



Knowledge is Freedom

# AFRICA CENTRES OF EXCELLENCE (ACE) PROJECT

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PAN AFRICAN MATERIALS INSTITUTE  
(PAMI)

## BIDDING DOCUMENT

for the

SUPPLY AND INSTALLATION OF X-RAY  
DIFFRACTION(XRD) EQUIPMENT AND 20KVA ONLINE  
UPS

at

AFRICAN UNIVERSITY OF SCIENCE AND  
TECHNOLOGY, ABUJA, NIGERIA

Issue Date: May 31, 2017

NCB NO: PAMI /06/2017/01  
(LOT 1)

Employer:

AFRICAN UNIVERSITY  
OF SCIENCE AND TECHNOLOGY  
NO 19 AIRPORT ROAD,  
SHADIMAWA  
ABUJA



...Materials for African Development  
African University of Science and Technology

## Section 7. Technical Specifications

### A: X-RAY DIFFRACTION EQUIPMENT

**N/B: IRRESPECTIVE OF WHAT IS WRITTEN IN THE SPECIFICATIONS OR BIDDING DOCUMENT(S), THE REQUIRED VOLTAGE FOR ALL THE EQUIPMENT IS 220-240 VOLTS. KINDLY NOTE AND CORRECT ACCORDINGLY**

The Goods and Related Services shall comply with the following Technical Specifications:

#### X-Ray Diffraction Equipment (XRD)



#### XRD Minimum Technical Specifications (Bruker D8 Discover Preferred)

SN	Item	Minimum Specifications
1	<b>Goniometer</b>	
	Measuring circle diameter (Depending on setup)	Any intermediate setting between 500 mm and 1,080 mm
	Angular range (Without Accessories)	360°
	Max. usable angular range	$-110^\circ < 2\theta \leq 168^\circ$



	Angle positioning	Stepper motors with optical encoders
	Smallest addressable increment	0.0001° (High Precision)
	Maximum angular speed	20°/s
2	<b>Detectors</b>	<ul style="list-style-type: none"> <li>• 0-D detector Scintillation counter</li> <li>• 2-D VANTEC-500: 135 mm diameter active area with 4,000,000 channels without defective/dead strips or areas</li> </ul>
3	<b>X-ray sources</b>	<p>Sealed tube</p> <ul style="list-style-type: none"> <li>• TWIST-TUBE: fast and easy switching between line and spot focus</li> <li>• TURBO X-RAY SOURCE: from 1.2 kW up to 18 kW, depending on focus size and anode type</li> </ul>
4	<b>Power supply</b>	Single phase: 208 to 240 V
5	<b>X-Ray Optics</b>	<ul style="list-style-type: none"> <li>• Divergent Beam Optics, Fixed and Automatic Divergent Slits, Antiscatter Slits, Beam Masks</li> <li>• Parallel Beam Optics, Monochromator</li> </ul>
6	<b>Sample Stages</b>	<ul style="list-style-type: none"> <li>• Universal Motion Concept (UMC) stages</li> <li>• Eulerian cradles</li> <li>• Tilt stages</li> <li>• Vacuum chucks</li> <li>• Sample spinners for capillaries and flat powder samples</li> <li>• Automatic sample changers</li> <li>• Non-ambient chambers (Heating / cooling Stage from -180 °C up to 800 °C)</li> </ul>
7	<b>Miscellaneous components</b>	<ul style="list-style-type: none"> <li>• Knife-Edge Collimator (KEC)</li> <li>• Laser-Video microscope</li> <li>• Manual control box</li> <li>• Anti-scatter screen</li> <li>• Rotary-Absorber</li> <li>• Universal Beam Concept (UBC) collimators</li> </ul>
8	<b>Applications</b>	<ul style="list-style-type: none"> <li>• Powder Diffraction</li> <li>• High-Resolution X-ray Diffraction (HRXRD) (Film thickness, lattice parameter, lattice mismatch, composition, strain &amp; relaxation, lateral structure, mosaicity, defects)</li> <li>• X-ray Reflectometry (XRR) (layer thickness, composition, roughness, density, porosity)</li> </ul>

		<ul style="list-style-type: none"> <li>• Reciprocal Space Mapping (RSM)</li> <li>• In-Plane Grazing Incidence Diffraction (in-plane GID)</li> <li>• Grazing Incidence Small Angle X-ray Scattering (GISAXS)</li> <li>• Stress and Texture</li> <li>• Phase Identification (Phase ID)</li> <li>• Microdiffraction</li> </ul>
9	Computer Workstation	OEM
10	Application Software	DIFFRAC.SUITE DIFFRAC.MEASUREMENT CENTER with: <ul style="list-style-type: none"> <li>• DIFFRAC.COMMANDER</li> <li>• DIFFRAC.CONFIGURATION</li> <li>• DIFFRAC.DAVINCI</li> <li>• DIFFRAC.D8 MANAGER</li> <li>• DIFFRAC.TOOLS</li> <li>• DIFFRAC.WIZARD</li> </ul> DIFFRAC.EVALUATION PACKAGE with: <ul style="list-style-type: none"> <li>• DIFFRAC.EVA</li> <li>• DIFFRAC.TOPAS</li> <li>• DIFFRAC.LEPTOS</li> <li>• DIFFRAC.MULTEX</li> <li>• DIFFRAC.POLY SNAP</li> <li>• DIFFRAC.NANOFIT</li> </ul>
11	Recirculating Water Chiller	Min. flow 4 l/min, pressure 7.5 bar min
12	Installation	Included
13	User - Training	Included
14	Basic Maintenance Training	Included
15	Technical Support	1 Year



