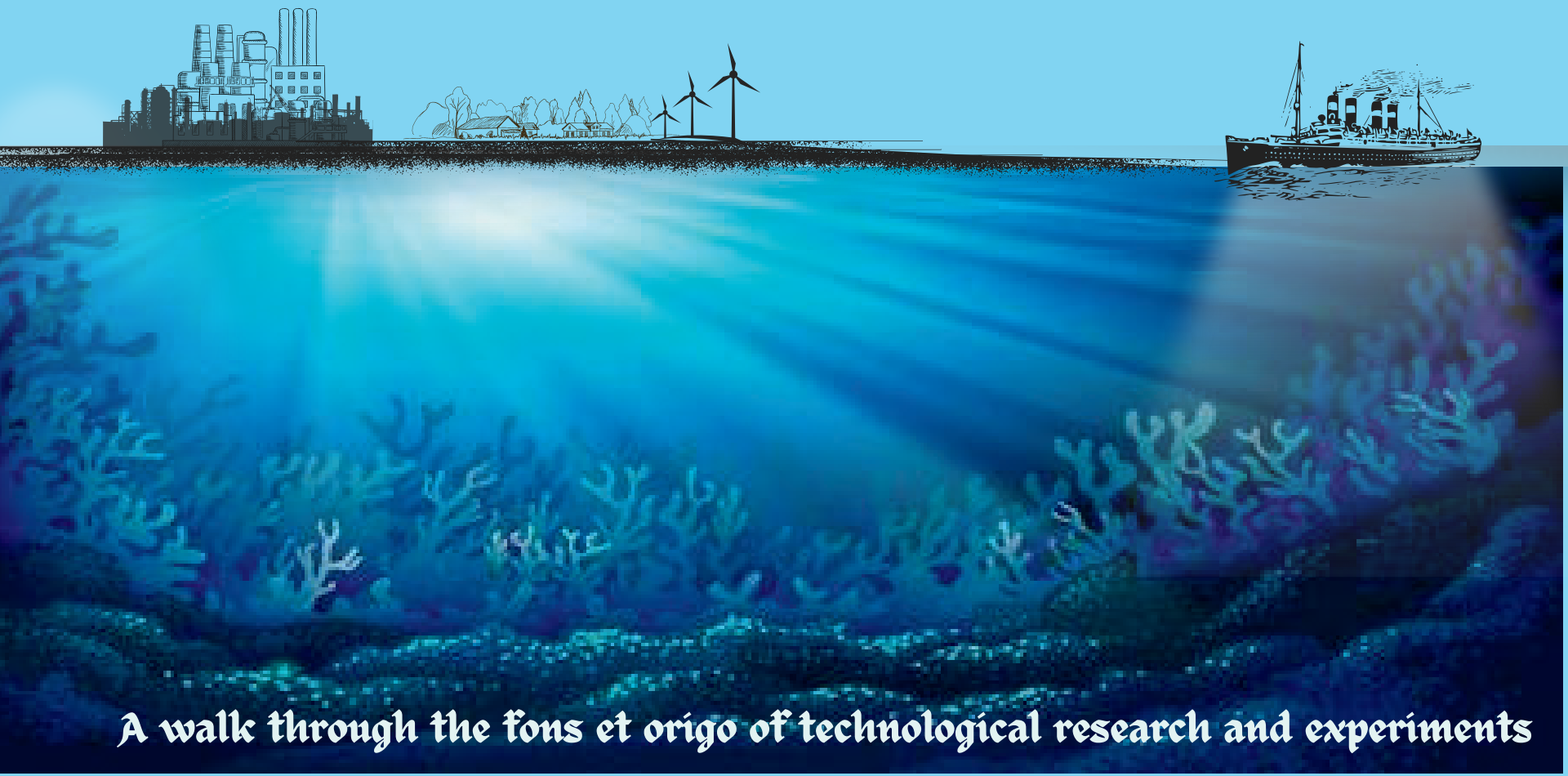
Department of Environmental, Water Resources, and Coastal Engineering

March, 2023

WATER RESOURCES ENGINEERING (WRE) LABORATORY PROSPECTUS



A walk through the fons et origo of technological research and experiments

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BASIC HYDRAULIC BENCH (HM 150)

Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh
The HM 150 series of devices permits a varied experiment cross-section in the fundamentals of fluid mechanics. Features include water supply for experimental units for fluid mechanics, volumetric flow rate measurement for large and small flow rates. Comprehensive range of accessories allows a complete course in the fundamentals of fluid mechanics.
Approximate cost: 5,00,000.00 BDT
Year of purchase: 2005

Technical Specifications:

- Base module for supplying experimental units in fluid mechanics
- Closed water circuit with storage tank, submersible pump and measuring tank
- Measuring tank divided in two for volumetric flow rate measurements
- Measuring beaker with scale for very small volumetric flow rates
- Measurement of volumetric flow rates by using a stopwatch
- Work surface with integrated flume for experiments with weirs
- Work surface with inside edge for safe placement of the accessory and for collecting the dripping water
- Storage tank, measuring tank and work surface made of GRP

Technical data:

- Pump
  - Power consumption: 250W
  - Max. flow rate: 150 L/min
  - Max. head: 7.6m
  - Storage tank capacity: 180L
- Measuring beaker with scale for very small volumetric flow rates
  - Capacity: 2L
- 230V, 50Hz, 1 phase
- 120V, 60Hz, 1 phase

Dimensions and Weight:

- Measuring tank
  - At large volumetric flow rates: 60L
  - At small volumetric flow rates: 10L
- Flume: LxWxH: 530x150x180mm
- Stopwatch
  - Measuring range: 0...9h 59min 59sec
- UL/CSA optional
- LxWxH: 1230x770x1070mm
- Weight: approx. 85kg

Main Test:

- Basic module for flow related experiment

Basic Hydraulic Bench (new):

Approximate cost: 6, 93, 000.00 BDT

Year of purchase: 2015

Similar Equipment Available in Market

https://www.echoscaninc.com/Secured/shop/product/flow-over-a-notch/

https://esolsengineering.com/allproducts.php?subservice=1&service=1

HYDROSTATIC PRESSURE APPARATUS (HM 150.05)

Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh

The HM 150.05 experimental unit offers typical experiments to study hydrostatic pressure in liquids at rest. The effect of the hydrostatic pressure of water can be clearly shown at different water levels and angles of inclination.

Approximate cost: 2,00,000.00 BDT
Year of purchase: 2005

Technical Specifications:

- Investigation of the hydrostatic pressure in fluids at rest
- Tiltable water tank with fill level scale
- Lever arm with different weights

Technical Data:

Water tank

- Inclination angle: 0°...90°
- Content: 0...1,8L
- Scale: 0...250mm
- Effective area: max. 75x100mm

Lever arm

- Max. length: 250mm

Weights

- 1x 2.5N
- 1x 2N
- 2x 1N
- 1x 0.5N

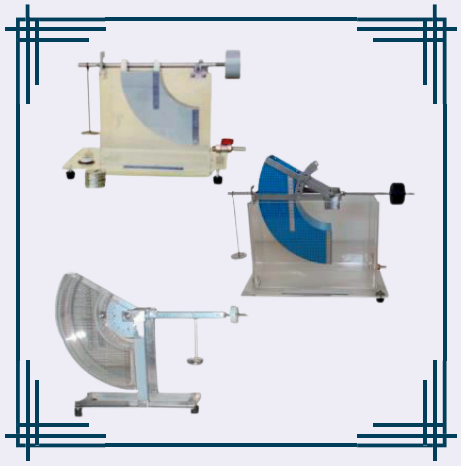
Dimensions and Weight:

- LxWxH: 400x500x450mm
- Weight: approx. 12kg

Main Test:

- Determination of Center of Pressure
  Required Accessories: Laboratory trolley (WP 300.09)
  Training Duration (if required): N/A

https://armfield.co.uk/product/armfield-f1-12-hydrostatic-pressure/



https://www.echoscaninc.com/Secured/shop/product/hydrostatic-pressure-apparatus/

STABILITY OF FLOATING BODIES (HM 150.06)

Country of origin: Germany

Country of manufacturing: Germany

Country of shipment: Bangladesh

In hydrostatics, the metacenter is an important point to be considered when assessing the stability of floating bodies. The HM 150.06 unit can be used to study the stability of a floating body and to determine the metacenter graphically. In addition, the buoyancy of the floating body can also be determined. The experiment is easy to set up and is particularly suitable for practical work in small groups.

