt reinforcements 12 gauge.
   b. Top and intermediate front horizontal rails, apron rails, hinge reinforcements, and
      reinforcement gussets, 16 gauge.
   c. Drawer assemblies, door assemblies, bottom, bottom back rail, toe space rail, and
      adjustable shelves, 20 gauge.

B. Base Cabinets:

1. End uprights shall be formed into not less than an L formation at top, bottom, back and a 3/4"
   wide front C formation. A pilaster shall be added to the inside front of the upright for cabinet
   and hinge reinforcement and shall be perforated for the support of drawer channels,
   intermediate rails, hinge screws, and shelf adjustment holes.

2. A 7/8" high top horizontal rail shall interlock with the flange at top of end panels for strength,
   but shall be flush at face of unit. Top rails not flush with face of end uprights are not
   acceptable.

3. Intermediate rails shall be provided between doors and drawers, but shall not be provided
   between drawers unless made necessary by locks in drawers. Intermediate rails shall be
   recessed behind doors and drawer fronts, and designed so that security panels may be added
   as required.

4. Intermediate vertical uprights shall be furnished to enclose cupboards when used in a unit in
   combination with a half width bank of drawers.

5. Cabinet bottom shall be formed of one piece of steel, except in corner units, and shall be
formed down on sides and back to create a square edge transition welded to cabinet end panels. Front edge shall include a C formation to form a 7/8" high bottom front rail and shall be flush with face of end uprights. Cabinet bottom front rails not flush with face of end uprights are not acceptable.

6. Toe space rail shall extend up and forward to engage bottom panel to form a smooth surfaced fully enclosed toe space, 3" deep x 4" high.

7. Back construction shall be one piece with integral channel formed for maximum strength and welded to back of top and bottom flanges of end uprights.

8. Each bottom corner of base cabinets shall have a 3/8"-16 leveling bolt, 2-1/2" long capable of supporting 500 lbs. Access to the leveling bolts shall be through plug buttons in the cabinet bottom. Access to leveling bolts through toe space or leveling bolts requiring special tools to adjust are not acceptable.

9. Adjustable shelves shall be formed down 3/4", returned back 7/8" and up 1/4" into a channel formation front and rear and formed down 3/4" at each end. Shelves over 42" long shall be further reinforced with a channel formation welded to underside of shelf. Shelves shall be adjustable on not more than 1" increments.

10. Steel Door assembly (two-piece) for solid panel swinging doors shall consist of an inner and outer door pan. Outer door pan shall be formed at all four sides. The corners on the pull side of the outer door pan shall be welded and ground smooth to prevent exposure of sharp edges of steel at these critical points. Inner door pan shall be flanged at all four sides with hinge reinforcements welded in place. The door assembly shall be 3/4" thick and contains sound deadening material. Door assemblies shall be painted prior to assembly, and shall be punched for attaching pulls. Inner pan formation of door shall be indented for in-field installation of locks when required.

11. Doors shall be readily removable and hinges easily replaceable. Hinges shall be applied to the cabinet and door with screws. Welding of hinges to either cabinet or door will not be acceptable.

12. Drawer Assemblies:
   a. Drawer bodies shall be made in one-piece construction including the bottom, two sides, back and front. They shall be fully coved at interior bottom on all four sides for easy cleaning. The top front of the inner drawer body shall be offset to interlock with the channel formation in drawer head providing a 3/4" thick drawer head.

13. Knee space panels, where shown or specified, shall be 20 gauge, finished same as casework cabinets, and easily removable for access to mechanical service areas.

