

**Engineering Laboratory Design, Inc.**

**PO Box 278, 2021 South Highway 61, Lake City, MN 55041 USA**  
**Voice: 612-345-4515, 800-795-8536      FAX: 612-345-5095**

**HYDRAULIC DEMONSTRATION CHANNELS  
STANDARD MODEL SPECIFICATIONS**



# ENGINEERING LABORATORY DESIGN, INC.

Designers and Manufacturers of Quality  
Engineering Laboratory Equipment since 1962.

## SPECIFICATIONS

### HYDRAULIC DEMONSTRATION CHANNEL - MODEL A-8

**General Description:** The system is a self contained, portable apparatus designed for use as a "hands on" student laboratory device and also as a demonstration teaching aid in support of classroom lectures. All flow variables can be controlled by the operator. The unit consists of a transparent flume, a headtank with adjustable, undershot gate, a movable tailgate, a reservoir, a circulating pump, a flow meter and flow control valves. A motorized jacking system adjusts the slope of the channel bed. The complete assembly is mounted on a casted frame for easy portability. All of the wetted parts of the equipment are made of non-corrosive materials. The only utility required for operation is electric service. The overall dimensions of the system are: length, 8'-3" (2.51 M); width, 2'-6" (.76 M); height, 5'-7" (1.70 M). Net weight (dry) is 650 lbs (295 Kg).

**Flume:** The working channel is 6" (15 cm) wide by 12" (30 cm) deep by 8'-0" (2.43 M) long and is fabricated of 1/2" (13 mm) thickness, clear plexiglass. A double bottom, box section floor is used. All construction joints are stainless steel fastened and solvent welded. Integral plexiglass flanges join the two channel modules at the center. An aluminum bar 2" (50 mm) by 3/4" (19 mm), stiffens the top edge of the channel side walls. The bar also serves as an instrument rail.

**Reservoir:** A one piece fiberglass tank contains the system water supply and also serves to support the flume and the pump. The reservoir is fitted with a drain valve.

**Pump and Piping:** A high volume, low head pump is used. The pump is of all bronze construction, fitted with a mechanical seal and close coupled to a 3/4 HP, open drip proof motor, arranged for 115 volt, single phase, 60 Hz electric service (220 VAC/50 hz units can be furnished at additional cost). The pump delivers 95 gallons (360 liters) per minute @ 25 ft. head (.75 bar). Water is conveyed to the flume via PVC piping. Two orifice meters (high and low range flow) are fitted in the supply piping. The deflection of water columns in on-board U-tube manometers can be related to the flow rate in the channel using the furnished calibration curves. Two bronze valves regulate the flow.

**Controls:** A panel, located at the upstream end of the channel, contains the electrical controls for the pump and the slope motor. A spirit level device indicates the slope of the channel bed. The headgate and tailgate are manually operated using handwheels.

**Accessory Models:** In addition to the experiments which may be performed with the basic channel, a series of 18 models and instruments are available for use with the channel. Threaded, brass inserts are installed at 6" (45 mm) intervals along the length of the channel so that the various models can be easily installed for use. Models are supplied with .100 ft. marked scales.

