

Petrochemical Technology
GPI Mardan

Petrochemical Technology DAE (GPI MARDAN)

BASIC GEOLOGY AND DRILLING LAB		
Sr. No.	Name of Item with Specifications	Qty
1	Hydrometers API 1-11API 9-21API 19-31API 29-41API 39-51API 49-61API 59-71API 69-81API 79-91API 89-101API	02 set
2.	Saybolt Viscometer (Universal Orifice) DIGITALSTOPWATCH, hand-held, 0.1s resolution, SAYBOLT VISCOSITY KIT (E102), comprises Cup Adaptor (qty 2), Saybolt viscometer Cup (qty 2), Universal Orifice Tip (qty 2), Withdrawl Tube, Thermometers 0-150c (qty 2), Thermometer Support (qty 2), Filter Funnel, 60ml Receiving Flask (qty 2), Displacement Ring (qty 2), Cover (qty 2), Spirit Level (qty 2). 1000W heater, Cooling coil	1

3.	<p>Saybolt Viscometer (Furrol Orifice) (Petrotest / Equivalent) DIGITALSTOPWATCH, hand-held, 0.1s resolution, SAYBOLT VISCOSITY KIT (D88), comprises Cup Adaptor (qty 2), Saybolt Viscometer Cup (qty 2), Furrol Orifice Tip (qty 2), Withdrawl Tube, Thermometers 50-300c (qty 2), Thermometer Support (qty 2), Filter Funnel, 60ml Receiving Flask (qty 2), Displacement Ring (qty 2), Cover (qty 2), Spirit Level (qty 2). 1000W heater, Cooling coil</p>	1
4	<p>ASTM Distillation Apparatus With ISO 3405-2007 Distillation range, ambient to 400°C Mains supply 220 V Heater power 750 W Overall dimensions (W x D x H) 450 x 450 x 535 mm</p>	2
5	<p>Microscope Microscopes can be equipped for phase contrast or dark field applications.</p> <ul style="list-style-type: none"> • Solid and stable stand • SMP semi-plan and PL plan DIN objectives for a high resolution and a flat image • Inverted equipped with infinity-type objectives • Compensating KHWF 10x DIN eyepieces – field no. 20 – correct the image of the objective and produce a large field of view • Flat-top mechanical stage – fitted with ball-bearings – 171 x 140 mm 	2
6	<p>Vernier Caliper (digital) With inside , outside and depth measurement range = 150 mm</p>	2

7	Mud Balance 4-Scale Mud Balance, Machined ARM, Complete W/Case	2
8	Marsh Funnel 12-Mesh Half Circle Screen Plastic Measuring Cup, 1000 mL Stainless Steel Measuring Cup, 1000 mL Thermometer w/Metal Dial, 5" Stem, 0-220°F Thermometer w/Metal Dial, 5" Stem, Dual Scale, 50/500°F, 0/250°C T-Handle Reamer 3/16" Digital Stopwatch	2
9	Filter Press Filter Press With Dead Weight Assy	1
10	<u>DIGITAL MICROMETER</u> For direct reading to 0.01 mm carbide tipped anvil & spindle , face lightly polished, friction –locking device, suitable for With inside , outside and depth = 150 mm measurement range	2
Sr. No.	Name of Item with Specifications	Qty
1	Redwood Viscometer 1 VISCOSITY KIT (IP 70), comprises No. 1 Cup Adaptor (qty 2), Redwood No. 1 Viscometer Cup (qty 2), Clip (qty 2), Kohlrausch Flask (qty 20), Cup Cover (qty 2), Spirit Level (qty 2). Thermometer	1

2	<p>Redwood Viscometer 2 VISCOSITY KIT (IP 70, BS 434), comprises No. 2 Redwood Adaptor Key, IP 70 Viscometer Cup (qty 2), BS 434 Viscometer Cup (qty 2), Clip (qty 2), Kohlrausch Flask (qty 20), Cup Cover (qty 2), Spirit Level (qty 2). Thermometer</p>	1
3	<p>Pensky Marten Flash and Fire Point Apparatus Method:Pensky-Martens Closed Cup Tests: P-M Procedures A, B & C GB/T 261 Search mode for unknown samples Temperature Range: Ambient to 400°C Barometric Correction: Automatic Bath: Solid Block/Air Heating: Bottom and side heaters Post Test Cooling: Fan assisted or Forced Air (Requires 34008-0 Cooling Boost Module option) Post Test Cool-down Time (90°C to 50°C): 36 minutes (Fan) 6 minutes (Forced Air) Ignitor: Quick-fit coaxial gas jet/electric hot wire, user selectable (Electric hot wire pilot light for gas jet) Temperature Probes: Class A Platinum Resistance Thermometer, °C or °F Flash Detection: Thermocouple Stirrer Speed: 105 & 250 rpm Gas Supply (gas jet ignitor): Laboratory gas, 3kPa (0.44psi) maximum pressure Air Supply (forced air cooling):Dry compressed air, 670kPa (100psi) maximum pressure Voltage: 220/240V, 50/60Hz, (switchable)</p>	1

