1. GENERAL
   A. Related sections:
      i. 72 41 00 General Audio-Visual Systems Requirements
   B. Tension projection screens are prohibited.
1. GENERAL
   A. Related sections:
      i. 23 00 00 – General Mechanical Requirements (HVAC)
   B. As a minimum, conform to the current Board of Regents of the University System of
      Georgia Design Criteria for Laboratories. This document is located at
      http://www.usg.edu/facilities/resources/design_criteria_for_laboratories.
   C. This section is for general purpose, hoods only; it is not appropriate for radiation,
      perchloric acid, or special purpose type hoods which should be discussed with the
      Project Manager.
   D. Determination of whether the hood should be variable volume or constant volume
      should be discussed with the Project Manager.
   E. Specific requirements of the hood shall be coordinated with laboratory staff and the
      final specification shall be submitted to the Project Manager for review.

2. PRODUCTS
   A. The hood shall be “High Performance” type:
      i. Basis of Design shall be Labconco Protector Xstream.
      ii. The hood shall not incorporate moving baffles, but shall be able to maintain
          fume capture by means of the hood design alone. Although, the use of air
          curtains are acceptable.
      iii. The hood shall be factory tested to pass ASHRAE 110 test with the vertical sash
           set at the full open position (minimum 28”) with a face velocity of 60 feet per
           minute as well as with a face velocity of 80 feet per minute. The test shall
           include all three components of ASHRAE testing to include, visual (smoke),
           tracer gas, and face measurement.
      iv. The hood shall be ASHRAE 110 tested on site (AI) as follows:
          1. Constant Volume Hood
             a. Set the vertical sash set at 18”, and the horizontal sashes fully
                closed and the fan speed manually modulated to provide an
                average face velocity set at 60 and 80 feet per minute.
             b. The hood shall be tested with the vertical sash fully closed and
                the horizontal sashes fully open (in the working position). The
                fan speed shall be maintained from step one.
             c. The test shall include all three components of ASHRAE testing to
                include, visual (smoke), tracer gas, and face measurement.
          2. Variable Volume Hood
             a. The hood shall be tested at 6” increments from fully closed to
                the 18” fully open at both 60 and 80 feet per minute.
             b. The hood shall be tested with the vertical sash fully closed and
                the horizontal sashes fully open (in the working position).
             c. The test shall include all three components of ASHRAE testing to
                include, visual (smoke), tracer gas, and face measurement.
      B. The fume hood shall be provided with a combination sash.
         i. A sash stop shall be provided at 18”. 
ii. Sash shall be 3/16’ thick tempered safety glass with an epoxy-coated aluminum sash handle

iii. Sash counterbalanced system by a single weight: Chain and sprocket type or cable and pulley.

C. The cabinet shall be double-walled. The exterior shall be 18 gauge and powder epoxy painted. The interior shall have a polyresin liner.

D. The work surface shall be cast 1.25” thick chemical resistant epoxy resin.

E. All hoods shall be provided with the following services as a minimum:
   i. Cold Water
   ii. Air
   iii. Vacuum
   iv. Natural Gas.

F. Services (Water, air, vacuum and natural gas) shall be provided through front loaded control valves (serviceable from the front of hood).

G. Provide an alarm monitor with the following features:
   i. LED readout
   ii. Measure face velocity
   iii. Local visual and audible alarm
   iv. Relay output

H. Plumbing service fixtures shall be located maximum 12 inch from the inside of the sash and shall be on a common vertical centerline.

I. Provide vacuum breaker on CW piping supply behind removable access panel. CW fixture in hood shall not have a vacuum breaker.

J. Provide transition duct flanged at both ends for mounting atop the hood and connection to exhaust system. Transition duct shall be bolted and gasketed to top of hood with Teflon gasket. Gasket shall be 1/16” thick neoprene with UV inhibitor.

K. Provide a minimum of two 120 volt GFCI duplex electrical services per side of the fume hood (208 volt may also be required).

L. Lights:
   i. Type: Two-tube, rapid-start fluorescent light fixture of longest practicable length.
   ii. Ballast: Electronic ballast and be suitable for T-8 lamps.
   iii. Shield: 1/4 inch thick safety glass or 1/8 inch thick tempered glass panel, sealed air tight into hood body with chemical resistant rubber channels.
   iv. Lamps: T-8 lamps.
   v. Include light switch, controls interface, and all internal wiring to circuit junction boxes located on top of hood.
   vi. Switch: Location shall be on sash post.
   vii. Set units so that fluorescent tubes are replaceable from outside hood.
   viii. Provide only fixtures that carry UL label.
   ix. Average interior illumination levels of the work area: 80-foot candles minimum.