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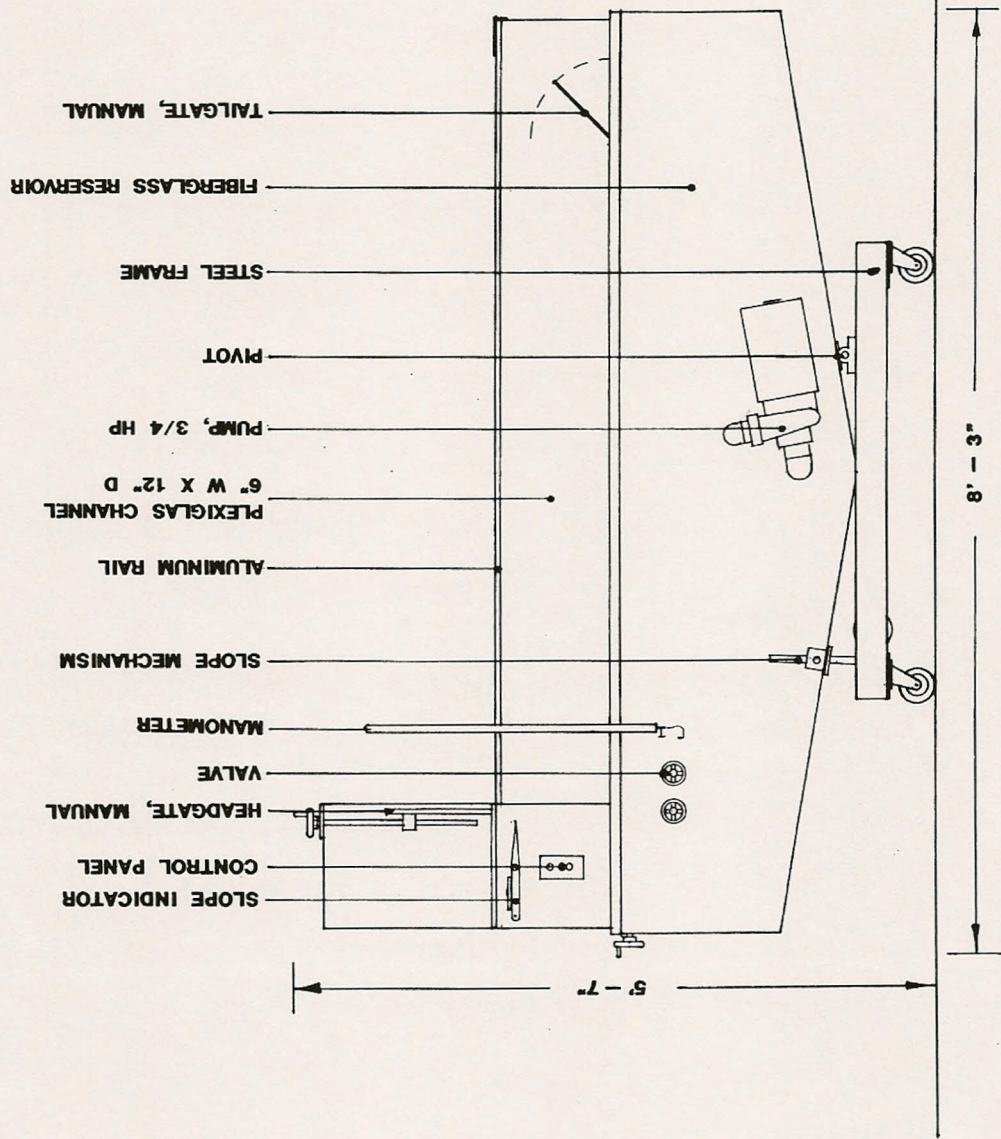


**Available models include:**

- Pipe Flow Set
- SAF Stilling Basin
- Pipe Drop Inlet
- Hydraulic Jump Basin
- Sluice Gate with pressure tubes.
- V-Notch Weir
- Wave Generator
- Broad Crest Weir
- Spillway Section
- Inclined Slope
- Flow Nozzle/Pipe Orifice
- Venturi Meter
- Sudden Contraction/Expansion
- Gauge Carriage
- Pitot Tube
- Differential Manometer
- Reynolds Experiment Apparatus







OVERALL WIDTH: 2' - 4"  
 SLOPE RANGE: -4% TO +12%

HYDRAULIC DEMONSTRATION CHANNEL - MODEL A - 8



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# ENGINEERING LABORATORY DESIGN, INC.

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## SPECIFICATIONS

### HYDRAULIC DEMONSTRATION CHANNEL - MODEL A-12

**General Description:** The system is a self contained, portable apparatus designed for use as a "hands on" student laboratory device and also as a demonstration teaching aid in support of classroom lectures. All flow variables can be controlled by the operator. The unit consists of a transparent flume, a headtank with adjustable, undershot gate, a movable tailgate, a reservoir, a circulating pump, a flow meter and flow control valves. A motorized jacking system adjusts the slope of the channel bed. The complete assembly is mounted on a casted frame for easy portability. All of the wetted parts of the equipment are made of non-corrosive materials. The only utility required for operation is electric service. The overall dimensions of the system are: length, 12'-3" (3.73 M); width, 2'-6" (.76 M); height, 5'-9" (1.75 M). Net weight (dry) is 850 lbs (385 Kg).

