

**DR.B.R.AMBEDKAR CENTER FOR BIOMEDICAL RESEARCH
UNIVERSITY OF DELHI, DELHI-110007**

TENDER NOTICE

**Tender No. ACBR/16/ Feb/
16th February 2016**

Dr.B.R. Ambedkar Center for Biomedical Research, invites sealed tender from reputed and experienced manufactures or their authorized dealers for supply of Scientific/Lab. Equipment as per details given below:-

| S.No. | Description | Qty | EMD (Rs.) |
|--------------|---|------------|------------------|
| 1 | Laboratory Furniture, wooden, steel and stone | | Rs. 20,000 |
| 2. | Online UPS 20 KVA | 01 | Rs. 20,000/- |

Financial & Technical Bid should be submitted in separate Envelops.

Performance Guarantee for each item equivalent to 10% of the total order value to be submitted by the successful Vendor at the time of placing the purchase order.

- Those who had applied earlier need not apply again.**

Tender documents (non transferable) along with detailed Specification, Terms & Conditions may be purchased by the bidder on submission of a written application to the Section Officer, ACBR upon payment of Non-refundable fee of Rs.500/- in the form of Bank Draft in favour of Director, ACBR, Payable at Delhi, between 10.00 a.m. to 4.00 p.m. on all working days as per following Schedule either in person or by post. The postal charge of Rs.50/- will be extra, if required, to be sent by post .Center will not be responsible for any postal delay. **The Center reserves the right to accept or reject any Bid without assigning any reason.**

| | | |
|----|---|---|
| a. | Date of Commencement of sale of Tender Document | : Thursday, 16 th February, 2016 (2.30 pm) |
| b. | Last date of sale of Tender Document | : Wednesday, 9 th March, 2016 (1:00 pm) |
| c. | Last date of Submission of Tender Document | : Thursday, 10 th March, 2016 (2:.00 pm) |
| d. | Date and Time of Tender Opening | : Thursday, 10 th March, 2016 (4:00 pm) |

For Specification of each item, please visit University/ ACBR Website www.du.ac.in / www.acbrdu.edu

Director (Offg.)

Specifications:-

1. Laboratory Furniture, wooden, steel and stone

Attached as under

2. Online UPS 20 KVA

This specification describes **One 20 KVA three phase input & single phase output and optional One 20 KVA Three- phase input and Three phase output**, on- line, double conversion, continuous operation, solid- state, DSP controlled, Uninterruptible Power Supply (UPS) along with external isolation transformer & battery bank for minimum one hour back up. The UPS is required for Biomedical Sophisticated Instrumentation Facility.

The following documents must be submitted along with the offer.

- a) Manufacturers Authorization letter to submit offer mentioning this tender.
- b) Reference list where similar UPS systems have been supplied in India.
- c) Product catalogue sheets or equipment brochures.
- d) Circuit diagram showing the UPS units, load sharing mode along with the input and output panel requirements.

The UPS shall operate as an on- line system in the following modes:

- a) Normal, b) Battery, c) Recharge, d)Bypass:

QUALIFICATIONS

- a) **Manufacturer experience:** The manufacturer shall have a minimum 8-10 years of Experience in the design, manufacture and testing of UPS systems.
- b) **Service Centre:** Should have a fully functional service centre with spares stock for attending the breakdown calls. Details of the service centre must be provided.
- c) **ISO Certification:** The manufacturer and bidder shall be ISO 9001 and ISO14001 certified.
- d) Bidder should provide **user's list** with full contact details and phone numbers of the model quoted in the tender.

WARRANTY

- a) **UPS Module:** The UPS manufacturer shall warrant the UPS module against poor workmanship and materials for 2 years from the date of installation. The standard warranty shall include coverage of all internal parts and the supporting equipment. An additional 2 years warranty/AMC is also required to be quoted.
- b) **External Batteries:** SMF type; for batteries connected to the UPS, the warranty should be at least ≥ 02Yearsfrom the date of supply, installation and acceptance.

Preventive Maintenance of SMART UPS (PM)

- a) Preventive Maintenance of complete setup of UPS system for a period of two years to be undertaken.
- b) Minimum 04 Numbers of Preventive maintenance shall be carried out in a year. Breakdown calls to be attended within 12 hours from the time of call.

STANDARDS

- a) **Safety** : EN 50091-1 or equivalent
 b) **Emission & Immunity** : EN 50091-2 & CE – Mark. 50 Hz Models or equivalent

Environmental Requirements

- a) **Storage Ambient Temperature** : 0°C to 50°C
 b) **Operating Ambient Temperature** : 0°C to 40°C
 c) **Relative Humidity** : 0 to 95% non- condensing.