C. Special Purpose Storage Cabinets:

1. Acid Storage Fume Hood Cabinets:
   Acid storage fume hood cabinets shall utilize the same gauges of steel and construction features as other base cabinets except they shall be completely lined with a one piece polyethylene corrosion resistant liner. The liner shall be 1/4" thick, molded into a seamless tub, including top, sides and bottom, with a 1" lip at the bottom front to contain spills. Tubs shall include integral cleats at both ends and back to support an optional shelf. Each door shall have a set of louvers at the top and bottom, and have a 1/8" sheet polyethylene liner. Each cabinet shall be vented into the fume hood with a 1-1/2" vent pipe allowing a positive airflow directly into the fume hood exhaust system. Cabinet shall include a full-depth phenolic resin. Provide positive latch.
2. Solvent Storage Cabinets:
Solvent storage cabinets shall be specifically designed for the storage of flammable and combustible liquids. Construction shall be based upon the requirements listed by UFC, OSHA and NFPA No. 30 - 1993, and cabinets shall be FM approved and labeled. The bottoms, top, sides and doors shall be fabricated of 18 gauge steel and shall be all double panel construction with a 1-1/2" air space between panels. All joints shall be welded, or screwed, to provide a rigid enclosure. The doors shall swing on full-length stainless steel piano hinges and shall be fully insulated. The doors are self-closing and synchronized so that both doors will always fully close. The right hand door is equipped with a three-point latching system that automatically engages when the doors close. Each door is equipped with a fusible-link hold-open feature that will ensure the door closes should the temperature outside the cabinet exceed 165 degrees Fahrenheit. Units 24" long have only one door, self-closing, and equipped with a three-point latching system and hold-open feature. A 2" deep liquid tight pan that covers the entire bottom of the cabinet shall be furnished to contain liquid leaks and spills. A second pan shall be provided to serve as a full-depth adjustable shelf. Two, 2" diameter, diatomically opposed vents with spark screens shall be provided in the back of the cabinet as well as a grounding screw. The cabinet shall have interior finish same as exterior. The cabinet shall be labeled: "FLAMMABLE - KEEP FIRE AWAY".

D. Upper Cabinet Construction:

1. Upper cabinets shall have a completely finished interior same as exterior and shall be designed so that no mounting hardware is visible when installed.

2. End uprights shall be formed at front, bottom and back to provide maximum strength and rigidity. Front edge of end upright shall be 3/4" wide. A pilaster shall be added to the inside front of the upright for cabinet and hinge reinforcement and shall be perforated for hinge screws, and shelf adjustment holes.

3. Cabinet tops shall be formed with a 7/8" high C formation at the front edge and turned down at the back to engage a wall hanging rail.

4. Cabinet flush bottoms shall be formed with a 7/8" high C formation at the front edge.

5. Cabinet false bottoms shall be formed down on all four edges and shall be removable.

6. Cabinet backs shall be welded to the top, bottom and ends. Backs shall be perforated for shelf adjustment holes. Holes shall be enclosed by end uprights.

7. Adjustable shelves shall be formed down 3/4", returned back 7/8" and up 1/4" into a channel formation front and rear, formed down 3/4" at each end. Shelves over 42" long shall be further reinforced with a channel formation welded to underside of shelf. Shelves shall be adjustable on not more than 1" increments.

8. Solid panel doors shall consist of an inner and outer door pan. Outer door pan shall be formed into a channel or flanged shape at all four sides. The corners on the pull side of the outer door pan shall be welded and ground smooth to prevent exposure of sharp edges of steel at these critical points. Inner door pan shall be flanged at all four sides with hinge reinforcements welded in place. The door assembly shall be 3/4" thick and contains sound deadening material. Provide positive latch closing.

9. Swinging doors under 36" high shall be hung on one pair of hinges, doors over 36" high shall be hung on three hinges.

10. Open Adjustable Wall Shelving. 1" thick formed from 16 gauge cold rolled steel on Steel Shelving uprights.
   a. Provide Shelf Locking Tabs for each shelf.
b. Provide fixed end shelf brackets at both ends of each shelf.
c. Provide ½” retention lips along the front edge of shelving.

a. Provide Shelf Locking Tabs for each shelf.
b. Provide fixed end shelf brackets at both ends of each shelf.
c. Provide ½” retention lips along the front edge of shelving.
d. Provide 12” upright with bracket to mount to epoxy countertop.

e. Steel Full Height Cabinet Construction:

1. Full height storage cabinets shall have a completely finished interior same as exterior.
2. End uprights shall be formed at front, bottom and back to provide maximum strength and rigidity. Front fascia of upright shall be 1-1/4" wide with inside edge formed in a channel 1/2" x 3/8". A full height box reinforcement shall be fitted to the channel, formed to provide a recessed strike for door and to reinforce the cabinet. The backside of the reinforcement shall be perforated with shelf adjustment holes spaced at not more than 1” centers. Back of upright shall be formed in a 2-1/2” formation. 16 gauge hinge reinforcement shall be welded to inner side of front uprights.
3. Cabinet tops shall be formed into a channel shape at front with flange at rear and sides for electro-welding cabinet top to cabinet back and ends. Front fascia channel shall be strengthened with electro-weld reinforcements.
4. Cabinet bottoms for storage cabinets shall be formed down on sides and back to create a square edge transition welded to cabinet end panels, and front edge shall be offset to create a seamless door recess rabbet for dust stop. Cabinet bottoms shall be formed to provide a flush 1” face rail with a return flange to give a 9/16” deep x 5” high toe space. All cabinets shall have a cleanable smooth interior.
5. Toe space rails shall interlock in back of bottom rail and with end panel to provide a welding plate, and shall extend to the floor with a flange turned back and up for support.
6. Cabinet backs shall be welded to the top, bottom and ends. Backs shall be perforated for shelf adjustment holes on not more than 1” centers. Holes shall be enclosed by a formation in cabinet back and enclosed by end uprights.
7. Adjustable shelves shall be formed down 3/4", returned back 7/8" and up 1/4" into a channel formation front and rear; formed down 3/4” at each end. Shelves over 42” long shall be further reinforced with a channel formation electro-welded to underside of shelf. Shelves shall be adjustable on not more than 1” increments.
8. Solid panel doors shall consist of inner and outer pan formations mechanically assembled after painting. All full height solid panel doors shall be further reinforced by a full-height channel formation welded to inner pan. Doors shall be 3/4” thick and contain sound deadening material. Provide positive latch closing.
9. Swinging doors under 36” high shall be hung on one pair of hinges, doors over 36” high shall be hung on three hinges.
10. Provide Angle brackets for securing to wall for seismic.

f. Heavy Duty Metal Tables:

1. Tops: Kemresin Slate color.
2. Construction: Basis of Design (Flex-Strut)
a. Table rails, legs and spreader rails shall be fully welded into a single piece table frame structure. No mechanical joints between members are permitted.
b. Rails: Not less than 2 inch x 2 inch 16 gauge square tubular steel sections, reinforced as needed for leg attachment
c. Legs: Not less than 2 inch x 2 inch 16 gauge square tubular steel sections
d. Adjustable-Height Legs: Where indicated on Laboratory Furnishing drawings, provide a stainless steel insert at the bottom of each leg. Height of each insert shall be adjustable in 2” increments using stainless steel pins. This shall result in a work-surface top height range between 30 inches and 38 inches. Include leveling glides at the bottom of each insert. Each glide shall have a load bearing capacity of 150 lbs.
e. Leg rails and spreader rails: Not less than 1 ½ inch by 4 ½ inch 16 gauge channel steel sections, reinforced as needed for leg attachment.
f. Lower level shelf where indicated (M2 & M5): Made of epoxy slate to match tops. Fixed Epoxy Shelf is 12” deep by the length of the table and supported as required.

G. Mobile Cabinets:
1. Mobile cabinets shall be engineered by the manufacturer to avoid overturning when drawers are loaded to their design load, opened to the specified glide opening.
2. Mobile cabinets shall be provided with a rod-based interlock glide system to prevent multiple drawers from being opening simultaneously.
3. Mobile cabinets may additionally be provided with a counter weight system. The weights shall not be visible when the cabinet is in the normal, upright position.
4. Provide mobile cabinets with lockable casters where indicated on the Laboratory Furnishing Drawings (if needed)
5. Mobile cabinets shall have a finished back with slate epoxy top flush to the front of the cabinet

H. Seismic Performance: Provide metal laboratory casework system capable of withstanding the effects of earthquake motions determined according to the building code in effect for this project. Provide bracing/supports for tall cabinet casework.