Approximate cost: 2,15,000.00 BDT

Year of purchase: 2005

Technical Specifications:

- Investigating the stability of a floating body and determining the metacenter
- Transparent floating body with rectangular frame cross-section
- One horizontally movable clamped weight for adjusting the heel
- One vertically movable clamped weight for adjusting the center of gravity
- Clinometer with scale for displaying the heel
- Other floating bodies with different shapes of frame available as accessories: HM 150.39

Technical data:

- Floating body
  LxWxH: 300x130x190mm
  max height: 400mm
- Weights
  floating body without clamped weights: 2.7kg
  vertical clamped weight: 575g
  horizontal clamped weight: 196g

Dimensions and Weight:

- LxWxH: 660x450x220mm (tank)
- Weight: approx. 6kg

Main Test:

- Determination of Center of Gravity, Metacenter, Stability
- Required Accessories: Floating bodies for HM 150.06 (HM 150.39) and Laboratory trolley (WP 300.09)
  Training Duration (if required): N/A

BERNOULLI'S THEOREM APPARATUS (HM 150.07)

Country of origin: Germany

Country of manufacturing: Germany

Country of shipment: Bangladesh

The features of HM 150.07 experimental unit include investigation and verification of Bernoulli's principle, static pressures and total pressure distribution along the venturi nozzle, determination of the flow coefficient at different flow rates and recognizing friction effects.

Approximate cost: 2,00,000.00 BDT

Year of purchase: 2005

Technical Specifications:

- Familiarization with Bernoulli's principle
- Venturi nozzle with transparent front panel and measuring points for measuring the static pressures
- Axially movable Pitot tube for determining the total pressure at various points within the Venturi nozzle
- 6 tube manometers for displaying the static pressures
- Single tube manometer for displaying the total pressure
- Flow rate determined by HM 150 base module
- Water supply using HM 150 base module or via laboratory supply

Technical Data:

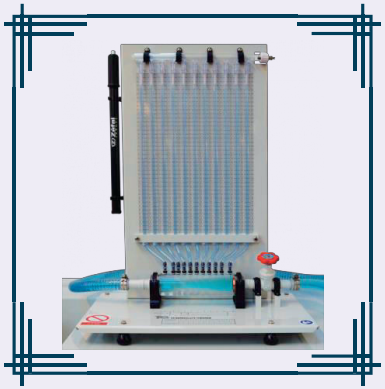
- Venturi nozzle
  - Area: 84...338mm2
  - angle at the inlet: 10,5°
  - angle at the outlet: 4°
- Pitot tube
  - movable range: 0-200mm
  - 4mm
- Pipes and pipe connectors: PVC
- Measuring ranges
- Pressure
  - 0-290mmWC (static pressure)
  - 0-370mmWC (total pressure)

Dimensions and Weight:

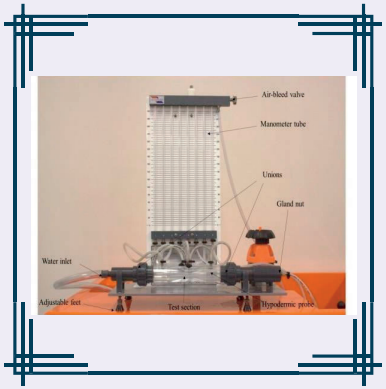
- LxWxH: 1100x680x900mm
- Weight: approx. 28kg

Main Test:

- Demonstration of Bernoulli's value
  Required Accessories: Basic Hydraulic Bench (HM 150), Drain
  Training Duration (if required): N/A



https://www.tecquipment.com/venturi-meter



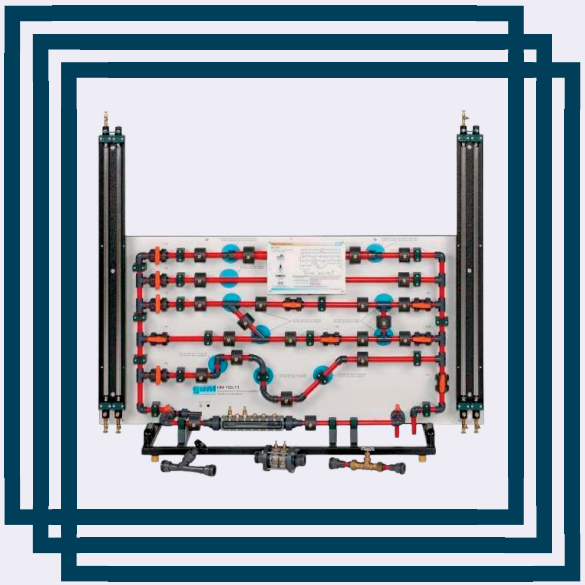
https://uta.pressbooks.pub/appliedfluidmechanics/chapter/experiment-2/

FLUID FRICTION APPARATUS (HM 150.11S)

Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh

Pressure losses occur during the flow of real fluids due to friction and turbulence. Pressure losses occur in pipes, pipeline elements, fittings and measuring devices. These pressure losses must be considered when designing piping systems. HM150.11 allows to study the pressure losses in pipes, piping elements and shut-off devices. In addition, the differential pressure method is presented for measuring the flow rate.

Approximate cost: 4,50,000.00 BDT
Year of purchase: 2005



Technical Specifications:

- Investigation of pressure losses in piping elements and shut-off devices
- Different measuring objects for determining flow rate according to the differential pressure method
- Six pipe sections capable of being individually shut off, with different piping elements: sudden contraction, sudden enlargement, Y-pieces, T-pieces, corners and bends
- One pipe section to hold interchangeable shut-off/measuring objects
- Measuring objects made of transparent material: Venturi nozzle, orifice plate flow meter and measuring nozzle
- Shut-off devices: angle seat valve, gate valve
- Annular chambers allow measurement of pressure without interaction
- 2 twin tube manometers for measuring the pressure difference
- Flow rate determined by HM 150 base module
- Water supply using HM 150 base module or via laboratory supply

Technical Data:

- Pipe sections

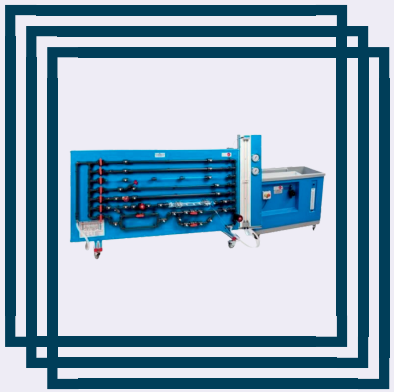
  Inner diameter: d
  - straight: d=20x1.5mm, length: 800mm, PVC
  - sudden contraction: d=32x1.8-20x1.5mm, PVC
  - sudden enlargement: d=20x1.5-32x1.8mm, PVC
  - with 2x Y-piece45° and 2x T-piece
  - with 2x 90° elbow/bend: d=20x1.5mm, PVC and 2x 45° elbow: d=20x1.5mm, PVC
- Pipe section to hold fittings or measuring objects
  - 20x1.5mm, PVC
- 2x twin tube manometers: 0...1000mmWC
- Measuring ranges
  - pressure: 0...0.1bar

Dimensions and Weight:

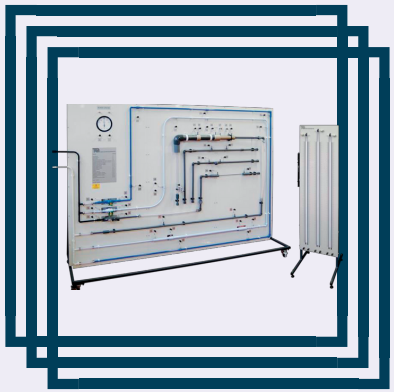
- LxWxH: 1550x640x1300mm
- Weight: approx. 58kg

Main Test:

- Determination of co-efficient of resistance for change in cross-section of pipe
- Flow through a venturi meter
- Flow through an orifice meter



https://www.devinsense.com/product/fluid-friction-apparatus/



https://www.edibon.com/en/fluid-friction-in-pipes-unit- with-hydraulics-bench-fme00

ORIFICE DISCHARGE APPARATUS (HM 150.12)

Country of origin: Germany

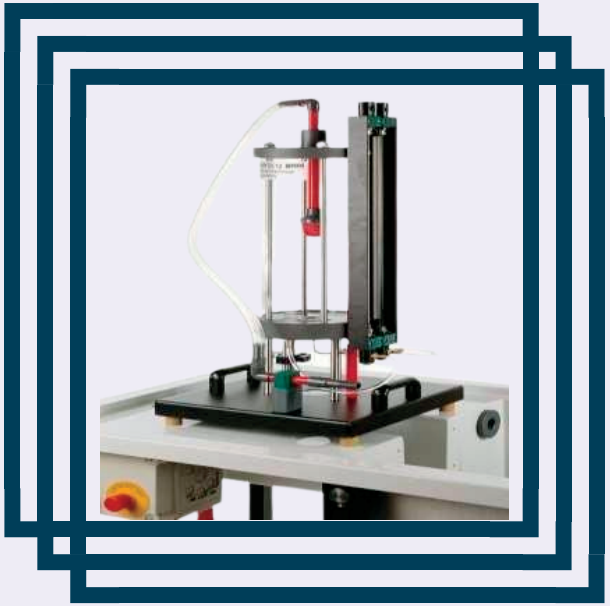
Country of manufacturing: Germany

Country of shipment: Bangladesh

HM 150.12 determines these losses at different flow rates. Different diameters as well as inlet and outlet contours of the openings can be studied. Additionally, the contraction coefficient can be determined as a characteristic for different contours. The experimental unit is positioned easily and securely on the work surface of the hydraulic bench.