4	<p>Cleveland Flash and Fire Point Apparatus RAMP CONTROLER, for optional automated temperature control. PROBE ASEMBLY, for use with 13663-0, (Cleveland). BUTANE REFIL CONTAINER, pack of 10. PORTABLE GAS TANK, with on/off switch regulator and ignitor. Suitable for use with Butane refill containers. , portable fume extractor and draught excluder, excluding flexible ducting. PORTABLE DIGITAL BAROMETER, 750 to 1150 mbar absolute, : Temperature range: Ambient to 400°C Power: 600W maximum Ramp Rate:Variable, manually controlled Voltage: 220/240V, 50/60Hz</p>	1
5	<p>Cloud and Pour Point Apparatus (Refrigerated) 0,-17,-34,-51 4 liter cooling bath with cover, which is equipped with an opening for one air jacket, a stopper and a borehole for thermometer. Supplied with: 1 test jar 10 spacer rings 1 insulating plate 1 air jacket 2 thermometer (ASTM 5C and ASTM 6C)</p>	1
6	<p>Thin Film Aniline Point Apparatus ASTM-test tube, jacket tube, ring-shaped hand stirrer with sleeve, 2 bored corks, one each pipette (5 ml and 10 ml), rubber suction bulb, stand with fixtures and 1 thermometer each ASTM 33C, ASTM 34 C and ASTM 35C. Along with Hester</p>	1

7	<p>Carbon Residue Apparatus (Canradson)</p> <p>Porcelain Crucible, wide form, glazed throughout, or a silica crucible; 29- to 31-mL capacity, 46 to 49 mm in rim diameter.</p> <p>Iron Crucible— Skidmore iron crucible, flanged and ringed, 65- to 82-mL capacity, 53 to 57 mm inside and 60- to 67-mm outside diameter of flange, 37 to 39 mm in height supplied with a cover without delivery tubes and having the vertical opening closed. The horizontal opening of about 6.5 mm shall be kept clean. The outside diameter of the flat bottom shall be 30 to 32 mm.</p> <p>Iron Crucible— Spun sheet-iron crucible with cover; 78 to 82 mm in outside diameter at the top, 58 to 60 mm in height, and approximately 0.8 mm in thickness. Place at the bottom of this crucible, and level before each test, a layer of about 25 mL of dry sand, or enough to bring the Skidmore crucible, with cover on, nearly to the top of the sheet-iron crucible.</p> <p>Wire Support— Triangle of bare Nichrome wire of approximately No. 13 B & S gage having an opening small enough to support the bottom of the sheet-iron crucible at the same level as the bottom of the asbestos block or hollow sheet-metal box .</p> <p>Hood—Circular sheet-iron hood from 120 to 130 mm in diameter the height of the lower perpendicular side to be from 50 to 53 mm; provided at the top with a chimney 50 to 60 mm in height and 50 to 56 mm in inside diameter, which is attached to the lower part having the perpendicular sides by a coneshaped member, bringing the total height of the complete hood to 125 to 130 mm. The hood can be made from a single piece of metal, provided it conforms to the foregoing dimensions. As a guide for the height of the flame above the chimney, a bridge made of approximately 3-mm iron or Nichrome wire, and having a height of 50 mm above the top of the chimney, shall be attached.</p> <p>Insulator—Asbestos block, refractory ring, or hollow sheet-metal box, 150 to 175 mm in diameter if round, or on a side if square, 32 to 38 mm in thickness, provided with a metal-lined, inverted cone-shaped opening through the center; 83 mm in diameter at the bottom, and 89 mm in diameter at the top. In the case of the refractory ring no metal lining is necessary, providing the ring is of hard, heat-resistant material.</p> <p>Burner, Meker type, having an orifice approximately 24 mm in diameter.</p>	1
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8	<p>Reid Vapour Pressure Apparatus (Seta-Stanhole / Equivalent) Vapor Pressure Vessel - REID Gasoline (Wet-Method): ASTM D 323-A+B+D, ISO 3007-A+B+D, IP69-A+B+D Gasoline-Oxygenate Blends (Dry-Method): ASTM D 4953-A <i>For a pressure less than 1.8 bar (180 kPa)</i> Consisting of: liquid chamber (valveless) made of stainless steel, air chamber with G 1/2" female manometer coupling and lowering chain Thermostatic Bath REID/LPG, 3-place (round shape) Consisting of: bath made of stainless steel with digital thermostat and a thermometer ASTM 18C (+34 bis +42 : 0.1°C) ... for tempering 1 to 3 vapor pressure vessel Power supply: 230 V, 50/60 Hz Manometer ASTM-35 twin-scale (analog) Range: 35 kPa / 5 psi (0.35 bar) Accuracy: class 1 Housing : Ø 100 mm, stainless steel with handle, parts with sample contact are of Cu-Sn/Mn alloy Coupling: NPT ¼" male thread</p>	1
9	<p>ASTM Distillation Apparatus Distillation Flask 1000ml. Electrical Heater 1000W, Water Cooled Condenser, Thermometer, Receiving Cylinder , Corks</p>	1
10	<p>Centrifugal Machine Speed 1500rpm 6 sample holder Power Supply 220-240 v</p>	2