SYSTEM RATINGS AND OPERATING CHARACTERISTICS

- a) The rating of UPS should be 20 KVA.
 b) UPS should be online- Double Conversion with Digital Signal Processor control.
 c) Should have IGBT based PFC Rectifier and IGBT based Inverter
 d) SMF Batteries should be sized for back- up of one hour at full load
 e) Battery manufacturer's catalogue and stacking details to be provided.
 f) Battery banks and their mounting racks should be separate for each UPS.
 g) Should have appropriate bypass.

SYSTEM INPUT

- a) Input Voltage Rating : 400-415 V for 3 phase
 Input voltage variation (\pm) 10 - 30%
 b) Input Voltage Range : In above range UPS should
 not switch to Battery backup mode.
 c) Input frequency Range : 40 - 60 Hz. In this range UPS should not
 switch to Battery backup mode.
 d) Input power factor : > 0.98 at 100% load
 e) No. of Battery selected option : as per load / model quoted

SYSTEM OUTPUT

- a. Output Voltage Rating: - 220 - 230 V for 1 phase &
 400-415 V for 3 phase
 b. Output voltage regulation - +/- 1 % or better
 c. Output Frequency Regulation - 50 Hz +/- 0.1 Hz or better, unsynchronized
 d. Synchronised Freq. - \pm 1 Hz, \pm 2Hz, \pm 3Hz or better
 e. Max. Voltage transient recovery time - 10 milliseconds to nominal
 f. Output Voltage THD: <2% for linear load & <5% Nonlinear Load
 g. Overload capability: 125-150% for 60 seconds in normal operation
 h. Acoustical noise: dB(A) of noise, typically, measured at 1 meter from
 the operator surface should not be more than less
 than 65 dB(A)

Tender Terms and Conditions:-

1. The vendor should be the Original manufacture, authorized distributor or Dealer with supporting documents.
2. The Vendor should have proven ability of Supply of Science Equipments/Lab work in reputed organizations including Government Department. Copies of purchase order should be include as a proof.
3. Manufacturer experience: The manufacturer should have a minimum 5-10 years of Experience in the design, manufacture and Quality control.
4. Service Centre: Should have a fully functional service centre with spares stock for attending the breakdown calls. Details of the service centre must be provided.
5. The Vendor must submit Earnest money deposit (EMD) in form of D.D. drawn in favour of the Director, Dr. B.R. Ambedkar Centre for Biomedical Research University of Delhi and for EMD is required and fill the form (Annexure-II)
6. The firm must submit an undertaking (Annexure-I) on its letter head that they have not been blacklisted by any state Government or Central Government or PSU Department.
7. The quoted price should be CIP/CIF/INR inclusive of all taxes and other charges clearly.
8. Financial bid and Technical bid should be submitted in a separate Envelop.
9. The bidder should be registered with revenue authorities (copy of PAN card, Service Tax Registration, Vat registration etc , should be enclosed)
10. Original brochures and specification sheets must be enclosed along with supporting data.
11. Guarantee or Warranty conditions must be clearly specified.
12. Validity of Tender must be at least 120 days from the date of opening Tender.
13. The center reserves the right to accept or reject any bid without assigning any reason.
14. Our Tender No & Date and name of the item/ equipment should invariably be marked on the top of each envelope containing the Technical/ Financial bids, as well as on the outer envelope.
15. The T/Bid prepared by the Tender/ bidder, as well as all correspondence and documents relating to the T/bid, shall be written in English Language. Supporting documents and printed literature shall also furnished in English.
16. Containing price with detailed break up as per format enclosed, both in figure and in words.
17. The documentary evidence of the bidder's qualifications to perform the contract if its bid is accepted, shall be established to the purchaser's satisfaction.
18. A list giving full particulars, including available source of all spare parts, special tools etc, necessary for the proper and continuing function of the goods . Following commencement of the goods use by the purchaser.
19. A confirmation that if the T/bidder offers system and /or other software systems offered by the bidder and the t/ bidder is willing to accept responsibility for its successful operation.
20. To sign the contract.
21. Firm must provide a user List with contact details of coated equipment (Name, address, email, & phone Number)
22. Performance Guarantee for each item equivalent to 10 % of the total cost of order value to be submitted by the successful Vendor at the time of placing the purchase order

Certificate from the bidder on their letterhead stating that the Company has not been blacklisted by any Government Organization, Non-Government or Public Sector.

To,

The Director
Dr. B.R.Ambedkar Center for Biomedical Research
University of Delhi
Delhi-110007.