Approximate cost: 2,00,000.00 BDT

Year of purchase: 2005



Technical Specifications:

- Study of pressure losses in vertical flows from tanks
- Determining the contraction coefficient for different contours and diameters
- Tank with adjustable overflow
- 5 interchangeable inserts with different contours
- Measuring device for determining the jet diameter
- Pitot tube for determining the total pressure
- Pressure display on twin tube manometers
- Flow rate determined by HM 150 base module
- Water supply using HM 150 base module or via laboratory supply

Technical data:

- Tank
- capacity: approx. 13L
- overflow height: max. 400mm
- max. flow rate: 14L/min
- Measuring ranges
  - pressure: 500mmWC
  - jet radius: 0...10mm

Dimensions and Weight:

- LxWxH: 400x400x830mm
- Weight: approx. 18kg

Main Test:

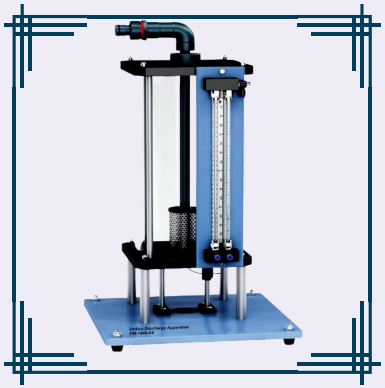
- Demonstration of Coefficient of discharge
- Inserts

Inner diameters: d1=inlet, d2=outlet

- 1x cylindrical hole, d=12mm
- 1x outlet from the insert: cone d1=24mm, d2=12mm
- 1x inlet to the insert: orifice plate d1=24mm, d2=12mm
- 1x inlet to the insert: cone d1=30mm, d2=12mm
- 1x inlet to the insert: rounded, d=12mm

Required Accessories: Basic Hydraulic Bench (HM 150), Drain Training Duration (if required): N/A

https://www.edibon.com/en/orifice-discharge



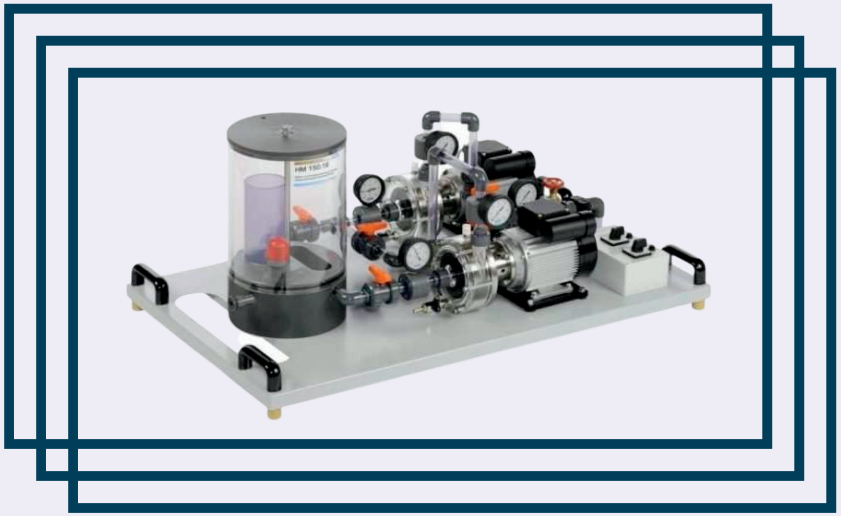
https://infinit-technologies.com/product/fm-1849-08-orifice-discharge-apparatus/

TWIN CENTRIFUGAL PUMP CONFIGURATIONS (HM150.16)

Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh

In complex systems, pumps can be connected in series or in parallel. In series operation the heads are added together and in parallel operation, the flow rates of the pumps are added. With HM 150.16 pumps are studied individually, in series and in parallel configuration. The experimental unit is positioned easily and securely on the work surface of the hydraulic bench.

Approximate cost: 3,00,000.00 BDT
Year of purchase: 2005



Technical Specifications:

- Investigation of series and parallel configuration of pumps
- Two identical centrifugal pumps
- Transparent tank as intake tank
- Overflow in the tank ensures constant suction head
- Ball valves used to switch between series and parallel operation
- Manometers at inlet and outlet of each pump
- Flow rate determined by base module HM 150
- Water supply via HM 150 or via laboratory supply

Technical data:

- 2x centrifugal pump
  1. power consumption: 370W
  2. max. flow rate: 21L/min
  3. max. head: 12m
- Tank: 13L
- Pipes and pipe connections: PVC

Dimensions and Weight:

- LxWxH: 1110x650x500mm
- Weight: approx. 62kg

Main Test:

- Series parallel pump test
- Measuring ranges
  - pressure (inlet): 2x -1...1,5bar
  - pressure (outlet): 3x 0...2,5bar
- 230V, 50Hz, 1 phase
- 230V, 60Hz, 1 phase; 120V, 60Hz, 1 phase
- UL/CSA optional

Required Accessories: Basic Hydraulic Bench (HM 150), Drain
Training Duration (if required): N/A

LARGE FLOW CHANNEL (HM 161.BL)

Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh

Large Flow Channel is 16m long and has a cross- section of 600x800mm. The HM 161.BL is the largest within the GUNT product range. The flow velocities that can be achieved in the channel, and the long length of experimental section, are the perfect conditions for designing own projects. These projects can be very close approximations of reality. The side walls of large flow channel are made of tempered glass, which allows excellent observation of experiments. All components that come into contact with water are made of corrosion -resistant materials. Most models are quickly and safely bolted to bottom of the experimental section.

Approximate cost: 1,65,00,000.00 BDT
Year of purchase: 2005

Technical Specification:

- Basic principles of open-channel flow
- Experimental flume with experimental section, inlet and outlet element and closed water circuit
- Smoothly adjustable inclination of the experimental section
- Experimental section with evenly spaced threaded holes on the bottom for installing models or for pressure measurement
- Side walls of experimental section are made of tempered glass for excellent observation experiments
- Experimental section with guide rails for the optionally available instrument carrier HM 161.59
- All surfaces in contact with water are made of corrosion-resistant materials
- Flow-optimized inlet element for low-turbulence entry into the experimental section
- Closed water circuit with water tanks, pumps, electromagnetic flow sensor and flow control
- Gallery that can be walked on
- PLC with 2 freely position able touch panels and a 32" monitor for control of the plant
- Models from all fields of hydraulic engineering available as accessories
- GUNT software for data acquisition via LAN under Windows 8.1, 10

Technical Data:

- Experimental section
  - length: 16m
  - flow cross-section WxH: 600x800mm
  - 3 spindle-type lifting gears
- Tanks
  - 1x 3600L
  - 4x 4300L
- 2 pumps
  - power consumption: 18.5kW
  - max. flow rate: 228m³/h
  - max. head: 35m
- Measuring ranges
  - flow rate: 0...440m³/h
  - inclination: -0.75...2,1%
- 400V, 50Hz, 3 phases
- 400V, 60Hz, 3 phases
- 230V, 60Hz, 3 phases
- UL/CSA optional

Dimensions and Weight:

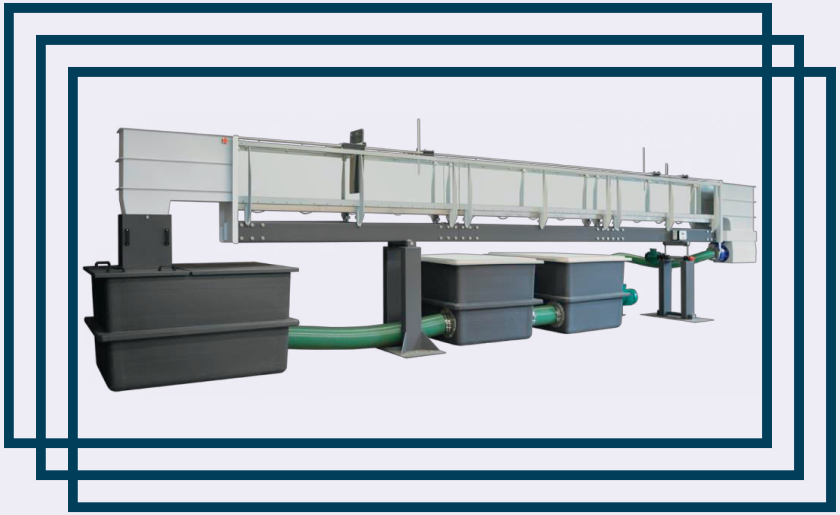
- LxWxH: 22000x4000x2700 mm
- Weight: approx. 13000 kg

Main Test:

- Numerous experiment related to flow measurement
- Measurement of flow rate
- Measurement of flow velocity
- Influence of wall shape on flow

Required Accessories: A wide selection of models, such as weirs, piers, flow-measuring flumes or a wave generator is available as accessories

Training Duration (if required): N/A



https://labmidwest.com/product-catalogue/large-flow-channel/

MODULAR FLOW CHANNEL (HM 162)

Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh

Modular Flow Channel is used in teaching and research to demonstrate and study the main phenomena of open-channel flow at the laboratory scale. For example, control structures for flow regulation and various methods of flow measurement are demonstrated.