11	<p>Smoke Point Apparatus Comprises a tripod stand, lamp body, and chimney. The measuring scale is viewed through a curved glass window on the front of the instrument. A mirror can be attached to the chimney to aid smoke detection. SUPLIED WITH: candle assembly and certified wick. MIROR, for fixing to chimney to detect first indication of smoke. WICK TRIMMER, inserts wick and automatically sets to correct length INSTRUMENT CASE, for lamp assembly, stand and five candles</p> <p>WICK EXTRACTION APPARATUS comprises a 60ml soxhlet extractor, condenser, 500ml glass flask, flask heater, stand and clamp. Power: 200W Voltage: 220/240V, 50/60Hz</p>	<p>1</p> <p>1</p>
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12	<p>Muffle Furnace</p> <p>General Characteristics</p> <p>Metal housing with paint protection. Built with low density refractory bricks and isolating fibers. It is composed of 1 or 2 heating plates with incorporated KANTAL AF thread resistance, covered and protected, placed on the bottom or on both sides.</p> <p>Minimum heat and extreme temperature loss.</p> <p>Chamber built with TRITTON KAOWOOL ceramic fiber.</p> <p>Ceramic tray included: HD-200.</p> <p>Side or front opening door, easy to load and withdraw materials.</p> <p>Manufactured according to CEE standards.</p> <p>Furnace Control</p> <p>HD-200: Placed in the lower part of the furnace.</p> <p>Line supply cor incorporated.</p> <p>Safety</p> <p>Execution Modes</p> <p>PAD adjustment: automatic digital pyrometer. Microprocessor.</p> <p>Alarma. POD parameters. Non-volatile.</p> <p><u>Parameters:</u></p> <p><u>Room</u></p> <p>HEIGHT 120</p> <p>WIDTH 150</p> <p>DEPTH 200</p> <p><u>Exterior</u></p> <p>HEIGHT 340</p> <p>WIDTH 450</p> <p>DEPTH 430</p> <p>Volume dm³ 3,6</p> <p>Power W 1200</p> <p>Voltage 220 v.ll</p> <p>Maximum Temperature 1100 deg C</p>	1
13	<p>HORIZONTAL FLOW OVEN</p> <p>Specification:</p> <p>Capacity: 105 Liters</p> <p>Temperature Range: Ambient+5degree C to 250degree C</p> <p>Sensor PT100</p> <p>Control: Digital Fuzzy Control</p> <p>Display: Digital LCD with Back-Light Function</p> <p>Timer: 99hr 59min (Delay&Continuous Function Included)</p>	1

14	<p>Burning Test Lamp Comprising a fabricated sheet metal oil reservoir, brass burner, glass chimney and wick. SUPLIED WITH: two spare chimneys and a pack of 10 certified wicks. FLAME GAUGE, A gauge for measuring the height and width of a flame. Mounted on a tripod base and adjustable height support column. Hinged and adjustable with stops for true horizontal and vertical readings.</p>	1
15	<p>Manual Universal Penetrometer A semi-automatic penetrometer with a range of 0 to 40mm (400 Pen).Plunger release and retention is controlled by a solid state timer which can be set for penetration times of 5, 8, 10, 12, 30 and 60 seconds.The head is fitted with a two speed elevating mechanism for quick and precise positioning of the penetration tip. Penetration is shown on a150mm dial, graduated 400 x 0.1mm increments, equipped with a slipping clutch pointer. The machined aluminium base is fitted with a flexible light with dimmer switch, and a spirit level. SUPPLIED WITH: 47.5g plunger, 50g and 100g plunger weights, mains lead and instruction manual. SPECIFICATIONS Penetration Range: 0 to 400 Pen (40mm) Penetration Time: 5, 8, 10, 12, 30, 60 seconds, selectable Retention/Release: Automatic Display: 150mm dial, 400 x 0.1mm increments Voltage: 220/240V, 50/60Hz (switchable) Power:45W</p>	1

16	<p>SayboltChromometer A colorimeter with an integral light source, for visual determination of the colour of highly refined, un-dyed liquid petroleum products, including gasolines, jet fuels, naphthas and kerosines. Comprises of a graduated glass sample column with a clear glass base, and a plain glass tube with a three position turret containing colour filter discs. An eyepiece provides a split-field view of both the column and tube. Illumination is from a light source in the base of the unit. The height of a column of sample is adjusted until it matches the colour disc in the reference tube. The height is then read off the graduations and expressed in Saybolt units. SUPPLIED WITH: 3 whole-colour filter discs and 1 half-colour filter disc, daylight filter, mains lead and instruction manual. SPECIFICATIONS Voltage: 220/240V, 50/60Hz Power: 60W Weight:4.8kg Fuses:2 x 0.5A CERTIFIED COLOUR STNDARDS 'O' RING, Viton, pack of 5 . BULB , 60W, pack of 2 GASKET, for tube, pack of 12</p>	1
17	<p>Copper Strip Corrosion Test (Seta-Stanhole/ Equivalent) to be composed of : - Copper Strip Corrosion Apparatus - Silicon Carbide Grit Paper - Copper Strip Corrosion Standards Technical Data Temperature Range: ambient to 200 °C Stability: +/- 0.1 °C Bath Volume: 20 liters</p>	1

18	<p>Bending Apparatus high-grade stainless steel housing with two-color powder coating, measuring head with bending mechanism, automatic fixture and adjustment of test plaques; test chamber cooled by solid-state components (Peltier-elements), chamber ventilator, touch-key panel with large LC-display visible up to 10 m distance for measured values and user guidance for temperature pre-selection and test-plaque clamping.</p> <p>Supplied with: 10 test-plaques (41 x 20 x 0.15 mm) 1 insulated hose-set (Ø 8 mm, 2 x 2 m)</p> <p>Power supply: 230 V, 50/60 Hz, 450 W, 2 A, Circulation Cooler: as auxiliary refrigeration of the Peltier-elements.</p> <p>Measuring Range: Resolution : 10 mN Temperature : -45 °C to +60 °C (dependent on cooling circuit temp.)</p>	1
19	<p>Ring and ball Softening Point Apparatus electric heater in stainless steel housing with electronic power regulator, 4 heater rods, electric stirrer and support for two test rings.</p> <p>Supplied with: 10 rings (shouldered) 10 load balls 2 ball centering guides 2 thermometers (precision made, 1x ASTM 15C, 1x ASTM 16C) 1 glass-beaker bath (600 ml) 1 heater support board (50 mm bored) 1 mortar with pestle 1 pouring plate (brass)</p>	1