## B: 20KVA ONLINE UPS

# Technical Data Sheet and Specification for Online UPS

### TECHNICAL CHARACTERISTICS

#### RATINGS

Frame Rating (kVA/kW) 20/18

Power Module rating (kVA/kW) 5/4.5

Maximum number of power module per frame 6

#### INPUT DATA

Nominal Input Voltage (V) 220/230/240; Single-Phase - 380/400/415; Three-Phase

Input voltage range without battery discharge at 70% load (V) 140-280 Single-Phase; - 242-485 Three-phase

Nominal Input Frequency (Hz) 50/60

Input Frequency Range (Hz) 40 to 70 auto-sensing

Input Power Factor (kW/kVA) Single-Phase Input, > 0.99 - Three-phase Input, > 0.95

Input Current Distortion, THDi (%) < 5

#### BATTERY MODULE

Battery Cells Per String 72

Backup Time, Minutes, Full Load

(for non-redundant system which has equal number of battery

strings and power modules) (min) 5

Maximum Charge Current (Full, Load) (A) Power module internal charger: 1.8 - Extra Charger module: 10

Voltage temperature compensation Yes

#### OUTPUT DATA

Nominal Output Voltage (V) 220/230/240 Single-Phase

Voltage Regulation (%)  $\pm 3$

Voltage Stability (100% Step Load) (%)  $\pm 7$

Voltage Recovery Time (ms)  $\leq 60$

Output Voltage Distortion, THDv (%)  $\leq 3$ , linear load

$\leq 5$ , non-linear load

Output Frequency (Hz) 50/60

Nominal load power factor (kW/kVA) 0.9

Output Overload Capability (s) 130% for 60s; 150% for 10s - 200% for 1s;  $> 201\%$  for 0.25s

#### DIMENSIONS AND WEIGHT

Unit Weight (empty frame) (kg) 145

Power Module Weight (kg) 8.2

Battery Module Weight (kg) 16.4

Dimensions, W x D x H (mm) 440 x 850 x 970

#### GENERAL & ENVIRONMENTAL

Operating Temperature, continuous, without derating ( $^{\circ}\text{C}$ ) 0 - 40

Double conversion Efficiency (AC-AC) (%) 92

Eco Mode Efficiency (AC-AC) (%)  $> 98$

Environmental WEEE and ROHS2 (6 by 6), REACH Compliant

Acoustic Noise Level @ 1 meter (dBA)  $< 55\text{dB}$  ( $< 50\%$  load),

$< 65\text{dB}$  (51-100% load)

UPS Classification According to IEC EN 62040-3 VFI-SS-111

Protection Degree IEC60529 IP 20

## Section 8. Drawings

### Notes on Drawings

*[Insert here a list of Drawings, including site plans, which should be attached to this section or annexed in a separate folder. The Drawings shall be clearly dated, numbered and show any revision number(s), if appropriate.]*





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(PAMI)

## BIDDING DOCUMENT

for the

**SUPPLY AND INSTALLATION OF LABORATORY  
EQUIPMENT FOR THE UPGRADE OF  
MULTIFUNCTIONAL LABORATORY**

at

**AFRICAN UNIVERSITY OF SCIENCE AND  
TECHNOLOGY, ABUJA, NIGERIA**

Issue Date: May 31, 2017

NCB NO: PAMI /06/2017/02

(LOT 2)

Supplier:

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NEW AIRPORT ROAD,  
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*...Materials for African Development*  
African University of Science and Technology



## Section 7. Technical Specifications

SPECIFICATIONS FOR EQUIPMENT AND ACCESSORIES FOR THE UPGRADE OF  
MULTIFUNCTIONAL LABORATORY

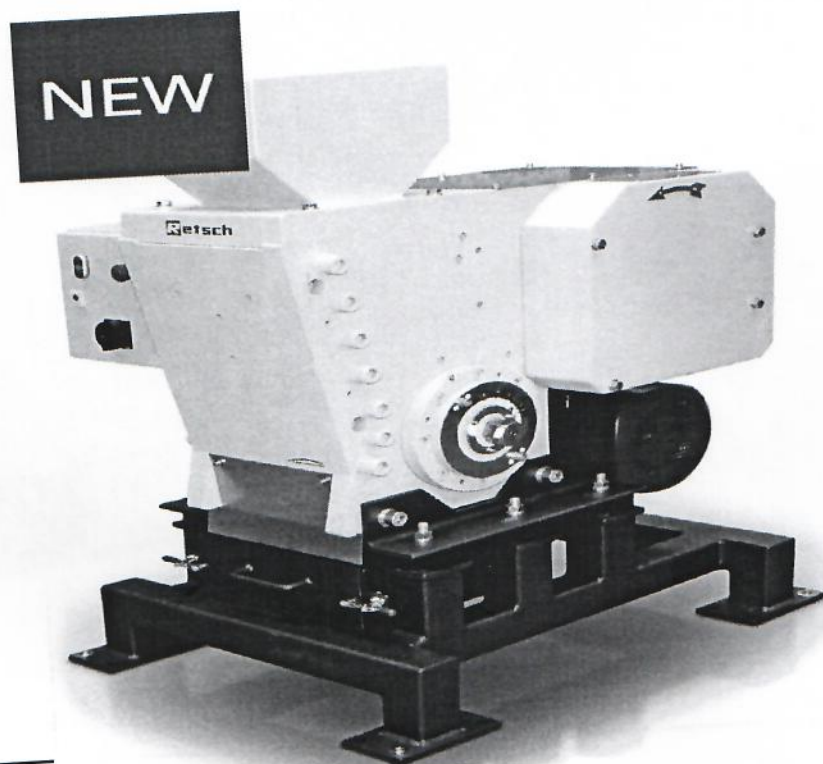
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ACCORDINGLY