2.05 PERFORMANCE REQUIREMENTS

A. Steel Casework Construction Performance:
1. Base cabinets shall be constructed to support at least a uniformly distributed load 200 pounds per square foot of cabinet top area, including working surface without objectionable distortion of interference with door and drawer operation.
2. Base cabinet leveling bolts shall support 500 pounds per corner, at 1-1/2” projection of the leveling bolt below the cabinet bottom.
3. Each adjustable and fixed shelf 4 feet or shorter in length shall support an evenly distributed load of 40 pounds per square foot up to a maximum of 200 pounds, with nominal temporary deflection, but without permanent set.
4. Full extension soft-close, self-closing ball bearing zinc plated drawer slide shall be rated for 100 pound loads.
5. Swinging doors on floor-mounted inset style casework shall support 200 pounds suspended at a point 12” from hinged side, with door swung through an arc of 160 degrees. Weight load test shall allow only a temporary deflection, without permanent distortion or twist. Door shall operate freely after test and assume a flat plane in a closed position.
6. Tables and casework as noted on drawings to be Vibration Sensitive.

B. Steel Paint System Finish and Performance Specification:
1. Steel Paint System Finish:

After Cold Rolled Steel and Textured Steel component parts have been completely welded together and before finishing, they shall be given a pre-paint treatment to provide excellent adhesion of the finish system to the steel and to aid in the prevention of corrosion. Physical and chemical cleaning of the steel shall be accomplished by washing with an alkaline cleaner, followed by a spray treatment with a complex metallic phosphate solution to provide a uniform fine grained crystalline phosphate surface that shall provide both an excellent bond for the finish and enhance the protection provided by the finish against humidity and corrosive chemicals.

After the phosphate treatment, the steel shall be dried and all steel surfaces shall be coated with a chemical and corrosion-resistant, environmentally friendly, electrostatically applied powder coat finish. All components shall be individually painted, insuring that no area be vulnerable to corrosion due to lack of paint coverage. The coating shall then be cured by baking at elevated temperatures to provide maximum properties of corrosion and wear resistance.

The completed finish system in standard colors shall meet the performance test requirements specified under PERFORMANCE TEST RESULTS.

2. Performance Test Results (Chemical Spot Tests):

a. Testing Procedure:

Chemical spot tests for non-volatile chemicals shall be made by applying 5 drops of each reagent to the surface to be tested and covering with a 1-1/4" dia. watch glass, convex side down to confine the reagent. Spot tests of volatile chemicals shall be tested by placing a cotton ball saturated with reagent on the surface to be tested and covering with an inverted 2-ounce wide mouth bottle to retard evaporation. All spot tests shall be conducted in such a manner that the test surface is kept wet throughout the entire test period, and at a temperature of 77° ±3° F. For both methods, leave the reagents on the panel for a period of one hour. At the end of the test period, the reagents shall be flushed from the surface with water, and the surface scrubbed with a soft bristle brush under running water, rinsed and dried. Volatile solvent test areas shall be cleaned with a cotton swab soaked in the solvent used on the test area. Immediately prior to evaluation, 16 to 24 hours after the reagents are removed, the test surface shall be scrubbed with a damp paper towel and dried with paper towels.

b. Test Evaluation:

Evaluation shall be based on 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.

After testing, panel shall show no more than three (3) Level 3 conditions.

c. Test Reagents

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

3. Performance Test Results (Heat Resistance):  
Hot water (190° F - 205° F) shall be allowed to trickle (with a steady stream at a rate not less than 6 ounces per minute) on the finished surface, which shall be set at an angle of 45° from horizontal, for a period of five minutes. After cooling and wiping dry, the finish shall show no visible effect from the hot water treatment.

4. Performance Test Results (Impact Resistance):  
A one-pound ball (approximately 2" diameter) shall be dropped from a distance of 12 inches onto the finished surface of steel panel supported underneath by a solid surface. There shall be no evidence of cracks or checks in the finish due to impact upon close eye-ball.
5. Performance Test Results (Bending Test):
An 18 gauge steel strip, finished as specified, when bent 180° over a 1/2" diameter mandrel, shall show no peeling or flaking off of the finish.