20	<p>Water Content by Dean and Stark Apparatus</p> <p>Consisting of:</p> <p>1 round flask (500 ml), standard taper (NS 29)</p> <p>1 glass trap (10 ml), standard taper (NS 29)</p> <p>1 reflux condenser (400 mm), standard taper (NS 29)</p> <p>Supplied with:</p> <p>1 electric heater (800 W), stainless steel housing</p> <p>1 heating board (center hole Ø 70 mm)</p> <p>1 support rod (600 mm) with 4 adjustable clamps</p> <p>Power supply: 230 V, 50/60 Hz</p>	1
21	<p>Gum Content By Jet Evaporation</p> <p>Consisting of:</p> <p>Housing of stainless steel with strong temperature insulation. Safety-Multifunction Head for simultaneous positioning of all 5 pre-adjusted inlet-tubes to pre-heating or working-position. The handle is in a position where air is not hazardous to operator. 5-place metal heating block. Manual air supply control valve, manometer with preset calibration marks for air-flow at 163°C and 233°C, digital electronic heating block control, over-temperature protection for the block.</p> <p>Supplied with:</p> <p>10 glass beakers</p> <p>1 thermometer</p> <p>1 pressure reducer with filter and hose</p> <p>1 tong, made of stainless steel</p> <p>Power supply: 230 V, 50/60 Hz</p> <p>Temperature Range: ambient to +246°C</p> <p>- Air Volume Set: flow-meter (range: 1.4 ... 17.6 m³/h) with stand</p> <p>- Strainer gauze, pack of 20 - Uniformity Test Set for Air: special adapter and flow-meter</p> <p>- Officially certified thermometer ASTM 3C / IP 73C</p> <p>Thermometer ASTM 3C</p> <p>Range: -5 to +400 : 1 °C</p> <p>Length: 415 mm, Immersion: 76 mm, Ø 6.5 mm</p> <p>Strainer Gauze, metal, pack of 20</p> <p>Beaker, Berzelius, 100 ml, glass, pack of 10</p> <p>Ø 50 x 78mm</p> <p>Heating Element, Power supply: 230 V (for dry heat bath)</p> <p>Conical Air-Outlet (for dry heat bath)</p>	1

3	Fluid Mechanics Lab	
Sr. No.	Name of Item with Specifications	Qty
1	<p>Hydraulic Bench</p> <ul style="list-style-type: none"> • Self contained fully mobile unit, with flat top area for conduct of different practicals. • Corrosion resistance glass reinforce plastic. • Sump tank capacity: 140~250 litres. • Volumetric tank <p>• Height of working surface above floor level: one meter.</p> <p>• Pump: centrifugal type/submersible: Max flow : 1 to 1.35 L/sec.</p> <p>Power supply 220-240V, 50 Hz, single phase.</p> <p>It should be provide means for mounting and connecting accessories for experiments as listed below:</p> <ul style="list-style-type: none"> • Flow over weir • Losses in pipe • Bernoulli's theorem • Hydrostatic pressure <p>Complete with accessories: stop watch. Pump with on-off switch. Control valve, quick release pipe connector at bench top, water level indication scale. dump valve etc and instruction manual</p>	1
2	<p>Venturimeter Apparatus</p> <ul style="list-style-type: none"> • Transparent acrylic. • Manometer range 0 to 290/300mm. • No. of transparent manometer tubes 8 to 11. • Throat diameter: 10-12 mm. <p>Complete with: manometer tubes; manifold with air bleed valve; base plate with foot screws; plastic outlet tube; flow regulator valve; and instruction manual.</p> <p>Compatible with Hydraulic Bench.</p>	1
3	<p>Manometer (U-Tube)</p> <p>Free water manometer, standard length one meter, glanded glass manometer tubes, engraved plastic scale, calibrated in metric units.</p>	5

4	<p>Pitot Tube</p> <p><u>Experimental Capabilities:</u></p> <ul style="list-style-type: none"> • Static and Dynamic pressure measurement • Determination of velocity profile in a tube flow • Pitot static tube complete with scale for positioning within the tube • Pipe section made of transparent acrylic • Manometer • Hose Coupling <p>Compatible with hydraulic bench.</p>	2
5	<p>Bourden Gauge</p> <p>Pressure Gauge (Bourdon Type)</p> <p>Dial Size 4 inch only</p> <p>Ranges 0 to 400 Psi</p> <p>(-)1 to 0 kg/cm² or (-)760 mm HG Vac.</p> <p>(-)1 kg/cm² or (-)760 mm Hg to 15 kg/cm²</p> <p>Standard Accuracy</p> <p>± 0.25% of F S D</p> <p>Master gauge – 200 mm dial size with all Stainless steel internal & system</p> <p>± 0.5% of F S D</p> <p>Test gauge – Available 200 mm dial size with all stainless Steel internals & systems</p> <p>± 1% of F S D</p> <p>Quality gauge – 200 mm dial size with all Stainless steel internals & system.</p> <p>± 2% of F S D Quality gauge – 200 mm dial size with all Stainless steel internals.</p> <p>Standard Degree of Protection</p> <p>1P-65</p> <p>Sensing Element</p> <p>Bourdon Tube</p> <p>Shape of Bourdon Tube</p> <p>In C P < 100kg/cm²</p>	05
6	<p>Centrifugal Pump</p> <p>Suction Head 2 inch dia.</p> <p>Closed Impeller</p> <p>Mounted with one phase motor</p>	1
7	<p>Reciprocating Pump (Double Acting)</p> <p>Suction Head 2 inch dia</p> <p>Mounted with one phase motor</p>	1