### Section 1: Equipment

BB 50 Jaw Crusher

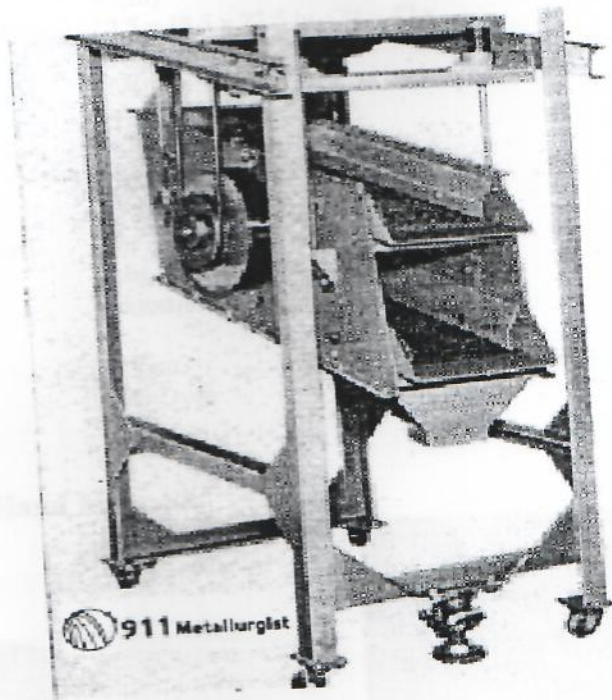


BB 300 Jaw Crusher

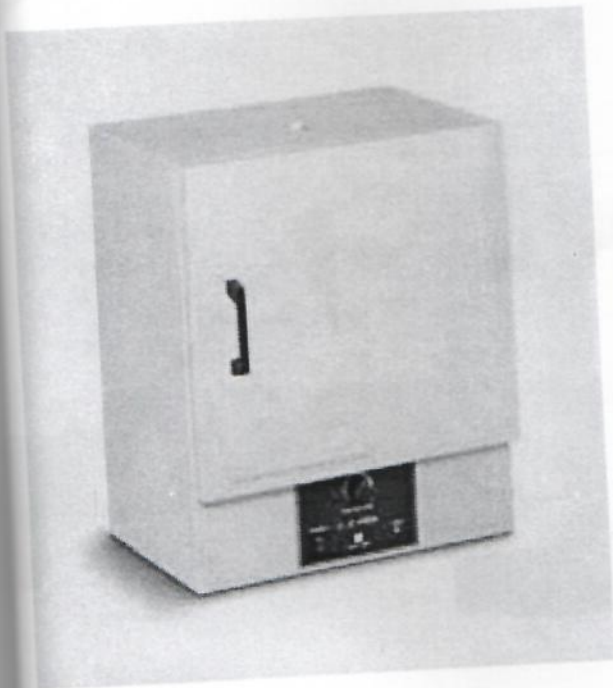


**Vibrating Screen**

Double Deck Dillion (Portable) Laboratory Vibrating Screen With Discharge Hopper

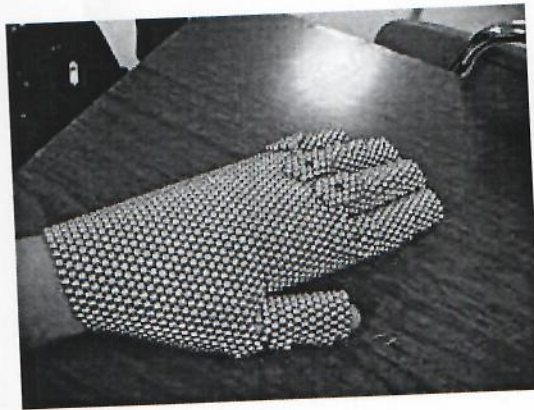
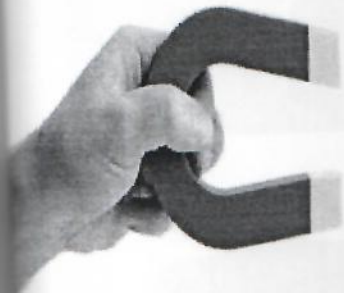


**Laboratory Sample Dryer (Number 12)**



Specifications	
Construction	Double-wall heavy-gauge steel
Amperage	6.5A
Chamber Material	Aluminum
Depth (Metric) Interior	34.29cm
Dimensions (D x W x H) Interior	11.5 x 16 x 16.25 in. (29 x 41 x 41cm)
Dimensions (L x W x H) Exterior	13.5 x 18.5 x 22.5 in. (34 x 47 x 57cm)
Hertz	50/60Hz
Height (Metric) Interior	57.15cm
Temperature Range (Metric)	5° to 210°C
Voltage	220-230V
Electrical Requirements	220-230V, 50/60Hz
For Use With (Application)	For small drying and sterilizing jobs, for bacteriological, clinical, educational, and industrial labs
No. of Shelves	3
Warranty	1 Year
Product Type	Lab Oven