M. Acid Storage Cabinets shall have the following:
   i. Corrosion resistant interior liner, including the backside of doors and shelf surfaces.
   ii. One-piece corrosion resistant insert tray with 2 inch lip for containment of spills at bottom of cabinet.
   iii. One shelf with 1 inch lip, adjustable on 1 inch increments.
iv. Vented with a minimum 1-1/2 inch I.D. corrosion resistant vent pipe at rear of cabinet terminating inside of fume hood 2 inch above the working surface.

v. Vent pipe shall be close to rear of hood as possible. Seal opening between working surface and pipe with chemical resistant material.

vi. Non-metal door catch or strike plate.

vii. Front of cabinet labeled with minimum 1 inch high, 1/4 inch stroke red letters: "ACID".

N. Flammable Liquids Storage Cabinets shall have the following:

i. Identified for flammable and combustible liquids shall be constructed in compliance with UL, OSHA, NFPA Standard No. 30, and UFC Article 79.

ii. Self-closing and self-latching doors synchronized so that both doors will always fully close.

iii. Bottom of the cabinet liquid tight to a height of 2 inches.

iv. Front of cabinet labeled with minimum 1 inch high, 1/4 inch stroke red letters: "FLAMMABLE - KEEP FIRE AWAY".

O. Vacuum Pump Cabinets (WHEN REQUIRED):

i. Designed to provide a means to store and vent vacuum pumps and their emissions and heat load.

ii. Hinged doors with integral toe space without a bottom and designed to allow a 20” by 16” mobile cart to roll in and out of cabinet. Door to swing open 165 degrees.

iii. Cabinet shall incorporate acoustical insulation on the interior door panels, sides, back and underside of top panel. Insulation shall be an open cell foam of clonal design. Top insulation/panel design shall prevent heat from pump from heating up the hood work surface.

iv. Cabinet shall incorporate an integral electrical switch with pilot light, located on the top front of the cabinet, just below hood, to indicate operational mode of pump.

v. Cabinet shall have an electrical duplex outlet (adequately sized), located in the rear (mid-height) for the vacuum pump plug. Outlet to be accessible from the inside of the cabinet. Outlet to be hard wired to the lighted electrical switch.

vi. Provide minimum 2 inch I.D. vent pipe at top rear of cabinet terminating inside of fume hood vacuum pump exhaust.

vii. Vent pipe shall be as close to rear of hood as possible. Seal opening between working surface and pipe with chemical resistant material.

viii. Provide 2 inch I.D. hole in hood work surface for vacuum piping/tubing. Provide rigid pass through bench top sleeve as manufactured by Scientific Plastics, Inc. Seal sleeve to bench top.

ix. Provide mobile platform, 20” by 16” min, capable of supporting 300 lbs. Front two casters shall be locking/swivel models. Lipped construction shall contain any accidental spills.

x. Vented with a minimum 1-1/2 inch I.D. corrosion resistant vent pipe at rear of cabinet terminating inside of fume hood 2 inch above the working surface.

xi. Front of cabinet labeled with minimum 1 inch high, 1/4 inch stroke red letters: "NO CHEMICAL STORAGE".
P. Fume Hood Identification Label: Provide label attached to the fume hood exterior with condensed information covering fume hood identification and initial performance label completed by the performance testing (ASHRAE 110) contractor.
   i. Each fume hood that passes the performance tests shall be labeled with the following baseline information inscribed into the label:
      1. -Date tested
      2. -Name of Inspector
      3. -Company Inspecting
      4. -Testing protocol used (such as ASHRAE 110 smoke visualization)
      5. -Average face velocity at the specified maximum operating sash height (measured from bench top to bottom of sash; for combination sashes, horizontal sashes are close -during testing).

Q. “Signage:
   i. A sign shall be secured to the center of the hood lintel, immediately above the sash opening. The sign shall be of white lettering, ¼ inch high, with red facing; (FUME HOOD “TYPE” lettering shall be ½ inch high) reading as follows:
      ii. GENERAL PURPOSE FUME HOOD”, “Reactions with radioactive material exceeding NRC guidelines, perchloric acid, highly toxic or unstable explosive materials are not permitted in this fume hood. Check with the Radiation Safety Officer for limits on isotope use.”