8	Rotary Pump Suction Head 2 inch dia Mounted with one phase motor	1
9	Centrifugal Compressor Suction Head 2 inch dia Mounted with one phase motor	1
10	Reciprocating Pump (Single Acting) Suction Head 2 inch dia Mounted with one phase motor	1
11	Series of 5 water pump rotors (on base)	1
12	Cut Section Self-priming high-lift centrifugal electric pump with built-it ejector (on base)	1
13	Cut Section Multistage centrifugal pump (on base)	1
14	Cut Section Reciprocal compressor (on base)	1

1	Process Instrumentation Lab	
Sr. No.	Name of Item with Specifications	Qty
1	<p>Glass Filled Thermometer</p> <p>a) 0-100c b) 0-150c c) 0-250c d) 0-360c e) 50-350c f) -50-150c</p>	05 set
2	<p>Bimetallic Thermometer</p> <p>Technical Specification Dial size 150 mm. Accuracy + 1% of F.S.D. Stem of connection metals AISI 316 SS Immersion Length Adjustable between 75 mm to 300 mm.</p> <p>Enclosure Cast aluminum stove enameled Black with weather-proof as per IP 150 mm dial sizes</p> <hr/> <p>Pressed AISI 304 sself colour finish with weather-proof as per IP 150 mm dial sizes Sensor Bimetallic strip Stem Diameter 6 mm / 8 mm Connection ½" BSP (M) / NPT (M) Mounting Horizontal (Co-axial) Vertical Entry Back /Bottom Standard range °C (-) 30 to 300. Window Sheet glass or safety glass Pointer Zero adjustable pointer</p>	2

Resistance Thermometer**Temperature range** -200 °C to 670 °C**Nominal resistance at 0.01 °C** 100 Ω \pm 0.5 Ω **Temperature coefficient** 0.0039250 $\Omega/\Omega/^\circ\text{C}$ **Sensor length**30 mm \pm 5 mm (1.2 in \pm 0.2 in)**Sensor location**3 mm \pm 1 mm from tip (0.1 in \pm 0.1 in)**Sheath dimensions,****length x diameter** 12 in x 0.25 in**Sheath material** INCONEL® 600**Transition junction****temperature range**[4] -50 °C to 200 °C**Transition junction****Dimensions** 71 mm x 12.5 mm (2.8 in x 0.49 in)**Minimum immersion****length**[5] (< 5 mK error) 5609: 100 mm (3.9 in)**Maximum immersion****Length** 305 mm (12 in)**Response time**[5] 12 seconds typical**Self heating (in 0 °C bath)** 5609: 50 mW/°C**Lead-wire cable type** Teflon,™ 24 AWG**Lead-wire length** 1.8 m (6 ft)**Lead-wire temperature range** -50 °C to 250 °C

4	<p>Thermocouple</p> <p>Model 5650 Type S (Pt10%Rh/Pt)</p> <p>Range 0°C to 1450°C</p> <p>For high accuracy 0°C to 1100°C</p> <p>Long term stability (depending on usage) Up to 1450°C ± 2°C</p> <p>Short term stability Up to 1450°C ± 0.6°C</p> <p>Accuracy (uncalibrated, special tolerance)† Up to 1450°C ± 0.1% of reading</p> <p>Protection sheath Material Alumina (99.8% pure Al₂O₃)</p> <p>Diameter 0.25 inch (6.35 mm)</p> <p>Length 20 inch (508 mm) or 25 inch (635 mm)</p> <p>Cold junction sheath Material Stainless steel</p> <p>Diameter 0.188 inch (4.8 mm)</p> <p>Length 8.25 inch (210 mm)</p> <p>Copper leads to readout Material Teflon-insulated, low EMF solid copper Length 70.4 inch (1788 mm)</p> <p>Immersion At least 6 inches recommend</p>	1
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BourdenGauge (Diaphragm)

Technical Specification

ACCURACY ± 2.5% of F.S.D.
± 2% of F.S.D & ± 1.5% of F.S.D

DIAL SIZE 150 mm

WINDOW Perspex

SENSING ELEMENT Diaphragm

DIAPHRAGM MATERIAL AISI 316 SS

MOVEMENT MATERIAL AISI 304 SS

DIAPHRAGM CHAMBER MATERIAL AISI 316 SS

MAX. STATIC PRESSURE

60 g/cm²/100kg/cm²(Optional)

ENCLOSURE

Die-cast aluminium weather proof stove enameled black standard

AISI 304 SS weather proof self colour finish

CONNECTION SIZE MOUNTING & ENTRY

¼" NPT (F) for LP & HP

Direct with bottom entry Flush panel with bottom entry 2" OD
pipe mounting with bottom entry

STANDARD FITMENT Over range relief valve

STANDARD RANGES 0-1250, m.m WC 0-1, 4 kg/cm²

CONNECTION ½" BSP, ½" NPT& M20 x 1.5 mm Standard

Flange as per BS.ASA &Din.Standard - Optional

SEALED UNIT (Optional)