Subject: _____

Dear Sir,

This is certified that M/s _____ has not been blacklisted and no criminal case is pending in any Government Organization, Non-Government or public Sector organization before submission of the bid document.

Yours faithfully

Signature

(Name & Designation)-----

(Company Seal)

Date

Annexure II

The Director
 Dr. B.R. Ambedkar Center for Biomedical research
 University of Delhi
 Delhi-11007

Sub:- Your tender ref No. _____

Dear Sir,

With reference to the above tender, having examined and understood the instructions, terms and conditions forming part of the tender, we hereby enclose our offer to supply the following items as per details in your above referred Tender.

| Basic item No | Item Description | Make & Model No |
|---------------|------------------|-----------------|
| | | |
| | | |
| | | |

We further confirm that the offer is in conformity with the terms and conditions as mentioned in your above referred letter and enclosures. We enclose EMD/ Bank Guarantee for _____ favoring Director, Dr. B.R. Ambedkar Center University of Delhi issued by _____ Bank _____ Branch, D.D. No. _____ Dated _____ and payable at Delhi, towards Earnest Money Deposit.

With Regards,

Yours faithfully,

Authorized Signatories
 (Name & Designation, Seal of the firm)

Date:

Dr. B.R. Ambedkar Center for Biomedical Research
BILL OF QUANTITIES OF LAB FURNITURE AND ACCESSORIES