**Flume:** The working channel is 6" (15 cm) wide by 12" (30 cm) deep by 12'-0" (3.65 M) long and is fabricated of 1/2" (13 mm) thickness, clear plexiglass. A double bottom, box section floor is used. All construction joints are stainless steel fastened and solvent welded. Integral plexiglass flanges join the two channel modules at the center. An aluminum bar 2" (50 mm) by 3/4" (19 mm), stiffens the top edge of the channel side walls. The bar also serves as an instrument rail.

**Reservoir:** A one piece fiberglass tank contains the system water supply and also serves to support the flume and the pump. The reservoir is fitted with a drain valve.

**Pump and Piping:** A high volume, low head pump is used. The pump is of all bronze construction, fitted with a mechanical seal and close coupled to a 3/4 HP, open drip proof motor, arranged for 115 volt, single phase, 60 Hz electric service (220 VAC/50 hz units can be furnished at additional cost). The pump delivers 95 gallons (360 liters) per minute @ 25 ft. head (.75 bar). Water is conveyed to the flume via PVC piping. Two orifice meters (high and low range flow) are fitted in the supply piping. The deflection of water columns in on-board U-tube manometers can be related to the flow rate in the channel using the furnished calibration curves. Two bronze valves regulate the flow.

**Controls:** A panel, located at the upstream end of the channel, contains the electrical controls for the pump and the slope motor. A spirit level device indicates the slope of the channel bed. The headgate and tailgate are manually operated using handwheels.

**Accessory Models:** In addition to the experiments which may be performed with the basic channel, a series of 18 models and instruments are available for use with the channel. Threaded, brass inserts are installed at 6" (45 mm) intervals along the length of the channel so that the various models can be easily installed for use. Models are supplied with .100 ft. marked scales.

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**Available models include:**

- Pipe Flow Set
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- Pipe Drop Inlet
- Hydraulic Jump Basin
- Sluice Gate with pressure tubes
- V-Notch Weir
- Wave Generator
- Broad Crest Weir
- Spillway Section
- Inclined Slope
- Flow Nozzle/Pipe Orifice
- Venturi Meter
- Sudden Contraction/Expansion
- Gauge Carriage
- Pitot Tube
- Differential Manometer
- Reynolds Experiment Apparatus



Function: The working channel is 8" (19 cm) wide by 12" (30 cm) deep by 12'-0" (3.66 m) long and is fabricated of 1/2" (13 mm) thickness clear plexiglass. A double bottom box section floor is used. All construction joints are stainless steel fastened and solvent welded. Integral plexiglass flanges join the two channel modules at the center. An aluminum bar 2" (50 mm) by 3/4" (19 mm), extends the top edge of the channel side walls. The bar also serves as an instrument rail.