### Various Types of Hand Magnets

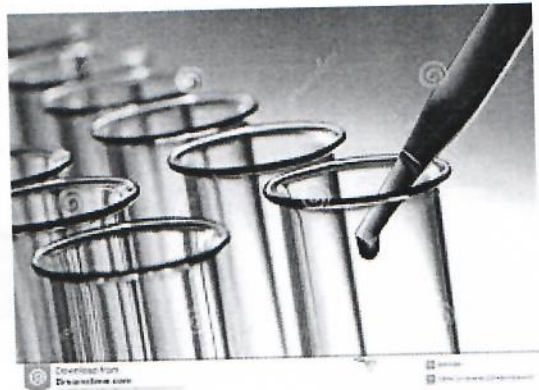




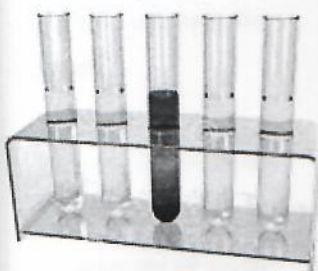


### Buckets, Pans and Tubes





### Laboratory Flotation Media

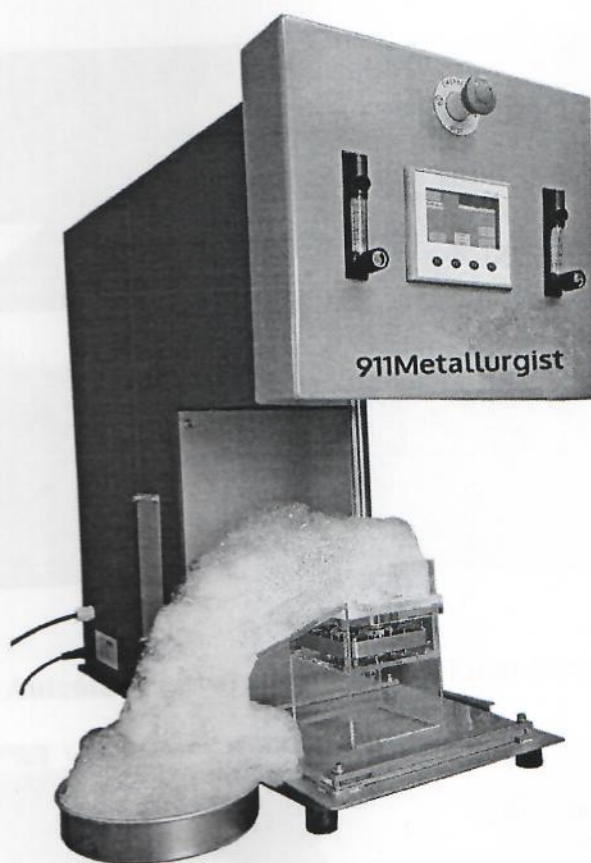


- 1.5% (w/v) ...
- 2.5% (w/v) ...
- 3.5% (w/v) ...
- 4.5% (w/v) ...
- 5.5% (w/v) ...
- 6.5% (w/v) ...
- 7.5% (w/v) ...

### Flotation Media



## Laboratory Flotation Cell



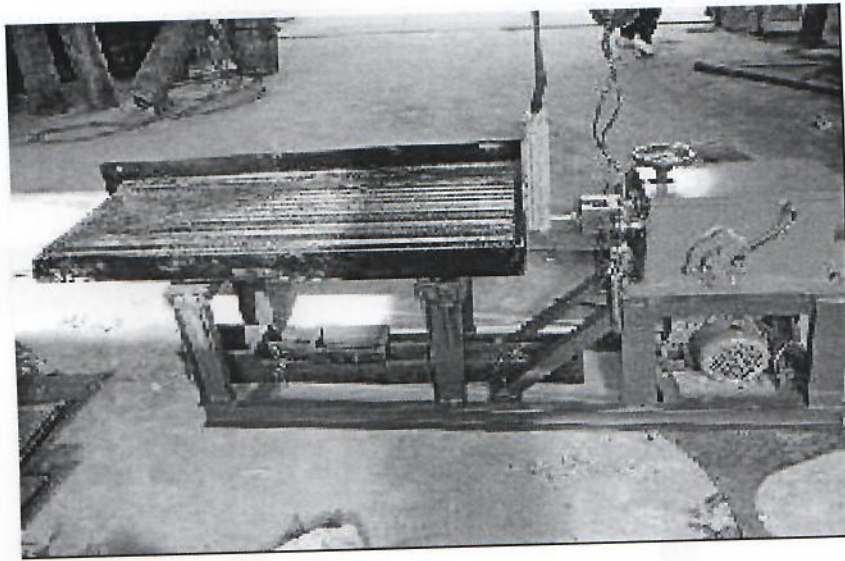
### Laboratory Flotation Machine Specifications

Flotation cells capacity	0,5 / 1 / 1,75 / 3 / 5 / 7 litres
Weight	Depending on version
Impellers	Interchangeable
Electrical requirements	0,37 KW
Impeller speed / Electronic digital read out	100 - 2000 RPM
Compressed air supply	5- 10 kpa
Approximate mass	75 kgs