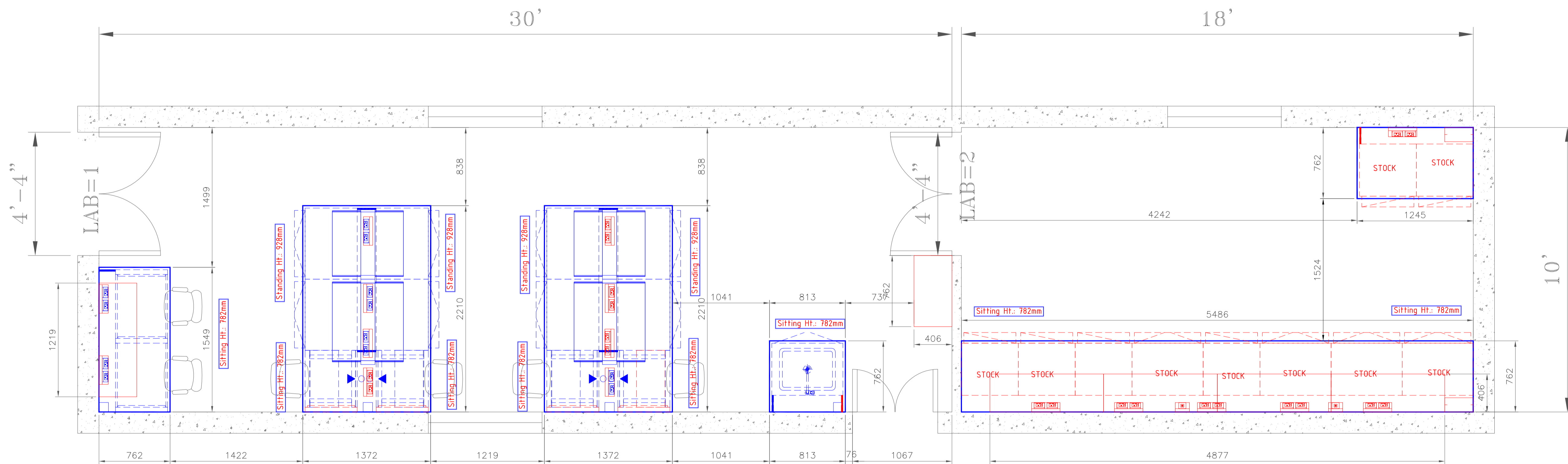
| SL. | DESCRIPTION | UNIT | QTY | U/P INR | T/P INR |
|------------------------|--|------|-----|------------|---------------------|
| LAB 1 | | | | | |
| NEW ITEM | | | | | |
| 1 | 6/16A SOCKET WITH SWITCH | Nos. | 20 | | |
| 2 | APRON RAIL - 04Hx02Dx24L | Nos. | 4 | | |
| 3 | APRON RAIL - 04Hx02Dx27L | Nos. | 4 | | |
| 4 | KNEE SPACE PANEL - 24Hx00Dx24L | Nos. | 4 | | |
| 5 | KNEE SPACE PANEL - 24Hx00Dx27L | Nos. | 2 | | |
| 6 | PEDESTAL ASSY LEFT - 29Hx22Dx02L | Nos. | 4 | | |
| 7 | PEDESTAL ASSY RIGHT - 29Hx22Dx02L | Nos. | 3 | | |
| 8 | WORKTOP SUPPORT FRAME - 01Hx22Dx24L | Nos. | 4 | | |
| 9 | REAR SCRIBE - 30Hx00Dx07L | Nos. | 3 | | |
| 10 | REAR SCRIBE - 36Hx00Dx08L | Nos. | 4 | | |
| 11 | BENCH MOUNTED 1-WAY WATER FITTING WITH 8" RIGID/SWING GOOSENECK WITH AERATOR FOR RAW WATER | Nos. | 1 | | |
| 12 | CABLE MANAGER DIA 2.5 | Nos. | 4 | | |
| 13 | BASE UNIT 2 DOOR 1 DRAWER - 36Hx22Dx30L., K=WITH LOCK | Nos. | 8 | | |
| 14 | BASE MOLDING 4 FT. | Nos. | 25 | | |
| 15 | CORNER CLIP | Nos. | 22 | | |
| 16 | ISLAND MODULE WITHOUT ACCESS PANEL, X=30x6x72 | Nos. | 2 | | |
| 17 | ISLAND MODULE WITHOUT ACCESS PANEL, X=36x6x72 | Nos. | 2 | | |
| 18 | ADJUSTABLE OPEN FRONT SHELF | Nos. | 8 | | |
| 19 | ADJUSTABLE OPEN FRONT SHELF | Nos. | 8 | | |
| 20 | KEY BOARD TRAY 24x12 | Nos. | 4 | | |
| 21 | BASE UNIT SINK 2 DOOR - 30Hx22Dx30L | Nos. | 1 | | |
| 22 | PP SINK, SIZE: 560Lx355Dx245Hmm AND BOWL SIZE: 500Lx293Dx245Hmm | Nos. | 1 | | |
| 23 | WASTE, 1 1/2" BSP X 76mm. | Nos. | 1 | | |
| 24 | ANTI SIPHON PP BOTTLE TRAP. | Nos. | 1 | | |
| 25 | REDUCING COUPLER IN PP 51 X 31MM + PP PIPE LENGTHS - ONE FEET LENGTH - DIA. 38MM | Nos. | 1 | | |
| 26 | SERVICE DROPPER OF SIZE: 4x4x112 | Nos. | 4 | | |
| 27 | 18/19mm THK. GRANITE WORKTOP IN SFT | Sft | 95 | | |
| 28 | GRANITE SKIRTING. 4x1 | Rft | 32 | | |
| ACBR STOCK ITEM | | | | | |
| 1 | SINGLE SIDE SOCKET BOX 12x4x4.M, (STOCK) | Nos. | 10 | | NOT TO QUOTE |
| 2 | WALL UNIT SLIDING PLATE GLASS - 24Hx16Dx48L, (STOCK) | Nos. | 1 | | NOT TO QUOTE |
| 3 | WALL UNIT SWINGING GLAZED - 24Hx16Dx30L, K=WITH LOCKS AND (STOCK) | Nos. | 1 | | NOT TO QUOTE |
| LAB 2 | | | | | |
| NEW ITEM | | | | | |
| 1 | BASE MOLDING 4 FT. | Nos. | 11 | | |
| 2 | CORNER CLIP | Nos. | 2 | | |
| 3 | 18/19mm THK. GRANITE WORKTOP IN SFT | Sft | 62 | | |
| 4 | GRANITE SKIRTING. 4x1 | Rft | 40 | | |
| ACBR STOCK ITEM | | | | | |
| 1 | 6/16A SOCKET WITH SWITCH (STOCK) | Nos. | 12 | | NOT TO QUOTE |
| 2 | REAR SCRIBE - 30Hx00Dx07L (STOCK) | Nos. | 1 | | NOT TO QUOTE |
| 3 | SINGLE SIDE DATA SOCKET BOX 06x4x4 (STOCK) | Nos. | 2 | | NOT TO QUOTE |
| 4 | BASE UNIT 1 DOOR 1 DRAWER - 30Hx22Dx24L (STOCK) | Nos. | 6 | | NOT TO QUOTE |
| 5 | BASE UNIT 2 DOOR 1 DRAWER - 30Hx22Dx30L (STOCK) | Nos. | 1 | | NOT TO QUOTE |
| 6 | BASE UNIT 2 DOOR 1 DRAWER - 30Hx22Dx30L., K=WITH LOCK (STOCK) | Nos. | 3 | | NOT TO QUOTE |
| 7 | SINGLE SIDE SOCKET BOX 12x4x4 (STOCK) | Nos. | 6 | | NOT TO QUOTE |
| 10 | DATA SOCKET (STOCK) | Nos. | 2 | | NOT TO QUOTE |
| 11 | SERVICE ENCLOSURE FOR WALL BENCH 12x6x112., (STOCK) X=WITH 3050mm | Nos. | 2 | | NOT TO QUOTE |
| 12 | WALL UNIT SLIDING PLATE GLASS - 24Hx16Dx48L, (STOCK) | Nos. | 4 | | NOT TO QUOTE |
| TOTAL | | | | | |