The HM 162 has a closed water circuit and an extendable experimental section. The side walls of the experimental section are made of tempered glass, which allows excellent observation of experiments. All components that come into contact with water are made of corrosion-resistant materials. A wide selection of models, such as weirs, piers, flow-measuring flumes or a wave generator is available as accessories.

Approximate cost: 80,05,000.00 BDT
Year of purchase: 2005

Technical Specifications:

- Basic principles of open-channel flow
- Experimental flume with experimental section, inlet and outlet element and closed water circuit
- Length of the experimental section is 5 - 12.5m possible with additional extension elements HM 162.10
- Smoothly adjustable inclination of the experimental section
- Experimental section with 20 evenly spaced threaded holes on the bottom for installing models or for water level measurement using pressure
- Side walls of the experimental section are made of tempered glass for excellent observation of the experiments
- Experimental section with guide rails for the optionally available instrument carrier HM 162.59
- All surfaces in contact with water are made of corrosion-resistant materials: stainless steel, glass reinforced plastic
- Flow-optimized inlet element for low-turbulence entry into the experimental section
- Closed water circuit with 2 water tanks, pump, electromagnetic flow sensor and flow control
- Models from all fields of hydraulic engineering available as accessories
- Flume control with PLC via touch screen
- Integrated router for operation and control via an end device and for screen mirroring: mirroring of the user interface on up to 5 end devices
- Data acquisition via PLC on internal memory, access to stored measured values via WLAN with integrated router/ LAN connection to customer's own network
- GUNT software for data acquisition via LAN under Windows 8.1, 10

Technical Data:

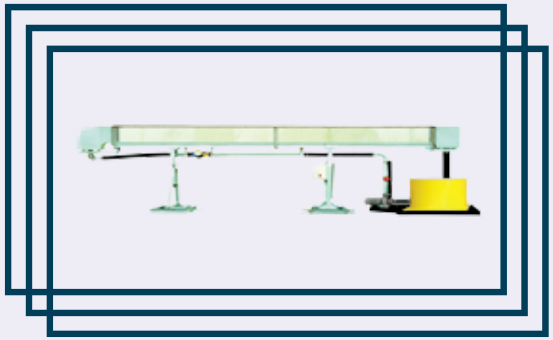
- Experimental section
  - possible lengths: 5m/7.5m/10m/12.5m
  - flow cross-section WxH: 309x450mm
  - inclination adjustment: -0,5...+2,5%
- 2 tanks, made of GRP, 1100L each
- Measuring ranges
  - flow rate: 5.4...130m^3/h
- Pump
  - power consumption: 4.75kW
  - max. flow rate: 132m^3/h
  - max. head: 16.1m
  - speed: 1450min^{-1}

Dimensions and Weight:

- 400V, 50Hz, 3 phases, 400V, 60Hz, 3 phases
- 230V, 60Hz, 3 phases, UL/CSA optional
- LxWxH: 9170x1000x2100mm (experiment section 5m)
- Empty weight: approx. 1800kg

Main Test:

- Numerous experiment related to flow measurement
- Measurement of flow rate
- Measurement of flow velocity
- Influence of wall shape on flow



Required Accessories: A wide selection of models, such as weirs, piers, flow-measuring flumes or a wave generator is available as accessories

Training Duration (if required): N/A

https://www.echoscaninc.com/Secured/shop/product/flow-channel-75mm-wide-tilting/

SLUICE GATE(HM 161.29 and HM 162.29)

Country of origin: Germany

Country of manufacturing: Germany

Country of shipment: Bangladesh

Sluice gates are movable control structures under which water flows. A sluice gate is a vertical wall causing backwater in the flume and is used to ensure a minimum upstream discharge depth at varying discharge. The gate opening of the sluice gate HM 161.29 and 162.29 differs and therefore the discharge under the gate can be manually adjusted with a hand wheel.

Approximate cost: 7,00,000.00 BDT (HM 161.29), 4,25,000.00 BDT (HM 162.29)

Year of purchase: 2005

Technical Specifications:

- Sluice gates for the experimental flume HM 161 and HM 162 respectively
- Sluice gate with lateral sealing lips
- Height adjustment using hand wheel
- Scale to read the height of the gate opening

Technical Data

HM 161.29

- Gate
  - weir plate made of PVC
  - head adjustment: 0...400mm

HM 162.29

- Gate
  - weir plate made of PVC
  - head adjustment: 0...150mm

Dimensions and Weight:

HM 161.29

- LxWxH: 420x820x700mm
- Weight: approx. 10kg

HM 161.29

- LxWxH: 370x263x710mm
- Weight: approx. 5kg

Main Test:

- Observing development of Generalized Specific Energy
  Required Accessories: Large Flow Channel (HM 161.BL)
  Training Duration (if required): N/A

https://armfield.co.uk/product/fex40-3-4-sluice-gates/

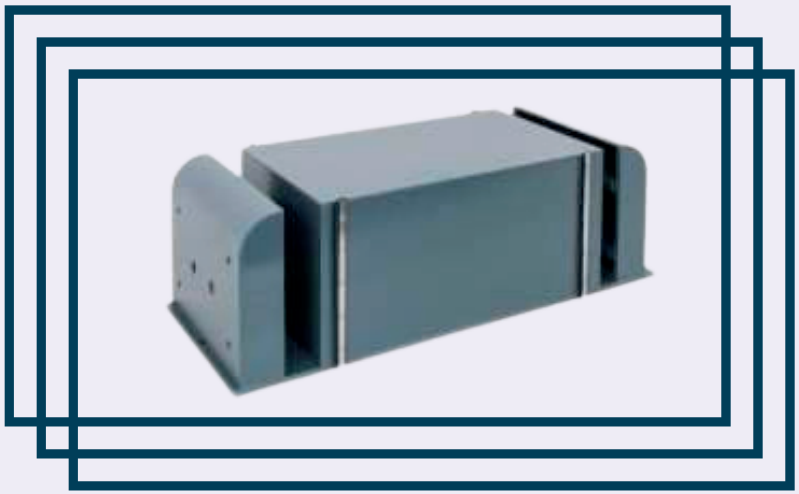
https://grabcad.com/library/sluice-gate-6.

BROAD CRESTED WEIRS (HM 161.31)

Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh

Broad-crested weirs are control structures. Under certain conditions, broad-crested weirs can be used as measuring weirs, preferably when weir is fully submerged in the water downstream. The HM 161.31 contains a cuboid shaped weir body with sharp edges and the effect of the sharp-edged weir crest on the nappe is easily observable. Free and submerged over fall can be clearly demonstrated.

Approximate cost: 3,00,000.00 BDT
Year of purchase: 2005



Technical Specifications:

- Broad-crested weir for the experimental flume HM 161
- Weir with sharp edges
- 2 additional elements for rounded edges
- Hollow weir body with sealing lips

Technical Data:

- Weir body
- material: PVC

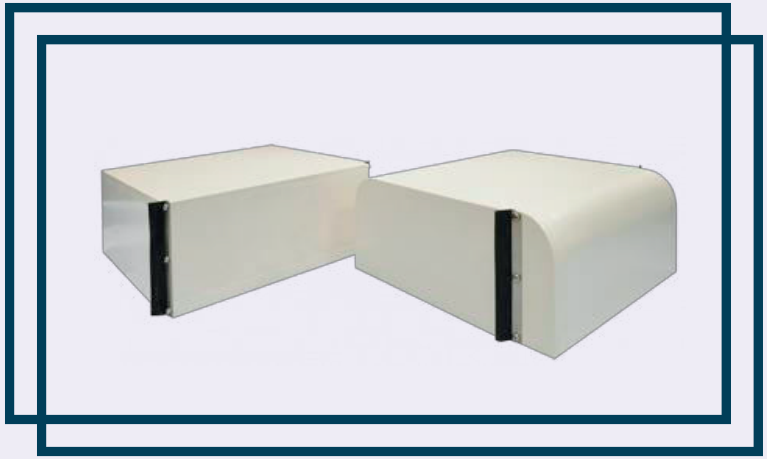
Dimensions and Weight:

- LxWxH: 1400x600x500mm
- Weight: approx. 40kg

Main Test:

- Determination of co-efficient of over flow

Required Accessories: Large Flow Channel (HM 161.BL)
Training Duration (if required): N/A



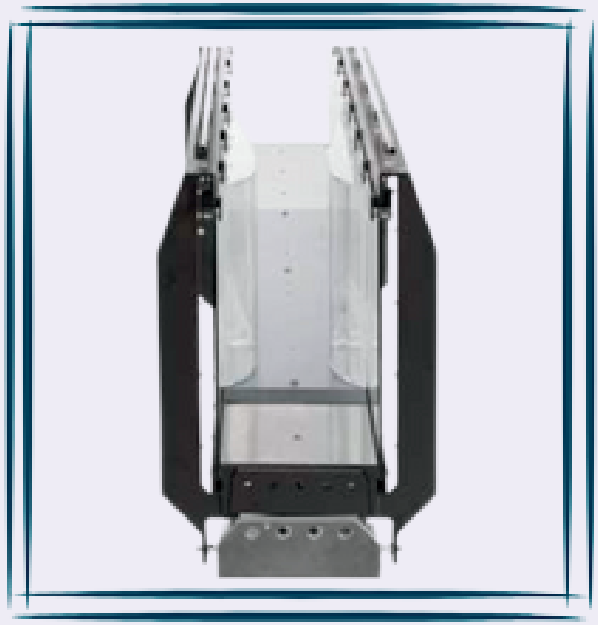
https://www.tecquipment.com/pt/broad-crested-weirs-fc300r

VENTURI FLUME (HM 161.51) and (HM 162.51)

Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh

Venturi flumes are specially shaped flumes with defined lateral contraction and a shaped bottom, which are used to determine the discharge of a flume. The venturi flumes HM 161.51 and HM 162.51 both consist mainly of two transparent side elements and a flat base plate. The transparent side elements allow the clear observation of the processes in the flume.

Approximate cost: 2,50,000.00 BDT (HM 161.51), 1,50,000.00 BDT (HM 162.51)
Year of purchase: 2005



Technical Specifications:

- Venturi flume for the experimental flume HM 161.BL and HM 162
- Venturi flume consisting of 1 base plate, 2 side elements, 1 clamping device
- Side elements with sealing lips

Technical Data:

HM 161.51

- Venturi flume
  LxWxH: 1600x600x800mm
  - narrowest cross-section,
  - WxH: 350x780mm
- Side element
  LxWxH: 1420x125x780mm
  - material: PMMA

HM 162.51

- Venturi flume
  LxWxH: 1000x304x450mm
  - narrowest cross-section,
  - WxH: 152x430mm
- Side element
  LxWxH: 828x76x430mm
  - material: PMMA

Dimensions and Weight:

HM 161.51

- LxWxH: 1600x600x800mm
- Weight: approx. 100kg

HM 162.51

- LxWxH: 1000x304x450mm
- Weight: approx. 25kg

Main Test:

- Flow through a venturi Flume

Required Accessories: Large Flow Channel (HM 161.BL) for HM 161.51 and Modular Flow Channel (HM 162) for HM 162.51
Training Duration (if required): N/A

DIGITAL LEVEL GAUGE (HM 161.51S) and (HM 162.52S)

Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh

It is important to know the discharge depth for many experiments in open channel flow. The discharge depth can be measured using the level gauge HM 161.52 and HM 162.51. They can be used along the length and width of their respective flow channels or experimental sections as they are mounted on the moveable instrument carriers HM 161.59 and 162.59.

Approximate cost: 1,00,000.00 BDT (HM 161.52), 75,000.00 BDT (HM 162.52)
Year of purchase: 2005

Technical Specifications:

- Device for measuring discharge depths in the experimental flume HM 161
- Used together with HM 161.59
- Measurement either with probe tip or hook
- Vertically travelling probe tip or hook
- Scale to indicate the discharge depth
- Use of corrosion resistant materials

Technical Data:

HM 161.52S

- Scale
  - measuring range: 0…800mm
  - graduation: 1mm
- Max. travel: 800mm

HM 162.52S

- Scale
  - measuring range: 0…450mm
  - graduation: 1mm
- Max. travel: 450mm

Dimensions and Weight:

HM 161.52S

- LxWxH: 95x60x1180mm
- Weight: approx. 4kg

HM 162.52S

- LxWxH: 85x60x830mm
- Weight: approx. 1kg

Required Accessories: Large Flow Channel (HM 161.BL) and Instrument Carriage (HM 161.59) for HM 161.51 and Modular Flow Channel (HM 162) and Instrument Carriage (HM 162.59) for HM 162.51
Training Duration (if required): N/A

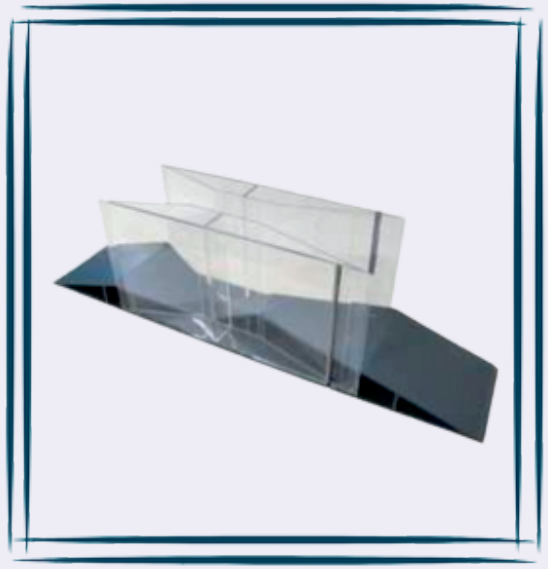
PARSHALL FLUME (HM 161.55) and (HM 162.55)

Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh

Parshall flumes are venturi flumes with a profiled bottom. They are commercially available as a complete component including a discharge curve.

The Parshall flumes HM 161.55 and HM 162.55 consist mainly of two transparent side elements and the profiled base plate which allow the clear observation of the processes in the flume.

Approximate cost: 3,60,000.00 BDT (HM 161.55), 2,00,000.00 BDT (HM 162.55)
Year of purchase: 2005



Technical Specifications:

- Parshall flume for the experimental flumes HM 161.BL and HM 162
- Parshall flume consisting of profiled base plate, 2 side elements, 1 clamping device
- Parshall flume with sealing lips

Technical Data:

HM 161.55

- Parshall flume (6”)
  - narrowest cross-section,
  - WxH: 152.4x305mm
- Side element
  - LxWxH: 1730x225x730mm
  - material: PMMA
- Base plate
  - LxWxH: 2050x600x132mm
  - material: PVC

HM 162.55

- Parshall flume (2”)
  - narrowest cross-section,
  - WxH: 50.8x114mm
- Side element
  - LxWxH: 900x126,5x300mm
  - material: PMMA
- Base plate
  - LxWxH: 1090x304x60mm
  - material: PVC

Dimensions and Weight:

HM 161.55

- LxWxH: 2150x600x750mm
- Weight: approx. 180kg

HM 162.55

- LxWxH: 1090x304x310mm
- Weight: approx. 25kg

Main Test:

- Flow through a Parshall Flume

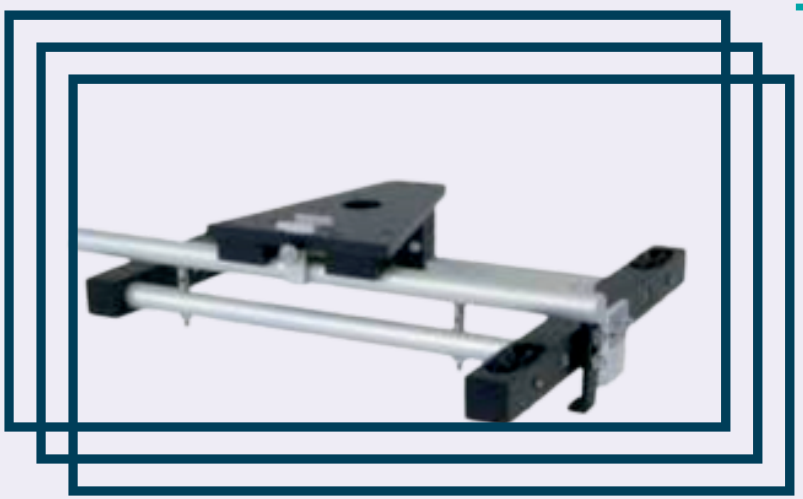
Required Accessories: Large Flow Channel (HM 161.BL) for HM 161.55 and Modular Flow Channel (HM 162) for HM 162.55
Training Duration (if required): N/A

INSTRUMENT CARRIAGE (HM 161.59) & (HM 162.59)

Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh

The accessories HM 161.59 and HM 162.59 are intended as carriers for instruments, e.g. the pitot static tube or the level gauge. Using the carrier, the used instrument can be moved to nearly every point of the flow. The exact determination of the position of the used instrument is realized with scales.