CONSTRUCTION Diaphragm welded with top chamber

DIAPHRAGM PROTECTION Teflon coating (Optional)

TOP CHAMBER AISI 304 SS

BOTTOM CHAMBER AND CONNECTION MATERIAL

AISI 316 SS – Standard

Teflon coating - Optional

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6	<p>Vacuum Guage Vacuum gauge head Cable length of vacuum gauge head 2m Upper measuring limit 1 x 10³ / 7.5 x 10² mbar/hPa / torr Lower measuring limit 1 x 10⁻³ / 1 x 10⁻³ mbar/hPa / torr Measurement principle Thermal conductivity acc. to Pirani (chem. resist. plastics/ceramics) Vacuum connection Small flange KF DN 16 and hose nozzle DN 6/10 mm Material of outer housing Robust plastic housing (PP) with good chemical resistance Dimensions of display unit (L x W x H) 138 x 124 x 115 mm Rated mains voltage / mains frequency / Plug 230 V / 50-60 Hz / CEE/CH/UK/US/AUS</p>	2
7	<p>BourdenGuage Dial size 50 mm Accuracy ±1% of Range Span Sensing Element Capsule Capsule Material AISI 316 SS Movement Maters AISI 304 SS Enclosure Cast Aluminum weather proof stove enameled black AISI 304 SS weather proof self colour finish Mounting Direct with bottom entry Direct Panel Panel Mounting back entry (cut out = 167 mm) Capsule Chamber Cast aluminum stove enameled black Connection Material AISI 316 SS Connection Size ½" BSP (M) ½" NPT (M). M 20 x 1.5 or Equivalent Range 0 to 10000 mm Wc</p>	2

8	Barometer Tube Length 1000mm Mercury Pan	2
9	Pitot Tube <u>Experimental Capabilities:</u> <ul style="list-style-type: none"> • Static and Dynamic pressure measurement • Determination of velocity profile in a tube flow • Pitot static tube complete with scale for positioning within the tube • Pipe section made of transparent acrylic • Manometer <ul style="list-style-type: none"> • Hose Coupling Compatible with hydraulic bench.	1
10	Venturimeter <ul style="list-style-type: none"> • Transparent acrylic. • Manometer range 0 to 290/300mm. • No. of transparent manometer tubes 8 to 11. • Throat diameter: 10-12 mm. Complete with: manometer tubes; manifold with air bleed valve; base plate with foot screws; plastic outlet tube; flow regulator valve; and instruction manual.	1

11	<p>Digital Manometer</p> <p>Pressure measurement range 0 ... 14 bar / 1400 kPa / 203 psi</p> <p>Pressure connection G$\frac{1}{4}$" male thread</p> <p>Temperature sensor Pt1000 class 1/3 B acc. to DIN EN</p> <p>Temperature measurement range 0 ... +200 °C / +32 ... +392 °F</p> <p>Power internal for OBA, OFA & RBOT manometer: 3.6 V Lithium battery, type SL-760 for REID manometer: coin cell, type CR 2430 external 5 ... 28 V / \approx 3 mA</p> <p>Digital interface RS485 (converter for RS232 and USB available), bus-compatible</p> <p>Error in pressure measurement</p> <p>Total error band 0 ... 50 °C 0.1 %</p> <p>Stability approx. 0.2 % / year</p> <p>Display LCD, 4$\frac{1}{2}$ digit</p> <p>Resolution 1 mbar / 0.1 °C</p> <p>Operating temperature 0 ... +50 °C / +32 ... +122 °F</p> <p>Rear electrical connections digital interface & external feeding 5-pole socket Pt1000 (not for RBOT) 4-pole socket</p> <p>Sample Wetted Materials Stainless Steel 1.4435 or similar (AISI 316L), FPM sealing</p> <p>Dimensions 75 mm x D 45 mm</p>	1
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12	<p>Digital Tachometer</p> <ul style="list-style-type: none"> • 5 Digits LCD display • Light reflex measurement • Range from 10.00 to 99,999 RPM • Measuring distance 50 to 300mm • Event counter elapsed time • Max/Min hold: true average • Auto range RPM • Suitable Optical measurement & contact measurement • Event counter (0 ~99,999) • RS-232 interface (RM-1501) • Contact RPM and circumferential velocity measurement in one simple adaptor (optional RM-1502) <p><u>General specification:</u> Battery Four 1.5V battery (AA, UM3) Time base 4.000MHz quartz crystal Operating temperature 0 °C ~50 °C (32 °F ~122 °F) Reflective light Red LED Size 608 (L) × 2.5 (W) × 1.4(H) 175mm (L) × 65mm (W) × 36mm (H) Accessories Carrying case × 1, reflective tape × 1 Instruction manual × 1 (Software & RS-232 cable for RM-1501) Option Contact adaptor (Optional RM-</p>	2
13	<p>Orifice Plate For 1 inch Dia. pipe a) Concentric Orifice With flanges b) Eccentric Orifice With flanges c) Segmental Orifice With flanges</p>	3 3 3
14	<p>Sight Glass Level Indicator Visible length SL: ME</p>	1