Note:


- The thickness of Granite worktop is 18/19mm.
- The cabling & tie in to Electrical sockets has to be done by ACBR
- The tie in of water and drain for sinks has to be done by ACBR

NOTE:
 ○ All dimensions in mm
 ○ All wall to wall dimensions are to be verified at site.
 ○ All Floor mounted case work should be with 100mm height toe space.

TENDER



1. RED COLOR SHOWS STOCK ITEMS
 2. BLUE COLOR SHOWS NEW ITEMS

Client:
 M/s. Dr. B.R. Ambedkar Center
 for Biomedical Research
 Delhi

Drawing Title:
 Laboratory Furniture Layout

Issue Date: 31.12.2015
 Drawing No: ACBR-TEND-1001-15
 Revision: 00

TECHNICAL SPECIFICATION FOR LABORATORY FURNITURE

INDEX

| SL. | CHAPTER NAME | DESCRIPTION |
|-----|--------------|------------------------------------|
| 1 | CHAPTER-01 | LABORATORY FURNITURE SPECIFICATION |

CHAPTER-01

LAB FURNITURE SPECIFICATIONS

DESCRIPTION OF WORK

1.00 SUMMARY AND SCOPE

A. Section Includes:

1. Furnish all cabinets and casework, including tops, ledges, supporting structures. 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 all utility service outlet accessory fittings, electrical receptacles and switches identified on drawings as mounted on the laboratory furniture. All plumbing and electrical fittings, not preinstalled in equipment, will be packaged separately and properly marked for delivery to the appropriate contractor.
3. 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. All tailpieces shall be furnished less the couplings required to connect them to the drain piping system.
4. Furnish service strip supports where specified, and setting in place service tunnels, service turrets, supporting structures and reagent racks of the type shown on the drawings.
5. Removal 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.

1.01 BASIS OF WORK

Laboratory Furniture as the standard of construction for steel laboratory furniture. The construction standards of this product line shall provide the basis for quality and functional installation.

2.00 CABINET STYLE:

Steel:

Cabinet bodies, drawer bodies, shelves, drawer heads and door assemblies shall be fabricated from Cold Rolled Steel.

2.01 DRAWER AND DOOR STYLE:

The outer drawer and door head shall have a channel formation on all four sides to eliminate sharp raw edges of steel and the top front corners shall be welded and ground smooth. Drawer and door, when closed, shall be recessed to create an overall flush face, and with optional pull.

2.02 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:

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. Glass:

Glass used for framed sliding and swinging doors shall be 1/8" float glass. Glass used for unframed sliding doors, shall be 1/4" float glass. Glass used in fume hoods or other hazardous locations shall be 7/32" laminated safety float glass, except the glass shielding fluorescent lights in fume hoods shall be tempered glass to provide greater resistance to heat and impact.

D. Drawer and Door Pulls:

Pull shall be of modern design, offering a comfortable handgrip, and be securely fastened to doors and drawers with screws. All pulls shall be satin finish aluminum, with a clear, lacquer finish. Two pulls shall be required on all drawers over 24" long. Use of plastic pulls (molded or extruded), or a design not compatible for usage by the handicapped will not be acceptable.

E. Hinges:

Hinges shall be 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" high shall be hung on 3 hinges.

F. Positive Catch:

A two-piece heavy-duty cam action positive catch shall be provided on all base cupboard doors and shall be positioned near the pivoting edge of door to provide a clean unobstructed opening. Main body of the catch shall be confined within an integral cabinet divider rail, while latching post shall be mounted on the hinge side of door. Nylon roller type catches are not acceptable.

G. 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.

H. Shelf Adjustment Clips:

Shelf adjustment clips shall be nickel-plated steel.