6. Performance Test Results (Adhesion):
Ninety or more squares of the test sample shall remain coated after the scratch adhesion test. Two sets of eleven parallel lines 1/16" apart shall be cut with a razor blade to intersect at right angle 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. Examine under 100 foot-candles of illumination. Note: This test is based on ASTM D2197-68, "Standard Method of Test for Adhesion of Organic Coatings".

7. Performance Test Results (Hardness):
The test sample shall have a hardness of 4-H using the pencil hardness test. Pencils, regardless of their brand are valued in this way: 8-H is the hardest, and next in order of diminishing hardness are 7-H, 6-H, 5-H, 4-H, 3-H, 2-H, F, HB, B (soft), 2-B, 3-B, 4-B, 5-B (which is the 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.

2.06 WORKSURFACES

A. Materials:
1. Epoxy Resin Tops (Kemresin – Kewaunee Slate Color)
   a. Epoxy Resin tops shall consist of modified epoxy resin that has been especially compounded and cured to provide the optimum physical and chemical resistance properties required of a heavy-duty laboratory table top. Tops and curbs shall be a uniform mixture throughout their full thickness, and shall not depend upon a surface coating that is readily removed by chemical and/or physical abuse. Tops and curbs shall be non-glaring. Tops shall be 1" thick, exposed edges beveled top and bottom, and drip grooves provided on the underside at all exposed edges. 4" high curbs at the backs and ends of tops shall be 1" thick and bonded to the deck to form a square watertight joint. Sink cutouts shall be smooth and uniform without saw marks with the top edge beveled. The bottom edge of the sink opening shall be finished smooth with the edge broken to prevent sharpness. Corners of sink cutouts shall be radiused not less than 3/4".

2. Performance Requirements: Molded Epoxy Resin (Kemresin):
   a. Physical Properties:
      Flexural Strength (A.S.T.M. Method D790-90) = 15,000 PSI
      Compressive Strength (A.S.T.M. MethodD695-90) = 30,000 PSI
      Hardness, Rockwell E (A.S.T.M. Method D785-89) = 100
      Water Absorption (A.S.T.M. Method D570-81)% by weight, 24 Hours = 0.04
      % by weight, 7 Days = 0.05
      % by weight, 2 Hour Boil = 0.04
      Specific Gravity = 1.97
      Tensile Strength = 8,500 PSI
   b. Performance Test Results (Heat Resistance):
      A high form porcelain crucible, size 0, 15 ml capacity, shall be heated over a Bunsen burner until the crucible bottom attains an incipient red heat. Immediately, the hot crucible shall be transferred to the top surface and allowed to cool to room temperature. Upon
removal of the cooled crucible, there shall be no blisters, cracks or any breakdown of the top surface whatsoever.

c. Performance Test Results (Chemical Resistance):
Tops shall resist chemical attacks from normally used laboratory reagents. Weight change of top samples submerged in the reagents* listed in the next paragraph for a period of seven (7) days shall be less than one-tenth of one percent, except that the weight change for those reagents marked with ** shall be less than one percent. (Tests shall be performed in accordance with A.S.T.M. Method D543-67 at 77° F.).

*Where concentrations are indicated, percentages are by weight.