	<p>Body: 40 x 40, 40 (for special materials) Connection gauge valve - body: union Gauge valve types: Actuation: hand wheel Material glass plates acc. to DIN 7081: Borosilicate Material media wetted parts: Depending on delivery situation material can vary. Types with special materials e. g. Hastelloy, Monel etc. are available.</p>	
15	<p>Rotameter</p> <p>Measurable flow rates - Water (20 °C) : 0.002 l/h bis 110 l/h - Air (20 °C ; 1 bar abs.): 0.1 l/h bis 3 500 l/h metering tube : 20:1 Max. Temperature - Fitting material SS : 100 °C - With option /MV : 130 °C (not for PP-Rotameter) - Fitting material PP : 80 °C Max. Pressure : 16 bar Material process connection - Inner thread : PP or 1.4581 (for option controller 1.4571) - Cutting ring : 1.4571 or steel - Nozzle : 1.4571 or steel (PTFE) - Swageloc connection : 1.4571 Material of fitting : Polypropylen; 1.4581 Material of gaskets : PE / Buna Length approx. : 325 mm</p>	1
16	<p>Magnetic Level Indicator Float base level measuring and indicating instrument.</p>	1
17	<p>Conductivity Meter</p>	1

	<p>Basic multi-parameter analyser for pH, mV, conductivity, Salinity, TDS and temperature 1 pH/mV channel 1 conductivity channel 1 temperature channel A high resolution graphic screen with white backlight shows measurements and temperature. Full guidance is given by simple instructions on the display in the language of your choice (English, Dutch, French, German). Storage memory for 300 measurements. Shows a GLP report on the screen. Three year warranty Robust dust and splash-proof cabinet. Operates on the mains (120/230 VAC) or 9...15 VDC. Optional 12 V car adaptor permits these laboratory meters to work in a car. Specifications pH: 0...14 pH mV: 1000 mV Conductivity: 0...1000 mS/cm Salinity: 0...70 ppt TDS: 0...100 g/l Temperature: 0...100C Resolution: 0.01 pH, 1 mV, 0.01S/cm, 1C</p>	
19	<p>Resistivity Meter Resistivity Meter is a portable measuring instrument designed to give a quick, reliable measurement of the resistivity from a small sample, expressed in Ohm-Meters. This transistorized meter accurately measures the resistivity of fluids, slurries, and semi-solids with resistivities from 0.2 to 100 Ohm-Meters. Power supply AC220V±10% ; 50±1 Hz Working environment temperature 10-50C Measuring range 0.2-100Ω m Measuring temperature range 10-50C with precision range in ±1C</p>	1
20	1. Temperature Control Trainer	1
21	PH Control Trainer	1
22	Level Control Trainer	1
23	Flow Control Trainer	1
24	Pneumatic Control Trainer	1
21	Cut Section of Pneumatic Control Valve	1

UNIT OPERATIONS Lab		
Sr. No.	Name of Item with Specifications	Qty
1	Jaw Crusher , :with 3 phase 50 to 220 volt, V.Belt Drive with 3 to 3.5 jaw opening, 500 RPM speed capacity50-150 ib/hr.bench space 14.5x21 to reduce rock lamps from 2.5 dia to pass on 10 mesh or finer sieve jaws made of manganese steel corrugated faces	1
2	Pulverizer :Bron/c casting steel rotor 220 volt, 3 phase, 50N, I HP Motor 2600 RPM with V.Belt drive at guards 1.00 ammeter Extra retaining screen with fabric bags for outlet mounted on legs 2 casters for easy movement.	1
3	Centrifugal pump : with 1/2 HP motor single phase capacity 250gal/min, 30 feet head for 220 volt, 50 N in casting.	1
4	Sample Grinder :Open door dice tyhpe with locking hand wheel to regulate product size antiracism bearings, cast iron traction with stud dises 0 with 6" diadise capacity 200Ib/hr at 20mesh with 2 HP motor, 220 Volt 50 N mlounted on a common mounting base.	1
5	Lab Ball mill : for wet and dry grinding for ores etc. Sixe: 16" dia mill, 16"x16" with welded stud base extra thick shell with integral cast lifter bars. Capacity: 150Ib/hr complete wsith 250 Ib of stud balls with 1 1/2 HP 3 phase motor 550 volts 50N operation.	1
6	Sieve Shaker :Height 32" width 34" depth 17" weight in cladding 0.25 HP motor and time switch Capacity: 290Ib for 115 vac. 60HZ speet 1750 RPM with sieve set.	1
7	Portable mixer , with direct drive 4 inch diameter, Stainless steel propellers. 1/4 HP single phgase 50 cyucles. 220 v motor	1
8	Mixing Tank : Capacity 10 gallons stainless steel dull polished inside, Desalted outside slopping bottom of out let connection rein forced top brim steel legs. Complete with ss cover. Outlet valve casters and mixer frame	1

9	Ph-meter (Digital): Ph 0-16, mv 12000 temperature - 20 to 150c resolution 0.01/ 1 mv/0.1c temperature compensation, manual and automatic (Bench Type)	1
10	Water Diminrilizer : Equipped with different cell shoring % sodium chloride, water in put/ Out put flow rate 50l/hr power 220-240v	2
12	Electronic Balance: Digital top loading, capacity 300gms, sensitivity 0.01 gms for 220v weight mod. Gm, once, lbs and kg.	1
13	Plate and frame filter press: Plate size 2 inch * 12 inch, frame 12*12inch, No. of plate = 13 No. of frame = 12 complete with plunger pump and drive motor 1 HP single phase 220v	1
14	Smoke detector: Portable, standard	2
15	Rectifier: To convert AC to DC Ac in put 220v Dc voltage up to 12v ampere up to 500	2
16	Noise meter (Sound level meter): Two scales (range 35-130 db) portable resolution 0.1 db resolution 0.1 db with acoustical calibration Modal No.332	1
17	Nephlo meter (digital portable): Both for coarse and homogeneous solutions. Power supply 220v Wave length 42-87 nm	1
18	Magnetic stirrers with hot plates: Electric speed regulation of 150-2000 rpm Selectable reversible stirring motion	4
19	Raynold Demonstration Unil with hydraulic Bench: To observe laminar, transitional and turbulent pipe flow Reynolds experiment pipe dia 8-10mm Dy-reservoir, Capacity: 0.45-0.50 lit	1