I. Base Molding:

Base Molding shall be provided on all table legs, unless otherwise specified, to conceal leveling device. Shoes shall be a pliable, black vinyl material. Corner clip should be provided to hold the base molding firmly. Use of a leg shoe, which does not conceal leveling device, will not be acceptable

J. Sink Supports:

Sink supports shall be the hanger type, suspended from top front and top rear horizontal rails of sink cabinet by four 1/4" dia. rods, threaded at bottom end and offset at top to hang from two full length reinforcements welded to the front and rear top rails. Two 3/4" x 1-2/2" x 12 gauge channels shall be hung on the threaded rods to provide an adjustable sink cradle for supporting sinks. When sink capacity exceeds 3,750 cu. in., the sink supports shall be suspended from full-length reinforcements welded to the two end rails. Two 1" x 2" x 10 gauge full-length channels shall be hung from the four 1/4" dia. rods to provide an alternate sink cradle.

2.03 CONSTRUCTION

K. Steel Base 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 reinforcement at exterior corners. All face joints shall be welded and ground smooth to provide a continuous flat plane.
- 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 shall be rabbetted 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. Bottom edges shall be formed down on sides and back to create easily cleanable corners with no burrs or sharp edges, and front edge shall be offset to create a seamless drawer and door recess rabbet for dust stop.

2. Steel Gauges:

Gauges of steel used in construction of cases shall be 18 gauge, except as follows:

- a. Corner gussets for leveling bolts and apron corner braces, 12 gauge.
- b. Case and drawer suspension channels, 14 gauge.
- c. Top and intermediate front horizontal rails, table aprons, hinge reinforcements, and reinforcement gussets, 16 gauge.
- d. Drawer assemblies, door assemblies, bottom, bottom back rail, toe space rail, and adjustable shelves, 20 gauge.

3. Base Cabinets:

- a. End uprights shall be formed into not less than a channel formation at top, bottom, back and front. The front edge shall further offset to form a strike for doors and drawers, and shall be perforated for the support of drawer channels, intermediate rails and hinge screws. An upright filler shall be screwed in place in all cupboard units to close the back of the channel at front of the upright and to provide a smooth interior for the cupboard to facilitate cleaning. The upright filler shall be perforated with shelf adjustment holes at not more than 2" centers painted prior to assembly. The inside front of the upright shall be further reinforced with a full height 16 gauge hinge reinforcement angle.
- b. Top horizontal rail on base cabinets shall interlock within the flange at top of end panels for strength, but shall be flush as face of unit. Top rail shall have a full width rabbet for swinging doors and drawers. Reinforcements shall be provided at all front corners for additional welded strength between vertical and horizontal case members.
- c. Intermediate rails shall be provided between doors and drawers, but shall not be provided between drawers unless made necessary by locks in drawers. When required, intermediate rails shall be recessed behind doors and drawer fronts, and designed so that security panels may be added as required.
- d. Intermediate vertical uprights shall be furnished to enclose cupboards when used in a unit in combination with a half width bank of drawers. However, to allow storage of large or bulky objects, no upright of any type shall be used at the center of double door cupboard units.
- e. Cabinet bottom, and bottom rail 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, and front edge shall be offset to create a seamless drawer and door recess rabbet for dust stop.
- f. Toe space rail shall extend up and forward to engage bottom rail to form a smooth surfaced fully enclosed toe space, 3" deep x 5" high. Whenever toe space base is omitted for units to set on building bases on separate steel bases, then the toe space rail shall extend back 4-1/2".
- g. Back construction shall consist of a top and bottom rail, channel formed for maximum strength and welded to back and top flange of end uprights, open for access to plumbing lines.

Cupboard units only shall be provided with removable back panels.

- h. Die formed gussets, with multiple ends for strength, shall be furnished in each bottom corner of base units to insure rigidity, and a 3/8"-16 leveling bolt, 3" long, and shall engage a clinch nut in each gusset. Access to the leveling bolts shall be through plug buttons in the bottom pan. Each leveling bolt and gusset shall be capable of supporting 500 lbs. Access to leveling bolts through toe space or leveling bolts requiring special tools to adjust are not acceptable.
- i. 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.
- j. 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.
- k. Drawer suspension assembly shall consist of 2 sections providing a quiet, smooth operation on ball bearing nylon rollers. All drawers shall be self-closing from a point 5" open. Cabinet channels shall maintain alignment of drawer and provide an integral drawer stop, but the drawer shall be removable without the use of tools. Drawers shall provide 13-5/8" front to back clearance when fully extended. Drawers shall rise when opened thus avoiding friction with lower drawers and/or doors. Drawer suspension system shall incorporate a double stop, lock open feature. Case suspension channels shall be Galvanized Steel, drawer suspension channels shall be Cold Rolled Steel. Drawer suspension channels on Stainless Steel Cabinets shall be zinc plated after they are formed.
- l. Steel Door assembly (two-piece) for solid pan 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.