<table>
<thead>
<tr>
<th>Acetic Acid, Glacial</th>
<th>Iso-Octane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic Acid, 5%</td>
<td>Kerosene</td>
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<tr>
<td>Acetone</td>
<td>Methyl Alcohol</td>
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<tr>
<td>Ammonium Hydroxide, 28%</td>
<td>Mineral Oil</td>
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<td>Ammonium Hydroxide, 10%</td>
<td>Methyl Ethyl Ketone</td>
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<tr>
<td>Aniline Oil</td>
<td>Nitric Acid, 70%**</td>
</tr>
<tr>
<td>Benzene</td>
<td>Nitric Acid, 40%</td>
</tr>
<tr>
<td>Carbon Tetrachloride</td>
<td>Nitric Acid, 10%</td>
</tr>
<tr>
<td>Chronic Acid, 40%**</td>
<td>Oleic Acid</td>
</tr>
<tr>
<td>Citric Acid, 10%</td>
<td>Olive Oil</td>
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<tr>
<td>Cottonseed Oil</td>
<td>Phenol, 5%</td>
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<tr>
<td>Dichromate Cleaning Solution**</td>
<td>Soap Solution, 1%</td>
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<tr>
<td>Diethyl Ether</td>
<td>Sodium Carbonate, 20%</td>
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<td>Dimethyl Formamide</td>
<td>Sodium Carbonate, 2%</td>
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<tr>
<td>Distilled Water</td>
<td>Sodium Chloride, 10%</td>
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<td>Detergent Solution, 1/4%</td>
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<td>Ethyl Alcohol, 50%</td>
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<td>Ethylene Dichloride</td>
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<td>Heptane</td>
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<td>Hydrochloric Acid, 37%</td>
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<td>Hydrochloric Acid, 10%</td>
<td>Toluene</td>
</tr>
<tr>
<td>Hydrogen Peroxide, 28%</td>
<td>Transformer Oil</td>
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<tr>
<td>Hydrogen Peroxide, 3%</td>
<td>Turpentine</td>
</tr>
</tbody>
</table>

NOTE: Dichromate cleaning solution is a formula from Lange's Handbook of Chemistry.

d. Performance Test Results (Chemical Spot Tests - 24 Hours):
Chemical spot tests shall be made by applying 10 drops (approximately 1/2 cc) of each reagent to the surface to be tested. Each reagent (except those marked **) shall be covered with a 1-1/2" diameter watch glass, convex side down to confine the reagent. Spot tests of volatile solvents marked ** shall be tested as follows: A 1" or larger ball of cotton shall be saturated with the solvent and placed on the surfaces to be tested. The cotton ball shall then be covered by an inverted 2-ounce, wide mouth bottle to retard evaporation. All spot tests shall be conducted in such a manner that the test surface is kept wet throughout the entire 24-hour test period and at a temperature of 77 degrees F. + 3 degrees F. At the end of the test period, the reagents shall be flushed from the surfaces with water and the surface scrubbed with a soft bristle brush under running water, rinsed, and dried. Volatile solvent test areas shall be cleaned with a cotton swab soaked in the solvent used on the test area. Spots where dyes have dried shall be cleaned with a cotton swab soaked in alcohol to remove the surface dye. The test panel shall then be evaluated immediately after drying.

Ratings:
A = No effect or slight change in gloss.
B = Slight change in color or marked loss of gloss.
C = Slight surface etching or severe staining.
D = Swelling, pitting, or severe etching.

<table>
<thead>
<tr>
<th>Reagents*</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic Acid, 98%</td>
<td>A</td>
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<tr>
<td>Acetone**</td>
<td>A</td>
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<tr>
<td>Ammonium Hydroxide, 28%</td>
<td>A</td>
</tr>
<tr>
<td>Carbon Tetrachloride**</td>
<td>A</td>
</tr>
<tr>
<td>Chloroform**</td>
<td>A</td>
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<td>Chromic Acid, 60%</td>
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<tr>
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<td>Dichromate Cleaning Solution***</td>
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<td>Dimethyl Formamide</td>
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<td>Ethyl Acetate**</td>
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<td>Formaldehyde, 37%</td>
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<td>Toluene**</td>
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<tr>
<td>Wrights Blood Stain</td>
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</tr>
<tr>
<td>Xylene**</td>
<td>A</td>
</tr>
</tbody>
</table>

* Where concentrations are indicated, percentages are by weight.
** Indicates these solvents tested with cotton and jar method.
*** Dichromate cleaning solution is a formula from Lange's Handbook of Chemistry.