Approximate cost: 2,00,000.00 BDT (HM 161.59), 1,50,000.00 BDT (HM 162.59)
Year of purchase: 2005



Technical Specifications:

- Instrument carrier to be placed on the rails of the experimental flume HM 161
- Exact determination of the position via scales with pointers parallel and transverse to the flow
- Carrier made of corrosion resistant materials

Technical Data:

HM 161.59

- Travels
- Parallel to the flow: entire experimental section
- Transverse to the flow: ±296mm

HM 162.59

- Travels
- Parallel to the flow: entire experimental section
- Transverse to the flow: ±146mm

Dimensions and Weight:

HM 161.59

- LxWxH: 880x350x180mm
- Weight: approx. 10kg

HM 162.59

- LxWxH: 440x350x130mm
- Weight: approx. 5kg

Required Accessories: Large Flow Channel (HM 161.BL) for HM 161.59 and Modular Flow Channel (HM 162) for HM 162.59
Optional Accessories: Pitot static tube, Level gauge, Velocity meter and Digital level gauge
Training Duration (if required): N/A

WORKING SECTION EXTENSION (HM 162.10)

Country of origin: Germany

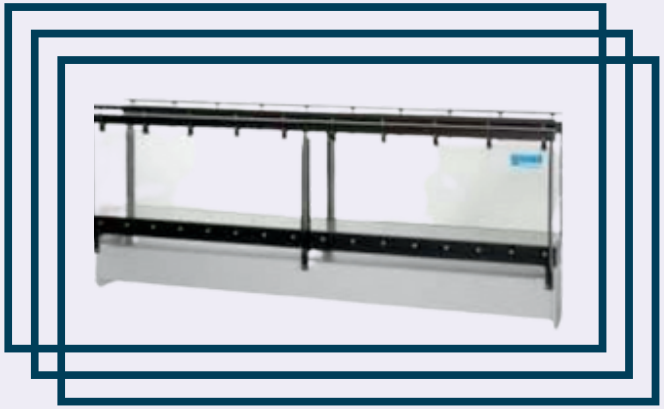
Country of manufacturing: Germany

Country of shipment: Bangladesh

The experimental section of the modular flow channel HM 162 can be extended step wise by 2.5m by adding extension elements HM 162.10. The maximum length is 12.5m. The extension elements are mounted during the setup of the experimental flume. It is not possible to install them at a later date. An additional water tank HM 162.20 is required to ensure that there is always sufficient water available.

Approximate cost: 8,23,000.00 BDT

Year of Purchase: 2005



Required Accessories: Modular Flow Channel (HM 162) and for experimental sections of 10m or 12.5m, Extension Sump Tank (HM 162.20)

Training Duration (if required): N/A

Technical Specifications:

- Element to extend the experimental section of HM 162 to 7.5m, 10m or 12.5m
- Element with 10 evenly spaced threaded holes on the bottom for installing models or for water level measurement using pressure
- Side walls made of tempered glass for excellent observation of the experiments
- Guide rails for the optionally available instrument carrier HM 162.59
- Water tank HM 162.20 required for experimental sections of 10m or 12.5m

Technical data:

Flow cross-section

- WxH: 309x450mm
- Length: 2.5m

Dimensions and Weight:

- LxWxH: 2500x540x1070mm
- Weight: approx. 400kg

EXTENSION SUMP TANK (HM 162.20)

Country of origin: Germany

Country of manufacturing: Germany

Country of shipment: Bangladesh

If the experimental section of the modular flow channel is extended to 10m or 12.5m, one additional tank HM 162.20 is necessary. As the flume already includes two tanks, at maximum length of the experimental section the number of tanks is increased to three. The connection to the existing water tanks is made with the aid of two connecting pieces. In addition, the water tank is equipped with a water outlet in the middle.

Approximate cost: 2,10,000.00 BDT

Year of Purchase: 2005

Required Accessories: Modular Flow Channel (HM 162) and Working Station Extension (HM 162.10)

Training Duration (if required): N/A

Technical Specifications:

- Water tank for flume HM 162 to extend the experimental section to 10m or 12.5m
- Two connecting pieces for connecting the existing water tanks of the experimental flume HM 162
- 1 water outlet
- Cover with anti-slip surface, thus possible to walk on the tank

Technical Data:

- Cover
  - LxWxH: 2000x1000x5mm
  - Material: Aluminium
- Water tank
  - LxWxH: 2230x1000x780mm
- Material: GRP
- Usable content: 1000L
- 2 connecting pieces
- 1 water outlet

Dimensions and Weight:

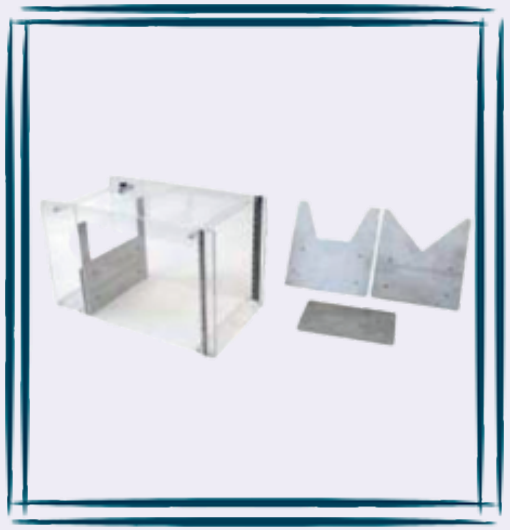
- LxWxH: 2230x1000x785mm
- Weight: approx. 80kg

PLATE WEIRS SET (HM 162.30)

Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh

Sharp-crested weirs are control structures causing a defined backwater. Additionally, they are often used to determine the discharge of an open channel. The HM 162.30 contains four different plate weirs as sharp-crested weirs. The other weirs are typical measuring weirs with defined openings. The weir to be studied is inserted in a frame. The frame is mounted into the experimental section of HM 162

Approximate cost: 1,00,000.00 BDT
Year of Purchase: 2005



Required Accessories: Modular Flow Channel (HM 162)
Training Duration (if required): N/A

Technical Specifications:

- 4 sharp-crested weirs for the experimental flume HM 162
- Rectangular weir with optional aeration as sharp-crested weir
- Thomson weir, Cipoletti weir and Rehbock weir as measuring weirs
- The opening of the Thomson weir is triangular, the opening of the Rehbock weir is rectangular and for the Cipoletti weir, it's trapezoidal.
- Identical weir height for all weirs
- Plate weir to be studied inserted in a frame
- Transparent frame with lateral sealing lips inserted in the flume
- Weirs made of stainless steel

Technical Data:

- Thomson weir
  - triangular weir opening
- Rehbock weir
  - rectangular weir opening
- Cipoletti weir
  - trapezoidal weir opening

Dimensions and weight:

- LxWxH: 620x304x370mm (frame)
- Total weight: approx. 13kg

PIPE FRICTION APPARATUS (HL 102)

Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh

When flow passes through pipes, pressure losses occur due to the friction between the pipe wall and the water. The pressure loss is directly dependent on the surface roughness of the pipe inner wall, and thus on the material used. In addition, the pressure loss is affected by the flow velocity and the cross- sectional area being flowed through. The HL 102 unit makes it possible to study the pressure loss of incompressible fluids in fully flowed through straight pipe elements.

Approximate Cost: 5,00,000.00 BDT

Year of Purchase: 2005

Technical Specifications:

- Investigation of friction-induced pressure losses in flow through pipes
- Pipe elements are commercially standard components in heating and sanitary engineering
- Clear panel mounted on a sturdy, movable frame
- Four measuring sections with different pipe cross-sections and materials
- Own individual measuring sections with annular chambers for pressure measurement can be used
- Pipe sections can be selected via ball valves
- Overflow valve ensures pressure equalization
- Water connections made using quick-release couplings in the inflow and return
- Flow can be adjusted via valves
- Flow measurement using rotameter
- Differential pressure measurement via differential pressure meter with display

Technical Data:

- Measuring length of pipe sections: 1000mm
- Pipe section 1: plastic roughened, Ø: 20x1.5mm
- Pipe section 2: steel, Ø: 1/2”
- Pipe section 3: copper, Ø: 18x1mm
- Pipe section 4: copper, Ø: 15x1mm
- Diffrential pressure meter

  *max. overpressure: 1000mbar
- Measuring ranges
- Flow rate: 150...1600L/h
- Differential pressure: ±350mbar

Dimensions and Weight:

- LxWxH: 1650x700x1850mm
- Weight: approx. 92kg

Main Test:

- Investigation of pressure loss due to friction

Required Accessories: Water connection 1500L/h, Drain

Training Duration (if required): N/A

JET-FILL TENSIOMETER (EIJKELKAMP)

Country of origin: USA/UK
Country of manufacturing: USA/UK
Country of shipment: Bangladesh

Complete standard set with different types of high quality tensiometers, suitable for multiple measurements. With this set measurements up to a depth of 90 cm can be done.