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- m. Steel Drawer/door assemblies shall be painted prior to assembly. Both shall be punched for attaching drawer pulls. Likewise, inner pan formation of door and drawer body shall be indented for in-field installation of locks when required.
 - n. 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.
 - o. 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.

2.04 PERFORMANCE REQUIREMENTS

L. Steel Casework Construction Performance:

1. Base cabinets shall be constructed to support at least a uniformly distributed load 200 lbs. per square foot of cabinet top area, including working surface without objectionable distortion or interference with door and drawer operation.
2. Base cabinet corner gussets with leveling bolts shall support 500 lbs. per corner, at 1-1/2" projection of the leveling bolt below the gusset.
3. Each adjustable and fixed shelf 4 ft. or shorter in length shall support an evenly distributed load of 40 lbs. per square ft. up to a maximum of 200 lbs., with nominal temporary deflection, but without permanent set.
4. Drawer construction and performance shall allow 13-5/8" clear when in an extended position and suspension system shall prevent friction contact with any other drawer or door during opening or closing. All drawers shall operate smoothly, a minimum of 10,000 cycles with an evenly distributed load of 150 lbs.
5. Swinging doors on floor-mounted casework shall support 200 lbs. 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.

M. Steel Paint System Finish and Performance Specification:

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, electro statically 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.

1. 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 $77^{\circ} \pm 3^{\circ}$ 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

| Test No. | Chemical Reagent | Test Method |
|----------|-------------------------|----------------------|
| 1. | Acetate, Amyl | Cotton ball & bottle |
| 2. | Acetate, Ethyl | Cotton ball & bottle |
| 3. | Acetic Acid, 98% | Watch glass |
| 4. | Acetone | Cotton ball & bottle |
| 5. | Acid Dichromate, 5% | Watch glass |
| 6. | Alcohol, Butyl | Cotton ball & bottle |
| 7. | Alcohol, Ethyl | Cotton ball & bottle |
| 8. | Alcohol, Methyl | Cotton ball & bottle |
| 9. | Ammonium Hydroxide, 28% | Watch glass |
| 10. | Benzene | Cotton ball & bottle |
| 11. | Carbon Tetrachloride | Cotton ball & bottle |
| 12. | Chloroform | Cotton ball & bottle |
| 13. | Chromic Acid, 60% | Watch glass |
| 14. | Cresol | Cotton ball & bottle |
| 15. | Dichlor Acetic Acid | Cotton ball & bottle |
| 16. | Dimethylformamide | Cotton ball & bottle |
| 17. | Dioxane | Cotton ball & bottle |
| 18. | Ethyl Ether | Cotton ball & bottle |
| 19. | Formaldehyde, 37% | Cotton ball & bottle |
| 20. | Formic Acid, 90% | Watch glass |
| 21. | Furfural | Cotton ball & bottle |
| 22. | Gasoline | Cotton ball & bottle |
| 23. | Hydrochloric Acid, 37% | Watch glass |
| 24. | Hydrofluoric Acid, 48% | Watch glass |
| 25. | Hydrogen Peroxide, 3% | Watch glass |
| 26. | Iodine, Tincture of | Watch glass |
| 27. | Methyl Ethyl Ketone | Cotton ball & bottle |
| 28. | Methylene Chloride | Cotton ball & bottle |

| | | |
|-----|---|----------------------|
| 29. | Mono Chlorobenzene | Cotton ball & bottle |
| 30. | Naphthalene | Cotton ball & bottle |
| 31. | Nitric Acid, 20% | Watch glass |
| 32. | Nitric Acid, 30% | Watch glass |
| 33. | Nitric Acid, 70% | Watch glass |
| 34. | Phenol, 90% | Cotton ball & bottle |
| 35. | Phosphoric Acid, 85% | Watch glass |
| 36. | Silver Nitrate, Saturated | Watch glass |
| 37. | Sodium Hydroxide, 10% | Watch glass |
| 38. | Sodium Hydroxide, 20% | Watch glass |
| 39. | Sodium Hydroxide, 40% | Watch glass |
| 40. | Sodium Hydroxide, Flake | Watch glass |
| 41. | Sodium Sulfide, Saturated | Watch glass |
| 42. | Sulfuric Acid, 33% | Watch glass |
| 43. | Sulfuric Acid, 77% | Watch glass |
| 44. | Sulfuric Acid, 96% | Watch glass |
| 45. | Sulfuric Acid, 77% and Nitric Acid, 70%, equal parts | Watch glass |
| 46. | Toluene | Cotton ball & bottle |
| 47. | Trichloroethylene | Cotton ball & bottle |
| 48. | Xylene | Cotton ball & bottle |
| 49. | Zinc Chloride, Saturated | Watch glass |

* Where concentrations are indicated, percentages are by weight.