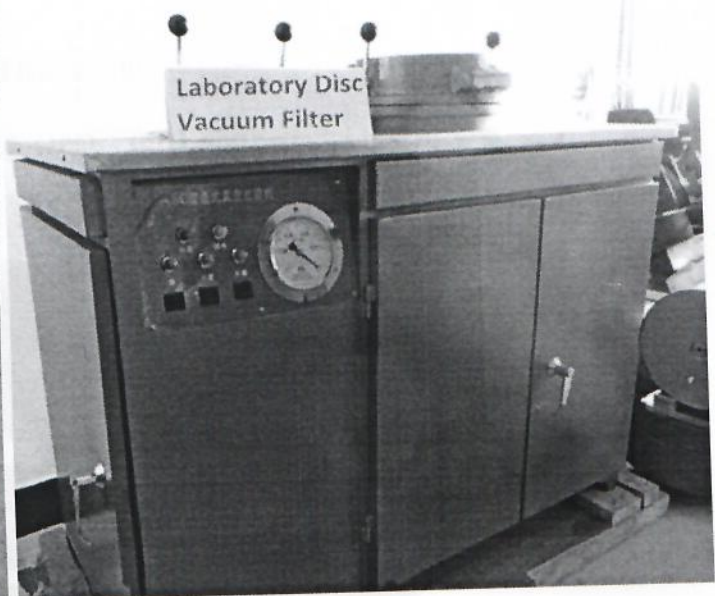
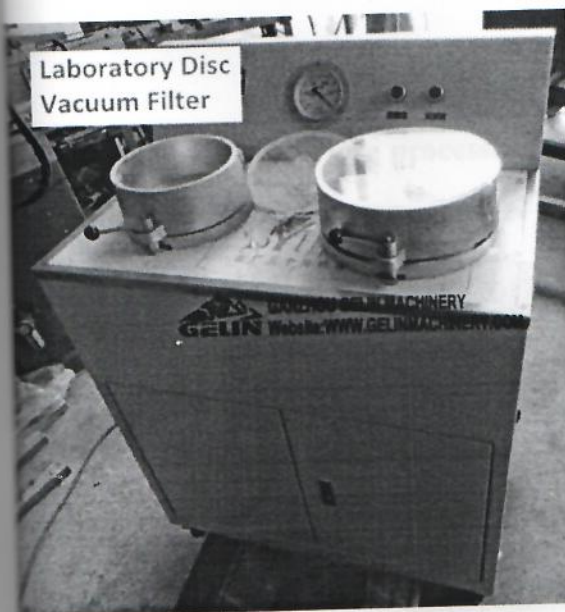
### Flotation Machine