- Direct read out of plant water stress
- Set perfect for schools and horticulturalists
- Simple installation
- Exchangeable porous ceramic cups
- Simple purely physical operating principle

The measuring values are read form the manometer. The tensiometer set also includes a service kit, a gauge auger with extension rod and cleaning spatula.

Approximate Cost: 4,25,000.00 BDT
Year of Purchase: 2005

Package size: 117 x 32 x 24 cm
Weight: 8 kg

Applications:

- Soil moisture sensing
- Soil water retention
- Irrigation management
- Soil physics

MECHANICAL CURRENT METER (EIJKELKAMP)

Country of origin: USA
Country of manufacturing: USA
Country of shipment: Bangladesh

The small, lightweight mechanical current velocity meter is suitable for measurements in rivers, channels, sewage systems, pipes, and more. The set is complete with line attachment and case.

Approximate Cost: 1,00,000.00 BDT
Year of Purchase: 2005

- Small and lightweight
- Corrosion proof
- Can be applied at great depths
- Balanced for dynamic stability

Specifications:

- Measuring range: 0.1 - 7.9 m/s
- Production material: Stainless steel
- Standard propeller diameter: 70 mm
- Rod length: 2.4 m
- Package size: 30 x 11 x 25 cm
- Weight: 1 kg

Applications:

- Irrigation research
- Water quantity research
- Monitoring water quantity
- Discharge measurements
- Not suitable for professional measurements in slow running waters

Electronic CURRENT METER (EIJKELKAMP)

Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh

Current meter with synthetic propeller of 125 mm diameter. The instrument is used for the accurate determination of the current velocity in water ways, channels, rivers and the sea and is suitable for use in polluted water currents.

- High accuracy universal current meter
- Propeller covers most velocities
- Measuring range of 0.025 to 10 m/sec
- Fiberglass-reinforced synthetic propeller
- Many additional options (extra rods, cable, operation, winches) for additional professional applications

Approximate Cost: 5,00,000.00 BDT

Year of Purchase: 2005

Specifications:

- Measuring range: 0.025 - 10 m/s
- Production material: Stainless steel
- Standard propeller diameter: 125 mm
- Rod length: 2 m
- Package size: 114 x 47 x 56 cm
- Weight: 7.5 kg

Applications:

- Irrigation research
- Water quantity research
- Monitoring water quantity
- Discharge measurements
- Oil in the body needs to be replaced once every few years.

MULTIMEDIA PROJECTOR

Country of origin: Japan/Singapore/USA

Country of shipment: Star tech/Bangladesh

Approximate cost (If procured from different countries): 1,50,000.00 BDT

Required accessories: Projector screen

Preferred brand: Epson/BenQ/Panasonic

Configuration may change due to availability, price and requirement

Specifications:

- Projector Lens : Optical
- Lamp Type :UHE, 250 W, 5,000h durability or better
- Native Resolution : LFull HD 1080p, 1920 x 1080, 16:9
- Brightness : 3000 lm or better
- Contrast Ratio: 70,000 : 1 or better

PAPER SHREDDER

Country of origin: China
Country of manufacturing: China
Country of shipment: Bangladesh
Model: Aurora AS1060SB

The Aurora AS1060SB is a medium-duty shredder that can shred up to 10 sheets of paper at a time into very secure 6mm step-cut pieces, meaning an A4 sheet is shredded into over 2000 particles and it can shred 1 credit, card at a time. It is equipped with Shred Safe, an adjustable safety cover that can be used as an emergency stop.

Approximate cost: 5,900.00 bdt
Year of Purchase: 2013

Specifications

- Shred Type/Size: Strip-cut/6mm
- Sheet Capacity: 10 (75g/A4)
- Shredding Speed: 3m/min
- Duty Cycle: 2 min on/ 15 min off
- Shred mouth Size - 220mm
- Waste Bin - 13.2 litres
- Cutting Features
- Strip-cut / 6mm
- Physical Specifications
  - Dimensions: 307 x 196 x 381mm
  - Weight: 3.22kg

UNIVERSAL DRYING CABINET (30°C TO 220°C)

Country of origin: Germany Natural convection from Memmert
Country of origin: Germany
Country of manufacturing: Germany
Country of shipment: Bangladesh
Model: UM500
The universally applicable lab oven U is Memmert's classic appliance for temperature control in science, research and material tests in industry.

Approximate Cost: 1,00,000.00 BDT
Year of Purchase: 2005

Technical specifications:

- 220 V, 9 A, 2000 W.
- Nominal temperature: 220°C.
- Including 1 shelf.
- Housing DxHxW: 57 x 47 x 71 cm.
- Interior DxHxW: 40 x 47 x 55 cm.

DRAIN PERMEAMETER HM065

Country of origin: Germany
Approximate cost: 3,70,000.00 BDT
Year of purchase: 2005

Drain Permeameter (HM 065)

INFILTRATION UNIT HM066

Country of origin: Germany
Approximate cost: 3,30,000.00 BDT
Year of purchase: 2005

Infiltration Unit (HM 066)

ECHOTRAC SOUNDERS CVM

Country of origin: USA
Country of manufacturing: USA
Country of shipment: Bangladesh

The rugged and weatherproof Echotrac CVM outperforms all other echo sounders in its class by offering the utmost portability without sacrificing Odom performance standards. With dual or single frequency configurations, optional built-in DGPS and bundled notebook PC with your choice of data acquisition software, the CVM has everything you need in an echo sounder even when portability is not an issue.

Approximate cost: 28,00,000.00 BDT

Year of purchase: 2016

Technical Specifications:

Frequency : 200kHz or 400kHz (Dual Fequency)

Along-track transmit beamwidth : 2° at 200 kHz & 1° at 400 kHz

Across-track receive beamwidth : 1° at 200 kHz & 0.5° at 400 kHz

Max ping rate : 50 Hz (±1hz)

Pulse length : 33µsec to 300µsec

Number of beams : 256EA/ED at 200 kHz, 512EA/ED at 400 kHz

Max swath angle : 128° (140°)

Depth resolution : 6mm

Max Range : Up to 750m at 200kHz

OBS - 3A

Country of origin: USA
Country of manufacturing: USA
Country of shipment: Bangladesh

The heart of the OBS-3A monitoring system is an OBS sensor for measuring turbidity and suspended solids concentrations. This sensor detects near infrared (NIR) radiation scattered from suspended particles. A fast-response, stainless steel-clad thermistor monitors temperature. Pressure is measured with a semiconductor piezo resistive strain gage, and conductivity is measured with a four-electrode conduction- type cell. Working depths of the pressure sensor are selected as an option.

Approximate Cost: 9,00,000.00 BDT
Year of Purchase: 2016

Technical Specifications:

Output : RS-232, RS-485
Maximum Submersion Depth : 300 m (984 ft)
Connector : MCBH-8-FS, wet-pluggable
Operating Temperature Range : 0° to 35°C
Storage Temperature Range : -20° to +70°C
Drift over Time : < 2% per year
Drift over Temperature : 0.05% per °C
Maximum Sample Size : 2048
Sampling Rate : 1 to 25 Hz (when connected to a PC)
Maximum Data Rate : 25 Hz (connected to PC)
5 Hz (used autonomously)

Data Capacity : 8 MB
Maximum Number of Data Lines : 200,000
Maximum Concentration Range : Concentration measurement range and accuracy depend on the sediment type.
0.4 to 5,000 mg/L (for mud)
Mud is defined as D50 = 20 µm.
2 to 100,000 mg/L (for sand)
Sand is defined as D50 = 250 µm.

PC Interfaces : RS-232/115 kbps, RS-485/115 kbps
Battery Capacity : 18 Ahr
Maximum Battery Life : 8,000 h
Infrared Wavelength : 850 nm
Pressure Measurement Range : 0 to 10, 20, 50, 100, or 200 m
Turbidity Measurement Range : 0.4 to 4,000 NTU
Conductivity Measurement Range : 0 to 65 mS/cm (40 PSU, o/oo)
Concentration Accuracy : Concentration measurement range and accuracy depend on the sediment type.
2% of reading (for mud)
Mud is defined as D50 = 20 µm.
3.5% of reading (for sand)
Sand is defined as D50 = 250 µm.
Pressure Accuracy,: ±0.5% of f.s. (where f.s. = 50, 100, or 200 dBar)
Turbidity Accuracy : < 2%
Temperature Accuracy : ±0.5°C
Conductivity Accuracy : 1%
Diameter : 7.6 cm (3.0 in.)
Height : 36.2 cm (14.3 in.)
Weight : 1.5 kg (3.4 lb) without batteries
Compatibility: Field Cables

Campbell Scientific offers a choice of field cables used to connect the OBS-3A to a PC for system configuration. The cables differ in their length. The HydroSci support software can be downloaded.