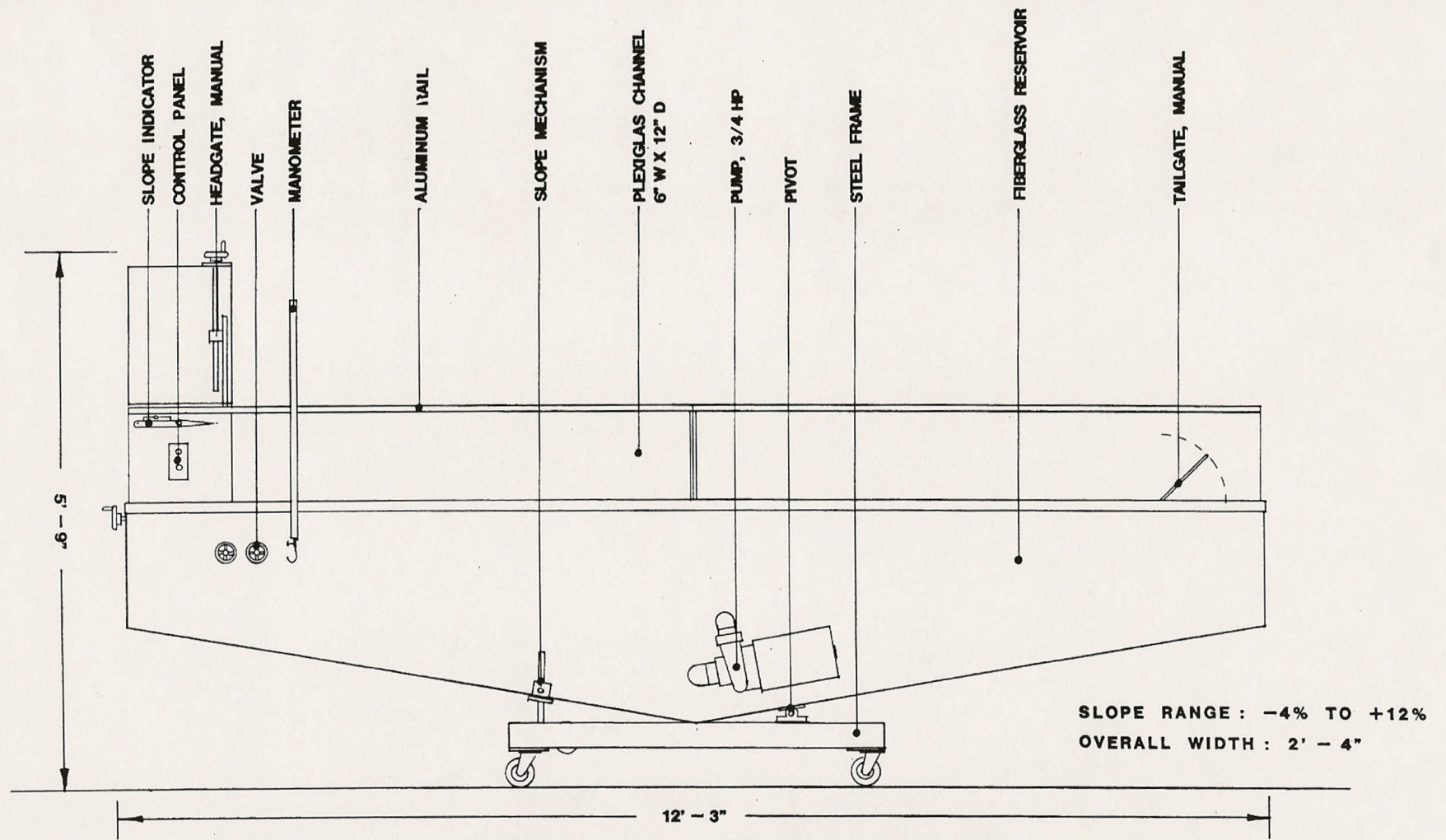
Reservoir: A one piece fiberglass tank contains the system water supply and also serves to support the flume and the pump. The reservoir is fitted with a drain valve.

Pump and Piping: A high volume, low head pump is used. The pump is of all bronze construction, fitted with a mechanical seal and close coupled to a 3/4 HP, open drip proof motor, arranged for 115 volt, single phase, 60 Hz electric service (230 VAC/50 Hz units can be furnished at additional cost). The pump delivers 80 gallons (300 liters) per minute @ 25 ft. head (1.5 bar). Water is conveyed to the flume via PVC piping. Two orifice meters (high and low range flow) are fitted in the supply piping. The deflection of water columns in on-board U-tube manometers can be related to the flow rate in the channel using the furnished calibration curves. Two bronze valves regulate the flow.

Controls: A panel, located at the upstream end of the channel, contains the electrical controls for the pump and the slope motor. A spirit level device indicates the slope of the channel bed. The headgate and tailgate are manually operated using handwheels.

Accessory Models: In addition to the experiments which may be performed with the basic channel, a series of 18 models and instruments are available for use with the channel. Threaded brass inserts are installed at 8" (45 mm) intervals along the length of the channel so that the various models can be easily installed for use. Models are supplied with 1/100 ft. marked scales.