**Small Laboratory Shaking Table**

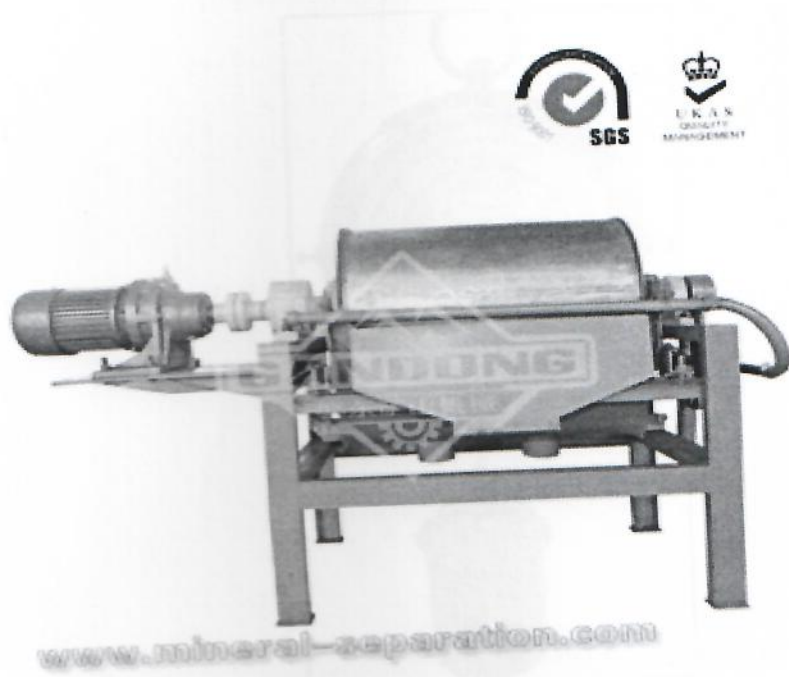


**Automatic Laboratory Vacuum Filter Dewatering Unit**



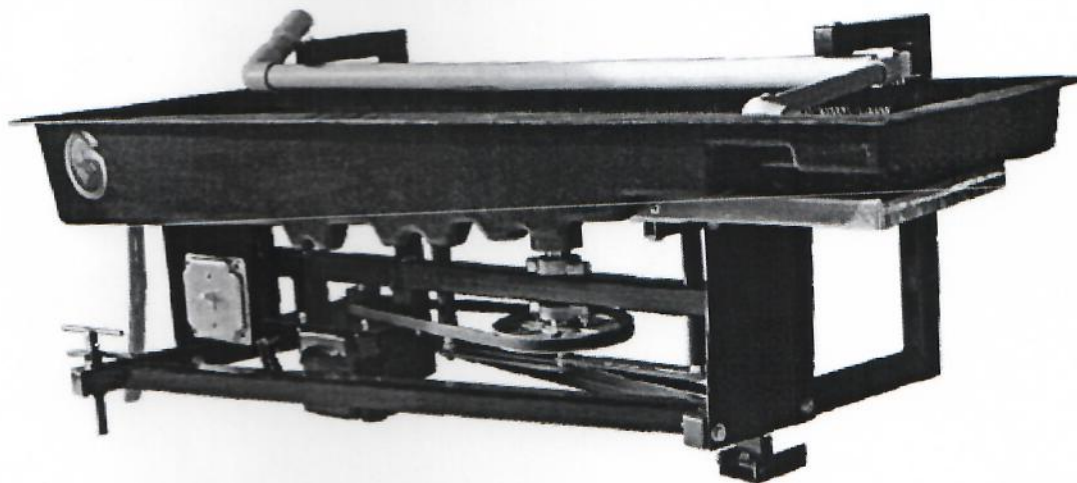
**DL-5C240/120**

## Wet Magnet Separation Equipment



CTB600×900

Shaking Table (Gold Ore processing inclusive) – for Laboratory Operations



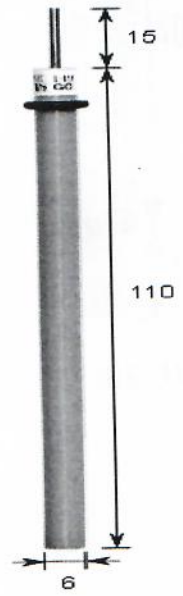
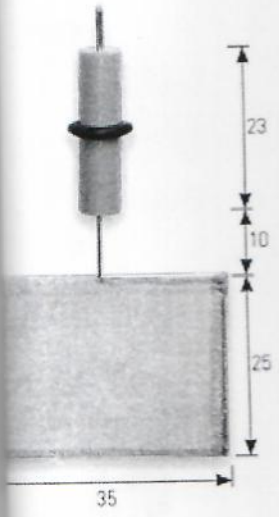
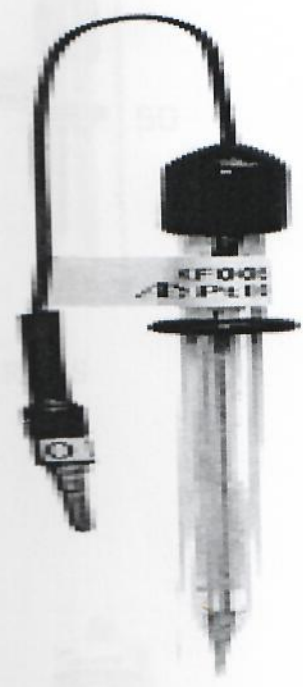
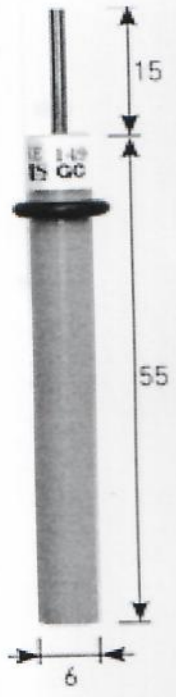
## Marcy Pulp Density and Specific Gravity Scale





### WORKING ELECTRODES OF DIFFERENT SIZES

Standard Type, Micro Type, Small Type, Gauze Type, Long Type



# REFERENCE ELECTRODES & POROUS GLASS FRITS FOR AQUEOUS MEDIA



RE-1B



RE-1S



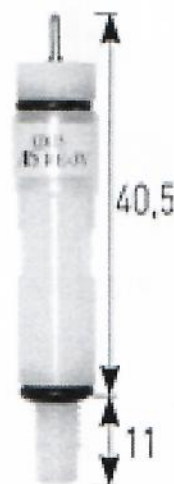
RE-1CP



RE-2BP



RE-2CP

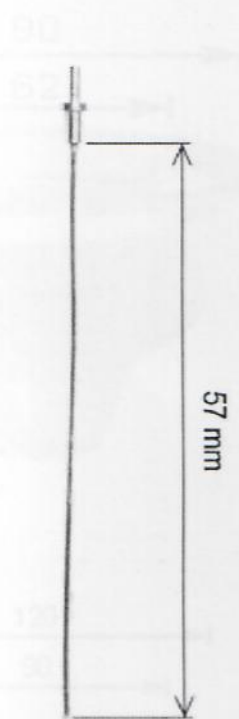


RE-3V



RE-61AP

### COUNTER ELECTRODES (SMALL SIZE)



A-002222

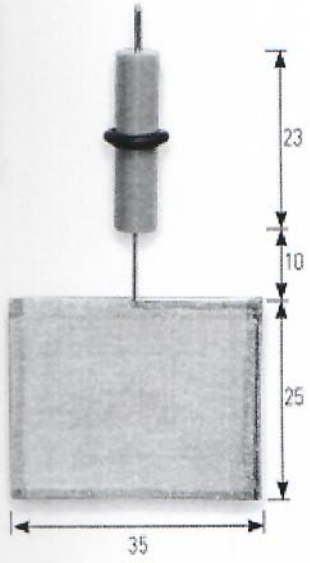
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A-002234