2. 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.

3. 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.

4. 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.

5. 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".

6. 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.

Table Tops:

The tabletops shall be of 18/19mm Jet black Granite of a even surface and the level Tolerance less than 1 mm. The front edge of the granite shall be chamfered at an angle of 28 deg and smoothened. The back splash for the wall bench shall be granite 18/19mm thick material for an height of 4" from the finished table top level.

Polypropylene Molded Sinks:

The sinks should be injection molded from Poly propylene co-polymer resin. Polypropylene to have very high resistance to attack from a wide range of chemicals and the ability to withstand temperatures up to 100 deg C. The impact resistance should be high which will minimize damage during and after installation. The sinks should be with self draining base and should be suitable for mounting on top or underside of the work benches. The sinks should be compatible to a vast number of acids, alkalis and reagents. The size of the sink is 600Lx450Dx315Hmm and Bowl size is 550Lx400Dx315Hmm. This sinks shall have bottle trap with reducing coupler of size 51x31mm and with 38mm polypropylene pipe of one foot length. All gaskets and O-rings are made from Nitrile.

LABORATORY SERVICE FIXTURES AND SAFETY EQUIPMENTS

I. General

A. All laboratory service fixtures shall have the construction and shall meet the performance requirements set forth in this specification. Fixture types shall be as indicated in the fixture schedule or fixture details included in either the project drawings or these specifications.

B. Laboratory service fixtures shall be [furnished, delivered to point of use and installed by the laboratory casework contractor.

C. All laboratory service fixtures and safety equipment shall be the product of one service fixture manufacturer to assure uniform appearance and ease of maintenance of the laboratory facility. Remote control valves and fittings furnished with fume hoods shall be the product of the same fixture manufacturer.

D. All service fixtures shall be factory assembled (including the assembly of valves and shanks to turrets, flanges and other mounting accessories), and each fixture shall be individually factory tested. Fixtures shall be tested in the manner and at the pressures set forth below.

E. Except as otherwise indicated, faucet and valve handles shall be forged brass Nylon type and shall have a color coded screw-on index disc. Color code requirements for indexing service fixtures shall follow DIN Standard 12920:1995.

II. Finish

A. General

1. Laboratory service fixtures and safety equipment shall be furnished with a powder coated finish to enhance the appearance of the fitting and to protect against corrosion. Coating material shall be a blend of epoxy and polyurethane. The hybrid blend shall ensure a finish coating with an optimum combination of chemical resistance, mar and abrasion resistance and resistance to fading under ultraviolet (UV) light.

2. Mar and Abrasion Resistance

Finishes shall have a pencil hardness of 2H-4H with adhesion substantial enough to withstand both direct and reverse impacts of 160 inch pounds. Finish shall have excellent mar resistance and be capable of withstanding scuffing, marring and other ordinary wear.

3. Reparability

Finish shall be capable of surface repair in the event that a fixture is scratched or a surface rupture occurs. The service fixture manufacturer shall have available an air-drying aerosol coating, specially formulated to match the existing epoxy coating color, which may be applied in the field to repair coated surfaces.

III. Water Faucets and Valves

A. All faucets and valves for water service shall have a renewable unit containing all working components subject to wear, including a stainless steel replaceable seat and an integral adjustable volume control (designated by the suffix "AC"). The renewable unit shall be interchangeable among all faucets and valves for water service. The renewable unit shall be broached for position locking in the valve body. The unit shall have a high durometer thermoplastic valve disc and a molded TFE stem packing. The unit shall be capable of being readily converted from compression to self-closing, and vice versa, without disturbing the faucet body.

B. Goosenecks shall have a separate outlet coupling with a 3/8" IPS female thread securely brazed to the gooseneck for attachment of serrated hose ends, aspirators and other outlet fittings. Rigid goosenecks shall have a 3/8" IPS male inlet thread and be threaded directly into the faucet body so as to be absolutely rigid. Swing goosenecks shall utilize a TFE packing with an externally adjustable packing nut.

C. Water faucets and valves shall be fully assembled and individually tested at 80 pounds per square inch (PSI) water pressure.

APPLICABLE CODES & STANDARDS

- a. SEFA 3 – Scientific Equipment and Furniture Association
- b. SEFA 8 - Scientific Equipment and Furniture Association
- c. NFPA 30 - National Fire Protection Association
- d. NFPA-45 - National Fire Protection Association
- e. UL - Underwriters Laboratories
- f. ASTM D552 – Bending Test