Acoustic Doppler Current Profiler (ADCP)

Country of origin: USA
Country of manufacturing: USA
Country of shipment: Bangladesh

The RIV series ADCP (Acoustic Doppler Current Profiler) are designed and introduced jointly by Institute of Acoustics, Chinese Academy of Sciences and CSSC Haiying Marine Company for providing an accurate acoustic current profiling solution. Composed of the ADCP sonar, communication cables & IOA River current measurement software, the RIV series are ideally used for collecting highly accurate velocities even in harsh environments. Gyro, GPS, radio station and other external devices are optional combined with RIV series to be installed on survey vessels and triple-hulled vessels for moving measurements.

Approximate cost: 33,00,000.00 BDT
Year of purchase: 2018

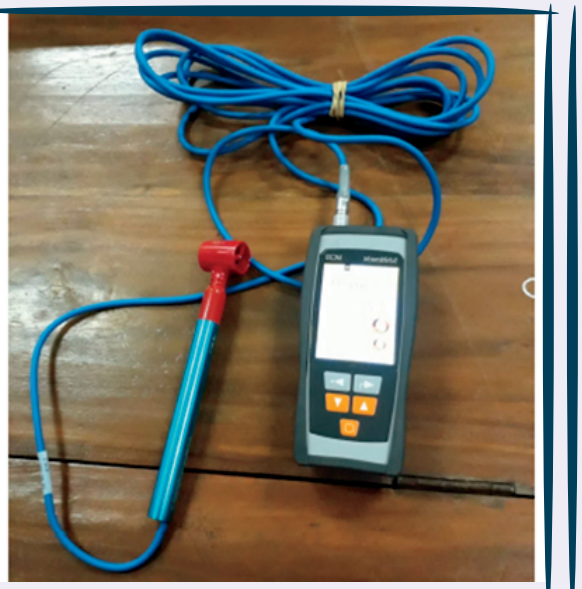
Model	RIV-300	RIV-600	RIV-1200
Current profiling			
Frequency	300kHz	600kHz	1200kHz
Profiling range	1~120m（@8m layer size）	0.4~80m	0.2~35m
Velocity range	±20m/s (default)	±20m/s (default)	±20m/s (default)
Accuracy	±0.3%±5mm/s	±0.25%±2mm/s	± 0.25% ± 2mm/s
Resolution	1mm/s	1mm/s	1mm/s
Layer size	1~8m	0.25~4m	0.1~2m
Number of Layers	1~260	1~260	1~260
Data output rate (typical)	1Hz	1Hz	1Hz
Bottom tracking			
Frequency	300kHz	600kHz	1200kHz
Depth range	2~240m	0.8~120m	0.5~35m
Accuracy	±0.3%±5mm/s	±0.25%±2mm/s	± 0.25% ± 2mm/s
Velocity range	±20 m/s	±20m/s	±20m/s
Data output rate (typical)	1Hz	1Hz	1Hz
Transducer and hardware			
Beam angle	20°	20°	20°
Beam width	4°	2°	2°
Transducer configuration	4 beams, JANUS	4 beams, JANUS	4 beams, JANUS
Storage	2G standard		
Communication	RS422、RS232 or 10M Ethernet		
House material	POM (standard), titanium, aluminum optional (depends on the depth rating required)		
Sensors			
Temperature	Range: -10°~ 85°C; Accuracy: ±0.5°C; Resolution: 0.01°		
Motion	Range: ±50°; Accuracy: ±0.2°; Resolution: 0.01°		
Heading	Range: 0~360°; Accuracy: ±0.5°（Calibrated）; Resolution: 0. 1°		
Power supply			
Power consumption	≤3W		
DC input	10.5V～36V	245mm (H)×225mm (Dia)	245mm (H)×225mm (Dia)
Dimension	245mm (H)×225mm (Dia)	7.5kg in air, 5kg in water（Standard）	7kg in air（Standard）
Weigth	7.5kg in air, 5kg in water（Standard）		
Environment			
Max. depth	100m/500m/2000m/4000m/6000m		
Operation temp.	-5°~ 45°C, relative humidity ≤93%		
Storage temp.	-25° ~ 65°C, relative humidity≤93%		
Software	IOA river current measurement software with acquisition and navigation modules		

Multi-channel Measuring Instrument

Country of origin: USA
Country of manufacturing: USA
Country of shipment: Bangladesh

"JDC ELECTRONICS" (Made in Switzerland) Portable Flow watch for Water Velocity Waste Water Flow measurement device.

Approximate cost: 4,00,000.00 BDT
Year of purchase: 2018

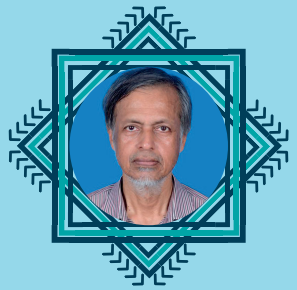


Technical Specifications:

Weight (Display Unit): 8.3 oz (230 g)
Dimensions (Display Unit): 2.5" × 2.5" × 5.1" (6.4 × 6.4 × 13 cm)
Dimensions (Included Case): 25" × 13.5" × 3.5" (63.5 × 34 × 9 cm)
Flow Speed Units: km/h, mph, knots, m/s and cm/s
Flow Speed Accuracy: +/- 5 % from - 10° to + 50°C
Flow Speed Range: 2 to 150km/h
Temp Units: °C, °F and wind chill
Temp Accuracy: +/- 1°
Temp Functions: Current, minimum, average, maximum temperature and wind chill factor

FROM WHOM WE PERCEIVE

Colonel Mir Sarwar Hossain Chowdhury, afwc, psc
Head, Department of Environmental, Water Resources and Coastal Engineering (EWCE)



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Professor

Md Gazi Ferooz Rahman
Professor

Major Mohammad Shafiul Azam, PhD, Engrs
Associate Professor

Major Kazi Shamima Akter, PhD, Engrs
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Major Nafiz Ul Ahsan
Assistant Professor

Major Numan-Al-Kibriya, Engrs
Assistant Professor and Program Coordinator

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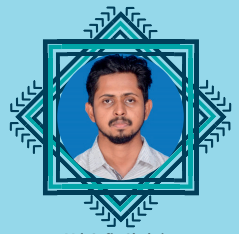
Lecturer



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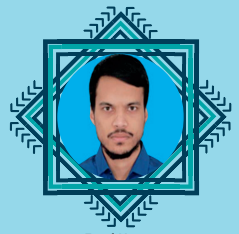
Lecturer

Simlia Satter Songi
Lecturer



Fuad Hasan
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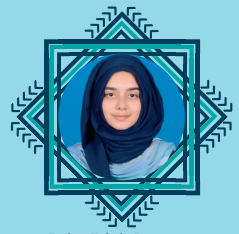

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Mohammad Kashif Shahid
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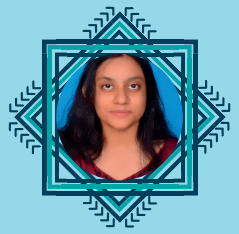

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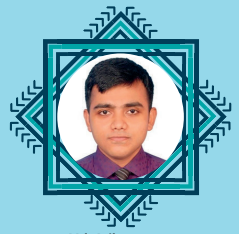

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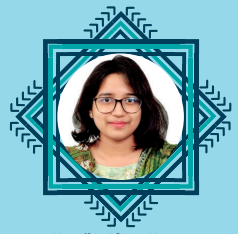

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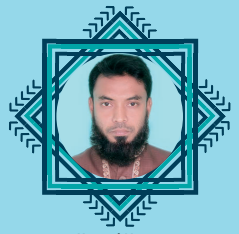
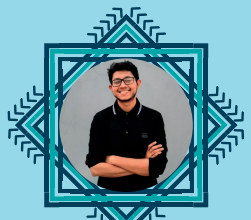
Rehena Akter
Sub Assistant Engineer



Kamrul Hasan
Lab Assistant

STUDENT EDITORS



Junaid Shahriar
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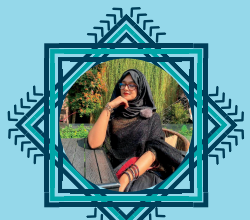
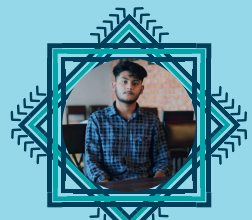


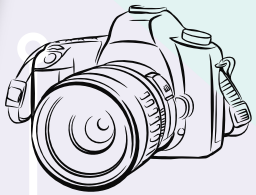
Urwah Binte Abid
EWCE - 06

Ahadul Islam
EWCE - 07



Sadat Sakib
EWCE - 07

Photolab




"Scientists study the world as it is; engineers create the world that has never been."