A-012638



A-012198



A-002250



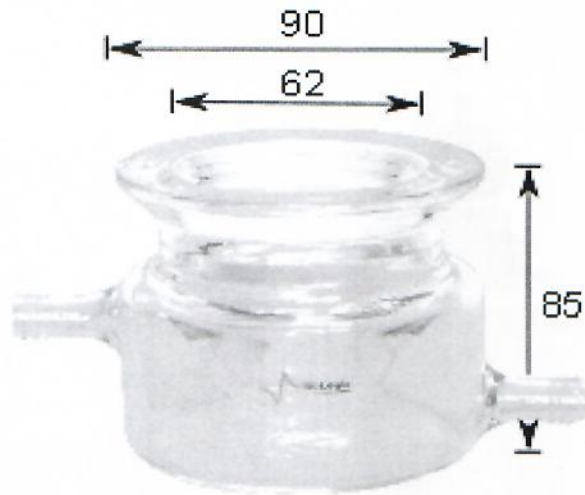
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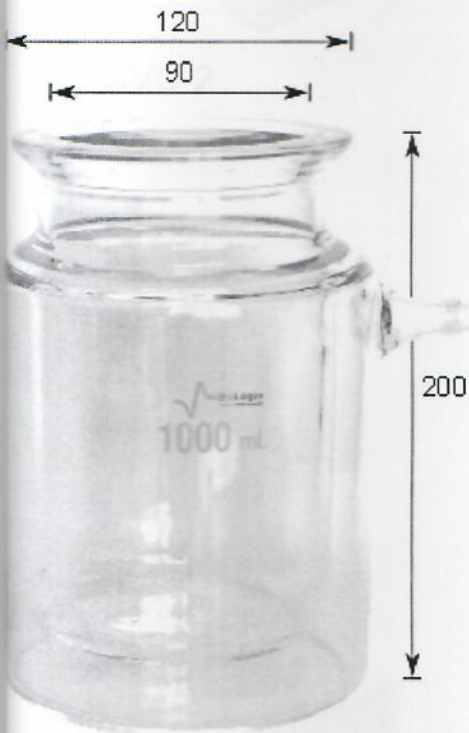
BIG VOLUME CELL VIALS



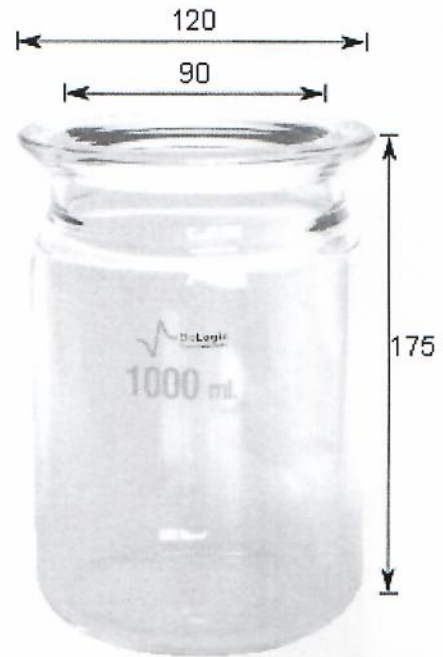
EL-A-001



EL-A-002



EL-C-002



EL-C-001

Bulk Electrolysis Cell

## SMALL VOLUME CELLS



SVC-2



SVC-3



VC-4



Bulk Electrolysis Cell

## Section 8. Drawings

### Notes on Drawings

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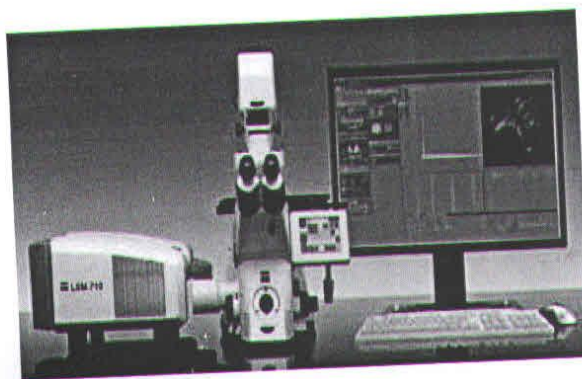
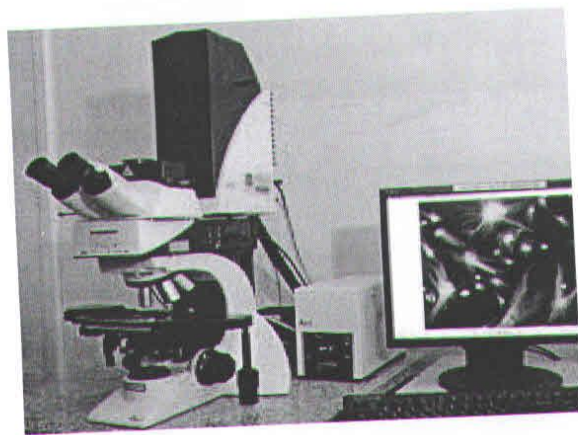


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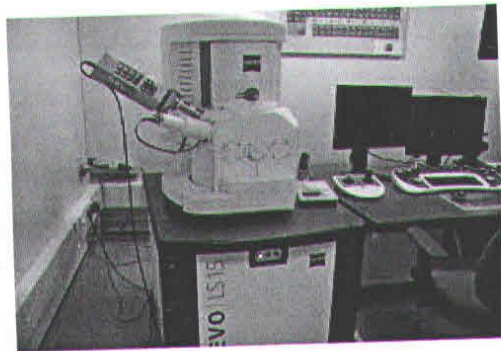
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Convocal Microscope:  
Qty - 1



N/B: This microscope must be fitted with camera(s)