3. EXECUTION:
   A. Set up hoods as follows:
      i. Constant volume:
         1. The vertical sash shall be placed at 18” above the work surface.
         2. The horizontal sashes shall be fully closed.
         3. The Face velocity shall be set up for 80 feet per minute by manually modulating the exhaust fan VFD speed dial.
      ii. Variable Volume:
         1. The horizontal sashes shall be fully closed.
         2. For all vertical sash positions up to 18” above the work surface, the Face velocity shall be maintained at 80 feet per minute by automatically modulating the laboratory controls.
   B. For constant volume hoods, with a dedicated exhaust fan, the exhaust fan shall be selected to for stable operation at 60 feet per minute and 80 feet per minute with the vertical sash at 18” above the work surface and the horizontal sashes closed. The Design Professional shall submit fan curves to the Project Manager for review indicating the fan operating duty point(s) at the cfm associated with 60 fpm and 80 fpm.
ROOF CURB FOR EXHAUST FAN TYPICAL DETAIL
SCHEMATIC DRAWINGS FOR GENERAL REFERENCE ONLY

NOTE:
FEATHER FELTS BACK IN PLACE WHERE APPLICABLE. CHECK ROOF TYPE BEFORE INSTALLING CURB.

DETAIL - CURB CONSTRUCTION

SET BOLTS IN ELASTOMERIC SEALANT
FAN MOUNTING BASE
NEOPRENE PAC
18 GA. STAINLESS STEEL
ROV. 3" WIDE X 2" HIGH X 1/8" THICK

DETAIL - EQUIPMENT MOUNTING RAIL

AIR TERMINAL (10") MIN. ABOVE DUCT

SUPPORT AND ATTACH AIR TERMINAL AND CABLE TO VENT AND ROOF PER LIGHTNING PROTECTION INSTITUTE STANDARD LP-175

FUME HOOD EXHAUST FAN ON VIBRATION ISOLATORS

CODEWELD TO EXIST. LIGHTNING PROTECTION SYSTEM MAIN CONDUCTOR (COPPER)

ELECTRICAL CONDUCTORS WITHIN CURB, CALK AT PLATFORM PIERCING

NOTES:
1. CURB SHALL BE LOCATED ON HIGH SIDE OF CURB.
2. THESE DETAILS APPLICABLE TO 3' X 3'
3. PROVIDE GUY WIRES FOR FUME HOOD STACKS OVER 10'-0" ABOVE ROOF.

DETAIL - FAN DISCHARGE STACK

DRAIN COLLAR
DISCHARGE DUCT
BRACKET RAIN COLLAR TO DISCHARGE DUCT

STAINLESS STEEL SHEET METAL
FLASHING
P.T. PLYWOOD SIDES
4" FRACE CANT STRIP ALL AROUND
WATER CUT-OFF
INSULATION
ROOF DECK
WATERPROOF SEAL

ONE PLY 15# FINISHED FELT SET IN ASPHALT OVER ONE NAILED 15# FINISHED FELT PLY
P.T. 2" X 4" KNEE WALL 2 X 6 @ 12" O.C.
INO. PLYWOOD PLATFORM

18 GA. 316 STAINLESS STEEL FLANGE = SECURE TO CURB CURB

DIAETER D: @ 3000 FPM:
4" HOOD 550 CFM 5 1/2#
5" HOOD 700 CFM 6 1/2#
6" HOOD 850 CFM 7#

DIAETER d: @ 1500 FPM:
4" HOOD 550 CFM 6#
5" HOOD 700 CFM 9#
6" HOOD 850 CFM 10#
EXPLODED VIEW OF FLANGED CONNECTION – TYPICAL FOR ALL EXHAUST DUCTS
SCHEMATIC DRAWINGS FOR GENERAL REFERENCE ONLY

NOTE:
THIS DRAWING IS NOT APPLICABLE FOR THROUGH-THE-WALL (TTW) SENSING OR FOR VAV FUME HOODS.
1. **GENERAL**
   A. Design Professional coordinates with Project Manager and FMD Services Department on whether a waste compactor shall be part of a project and the type of compactor used. Suitable types include: stationary compactors, self-contained compactors, and auger compactors.

2. **PRODUCTS**
   A. Acceptable manufacturers are:
      i. Bakers Waste Equipment
      ii. Sani-Tech Systems
      iii. Wastequip