20	Tray Dryer with digital Balance (complete with all accessories) small scale drying unit used for dew on striation of drying rfate. Heat and mass transfer drying test on solids. Effect of tamp air velocity on drying rate - used for psychometric chart, energy mass balances-1 Capacity 2-3 kg of solid -2 drying compartment 0.25 - 0.3 mx 0.25 - 0.3 x 0.35 - 0.4 m consisting of digital balance, are mom meter, aerated psychomotor.	1
3	Petrochemicals Lab	
	<u>a) List of Apparatus</u>	
Sr. No.	Name of Item with Specifications	Qty
1.	Beakers 100ml	50
2.	Beakers 250 ml	50
3	Beakers 500 ml	25
4	Beakers 1000ml	10
5	Glass Rod 8 inches	25
6	Funnel 3 inches	25
7	China Dish 60cc	25
8	Filter paper sheets 10 x 12 inches	100 Sheets
9	Sprit Lamp or Bunsen Burner With stop cork	50
10	Tripod stand 8inches/6inches	50
11	Thermometer (110 °C)	50
12	Capillary tubes	5 Packs
13	Universal pH Paper Rang (1-14)	20 Packs
14	Chromatograph Tank	50
15	Cork with hook	25
16	Watch Glass 3"	50
17	Glass pipe	10 m
18	Ostwald's Viscometer	50
19	Pipette 10ml	50
20	Specific Gravity Bottle 25 ml	25

21	Analytical / Electronic Balance	0.1 gm to 500 gm	6
22	Crucible with lid		10
23	Stop watch	Digital	25
24	Pipette sucker		25
25	Stalagmometer		50
26	Pinch Cock		50
27	Rubber Tubes	½ "	50
28	Hoffman's Voltmeter		10
29	Connecting Wires		20
30	Battery (12 V) D.C /Adapter	300 milli ampere	10
31	Distilled Water Plant. (Gas or Electric)		2
	5 liter /h		
32	Copper Foils	(5cm x 2cm)	10
33	Ammeter	0-3 ampere	10
34	Test Tubes	16 x 150 mm	300
35	Test Tubes Stands		25
36	Tube Test Brush		25
37	Test Tube Holder		25
38	Platinum wire		25
39	Measuring Flask	1 Litre	10
40	Measuring Flask	500 ml	10
41	Measuring Flask	250 ml	10
42	Measuring Flask	100 ml	10
43	Graduated Cylinder	100 ml	25
44	Graduated Cylinder	50 ml	25
45	Kipp's Apparatus	250 ml	4
46	Desiccators	150 mm	2
47	Conical Flask	250 ml	50
48	Burette	50 ml	50
49	Iron stand with clamps		50
50	Wire Gauze		50
51	Hot Plate	8"	2
52	Fusion tubes		250
53	Pestle and Mortar		2
54	Wash Bottle - plastic		20

55	Dropper	20
56	Glass Stirrer	50
57	Steal Spatula	25
58	Water Bath	20
59	Burette Stand	25
60	Tongs	25
61	Reagent Bottles 250ml Narrow Mouth	10
62	Reagent Bottles 250ml	10
63	Reagent Bottles 500ml	10
64	Reagent Bottles 1000ml	10
65	Titration Flask 250ml	10
66	Water still: electric type output litres per hour, 3.8 to 4.5 consumption per hour 3Kw approximate height 29/1/2" for 230 V 50 Hz , single phase	1
67	Balance students: with graduated brass deam and agate bearing capacity 250 gma. Sensitivity 1 mg mounted in polished wood case fitted with rider manipulator	1
68	Balance: single pan triple beam sliding weight weighing to 1110 gms x 0.1 gm rear beam divided 1000 cus x 100 gms and frot beam 10 gms x 0.1 gm. Attachment weight to increase total capacity to 2110 grms with stainless steel pan	1
69	Petrol gas generator: standerd model full tank fitted with filler plug and contents gauge capacity equivalent to 10 hours continous running gas delivered to the gans holder under a pressure adjustable to a maximum of 5" water gauge holder fitted with mercury switch controlling the motor which stops and starts with rise and fall of gas holder gas/ air mixture adjustable from normal rich mixture of 5% air use on 230 V 50 Hz single phase motor tropicalised.	1
70	Barometer mercurial: fortni type scale in cue vernier reading upto 0.01mm	1
71	Peumatic trough: stout borosilicate glass circular for collection of gases over water on or for storage of specimens diameter 25 cm height 12 cm	15

72	Kippker gas generators: borosilicate glass central bulb 1 litre capacity with ground in stock cock lower acid reservoir with stappered ground tubulure upper bulb fitted with rubber stopper and SAF-TY funner ground in conical tube to prevent solid matter falling into lower acid reservoir in returnable case	1
73	Dropping bottles: amber glass with ground in glass stopper nominal capacity M1100	15