2.07 SINKS CUPSINKS, AND DRAINS

A. Sinks:

1. Molded Epoxy Resin Sinks
   a. Molded Epoxy Resin Sinks (KEMRESIN - Kewaunee Slate Color)
      Sinks shall be molded of modified epoxy resin, carefully compounded with selected
      materials to provide maximum physical and chemical properties. Sinks shall be non-
      glaring with all inside corners coved and the bottom pitched to the drain outlet. Sinks shall
      possess a high resistance to mechanical and thermal shock.
   b. Kemresin sink sizes are to be equal or larger than Kewaunee #1026 35 1.2”x19 ½”x 10”.
      Tail pieces are to be provided.

B. Cupsinks:

1. Molded Epoxy Resin Cup Sinks (KEMRESIN - Kewaunee Slate Color)
   a. Molded Epoxy Resin cup drains shall be molded in one-piece of the same resin as
specified for Molded Epoxy Resin sinks. They shall have an integral mounting flange and a 1-1/2” I.P.S. male straight thread outlet.

2.08 LABORATORY ACCESSORIES

A. Reagent Shelves: Provide as indicated, fabricated from same material as adjacent metal casework, unless otherwise indicated.

   1. Size: refer to drawings

B. Pegboards: Polypropylene, epoxy, or phenolic-composite pegboards (match Kewaunee Slate Color) with removable polypropylene pegs (black) and stainless-steel drip troughs with drain outlet.

PART 3 — EXECUTION

3.00 SITE EXAMINATION

A. The owner and/or his representative shall assure all building conditions conducive to the installation of a finished goods product; all critical dimensions and conditions previously checked have been adhered to by other contractors (general, mechanical, electrical, etc.) to assure a quality installation.

3.01 INSTALLATION

A. Preparation:
  Prior to beginning installation of casework, check and verify that no irregularities exist that would affect quality of execution of work specified.

B. Coordination:
  Coordinate the work of the Section with the schedule and other requirements of other work being prepared in the area at the same time both with regard to mechanical and electrical connections to and in the fume hoods and the general construction work.

C. Performance:
  1. Casework:
     a. Set casework components plumb, square, and straight with no distortion and securely anchor to building structure. Shim as required using concealed shims.
     b. Bolt continuous cabinets together with joints flush, tight and uniform, and with alignment of adjacent units within 1/16” tolerance.
     c. Secure wall cabinets to solid supporting material, not to plaster, lath or gypsum board.
     d. Abut top edge surfaces in one true plane. Provide flush joints not to exceed 1/8”.
  2. Worksurfaces:
     a. Where required due to field conditions, scribe to abutting surfaces.
     b. Only factory prepared field joints, located per approved shop drawings, shall be permitted. Secure the joints in the field, where practical, in the same manner as in the factory.
     c. Secure worksurfaces to casework and equipment components with materials and procedures recommended by the manufacturer.

D. Adjust and Clean:
  1. Repair or remove and replace defective work, as directed by owner and/or his representative upon completion of installation.
  2. Adjust doors, drawers and other moving or operating parts to function smoothly.
3. Clean shop finished casework; touch up as required.
4. Clean worksurfaces and leave them free of all grease and streaks.
5. Casework to be left broom clean and orderly.

E. Protection:
1. Provide reasonable protective measures to prevent casework and equipment from being exposed to other construction activity.
2. Advise owner and/or his representative of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by work of other trades.

END OF SECTION 123553
LIST OF ALTERNATES

ALT #1
ALT #2
ALT #3
ALT #4
ALT #5
ALT #6

NOTE: DRAWINGS SHOWN WITH ACCEPTANCE TO ALTERNATE #3

CONSTRUCTION DOCUMENTS
GRAN & FORAGE CENTER OF EXCELLENCE
UNIVERSITY OF KENTUCKY RESEARCH AND EDUCATION CENTER

9 3/8" 7 5/8" 10°
4'-0" 5'-11 3/4" M.O.
7 5/8" 7 5/8" 7'-4"

4'-0" 5'-11 3/4" M.O.
7 5/8" 7 5/8" 7'-4"

4'-0" 5'-11 3/4" M.O.
7 5/8" 7 5/8" 7'-4"

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