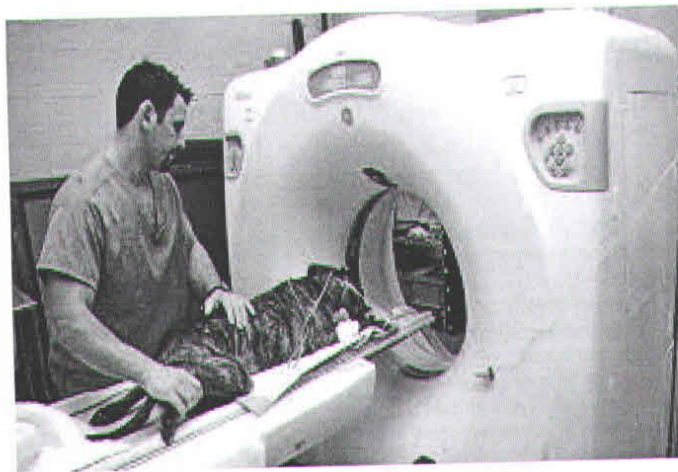
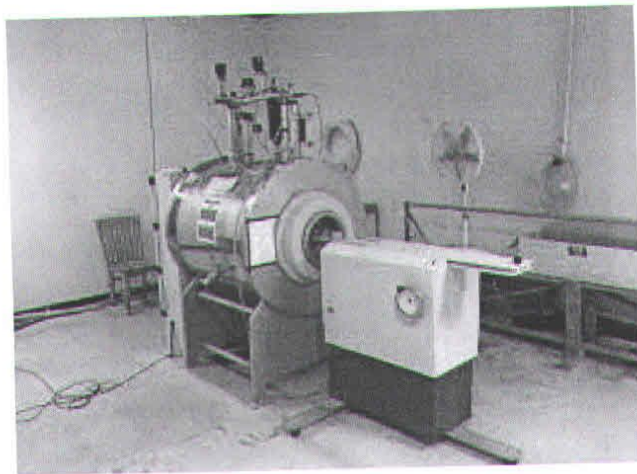
**Inverted Microscopes with Micromanipulation Workstations**  
Qty - 1



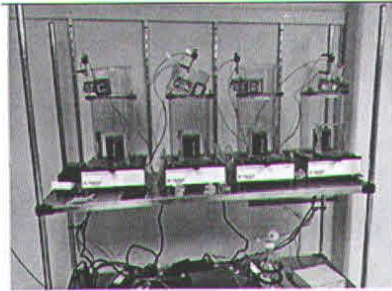
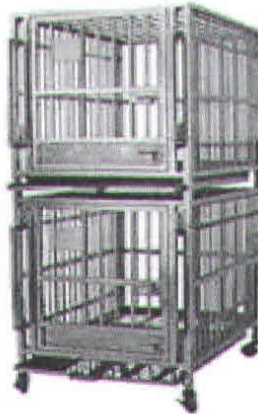
N/B: This microscope must be fitted with camera(s)



**Magnetic Resonance Imaging Equipment for Animals**  
Qty - 1



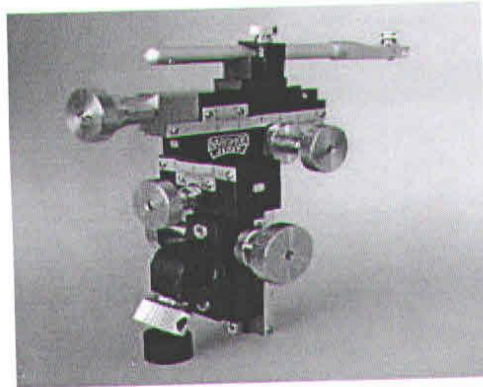
**Animal Test Workstations with Metabolic Cages**  
Qty – 1



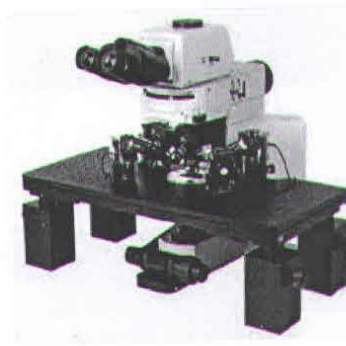
**Features**

- PC computer (with USB port) for data visualization, storage, and offline analysis.
- NeverWet. (NeverWet, LLC. <http://www.neverwet.com>).
- Comprehensive Laboratory Animal Monitoring System with Waste Freezing Unit (Columbus Instruments. <http://www.colinst.com>).

Micro-manipulators

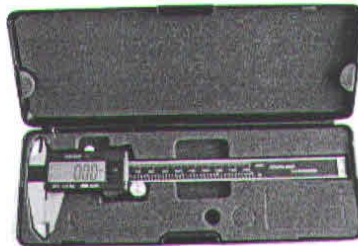
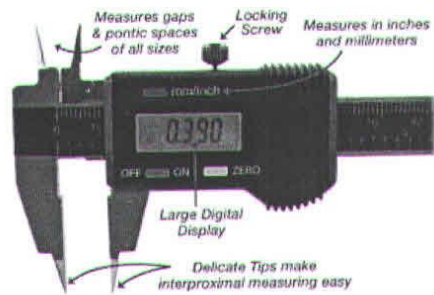
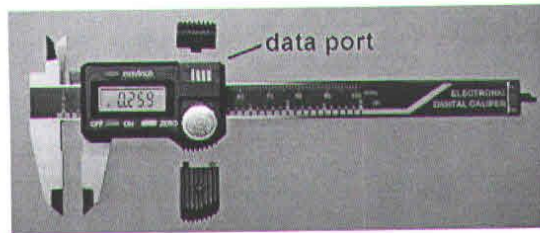
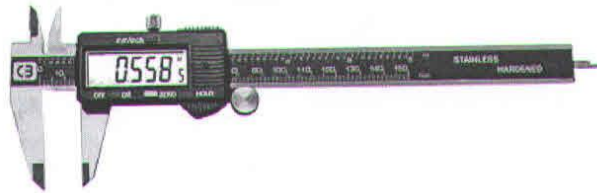


71





Electronic Calipers  
Qty: 5





## Section 8. Drawings

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