HYDRAULIC DEMONSTRATION CHANNEL - MODEL A - 12



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## SPECIFICATIONS

### HYDRAULIC DEMONSTRATION CHANNEL - MODEL B-12

**General Description:** The system is a self contained, portable apparatus designed for use as a "hands on" student laboratory device and also as a demonstration teaching aid in support of classroom lectures. All flow variables can be controlled by the operator. The unit consists of a transparent flume, a headtank with adjustable, undershot gate, a movable tailgate, a reservoir, two circulating pumps, a flow meter and flow control valves. A motorized jacking system adjusts the slope of the channel bed. The complete assembly is mounted on a casted frame for easy portability. All of the wetted parts of the equipment are made of non-corrosive materials. The only utility required for operation is electric service. The overall dimensions of the system are: length, 12'-3" (3.73 M); width, 3'-2" (.96 M); height, 7'-6" (2.28 M). Net weight (dry) is 1100 lbs (498 Kg).

**Flume:** The working channel is 12" (30 cm) wide by 18" (90 cm) deep by 12'-0" (3.65 M) long and is fabricated of 1/2" (13 mm) thickness, clear plexiglass. A double bottom, box section floor is used. All construction joints are stainless steel fastened and solvent welded. Integral plexiglass flanges join the two channel modules at the center. An aluminum bar 2" (50 mm) by 3/4" (19 mm), stiffens the top edge of the channel side walls. The bar also serves as an instrument rail.

**Reservoir:** A one piece fiberglass tank contains the system water supply and also serves to support the flume and the pumps. The reservoir is fitted with a drain valve.

**Pump and Piping:** Two high volume, low head pumps are used. The pumps are of all bronze construction, fitted with a mechanical seals and close coupled to 3/4 HP, open drip proof motors, arranged for 115 volt, single phase, 60 Hz electric service (220 VAC/50 hz units can be furnished at additional cost). The pumps each deliver 95 gallons (360 liters) per minute @ 25 ft. head (.75 bar) for a maximum total flow of 0.42 cfs. Water is conveyed to the flume via PVC piping. Two orifice meters (high and low range flow) are fitted in one pump supply pipe line and a single high range meter is furnished in the second supply line. The deflection of water columns in on-board U-tube manometers can be related to the flow rate in the channel using the furnished calibration curves. Three bronze valves regulate the flow.

**Controls:** A panel, located at the upstream end of the channel, contains the electrical controls for the pumps, headgate, tailgate and the slope motors. Limit switches protect the motor driven assemblies from over-travel. A spirit level device indicates the slope of the channel bed.

**Accessory Models:** In addition to the experiments which may be performed with the basic channel, a series of 18 models and instruments are available for use with the channel. Threaded, brass inserts are installed at 6" (45 mm) intervals along the length of the channel so that the various models can be easily installed for use. Models are supplied with .100 ft. marked scales.

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**Available models include:**

- Pipe Flow Set
- SAF Stilling Basin
- Pipe Drop Inlet
- Hydraulic Jump Basin
- Sluice Gate with pressure tubes
- V-Notch Weir
- Wave Generator
- Broad Crest Weir
- Spillway Section
- Inclined Slope
- Flow Nozzle/Pipe Orifice
- Venturi Meter
- Sudden Contraction/Expansion
- Gauge Carriage
- Pitot Tube
- Differential Manometer
- Reynolds Experiment Apparatus



General Description: The system is a self-contained, portable apparatus designed for use in a student laboratory device and also as a demonstration unit. The unit consists of a pump, a flow meter and flow control valves. A motorized jacking system is used to raise the channel bed. The complete assembly is mounted on a cast-iron base. The overall dimensions of the system are: length, 12'-3" (3.73 M); width, 3'-2" (0.98 M); height, 7'-6" (2.28 M). Net weight (dry) is 1100 lbs (498 Kg).

Flow: The working channel is 12" (30 cm) wide by 18" (45 cm) deep by 12'-0" (3.66 M) long and is fabricated of 1/2" (13 mm) thickness, clear plexiglass. A double bottom, box section floor is used. All construction joints are stainless steel fastened and solvent welded. Integral plexiglass flanges join the two channel modules at the center. An aluminum bar 2" (50 mm) by 3/4" (19 mm), affixed to the top edge of the channel side walls. The bar also serves as an instrument rail.

Reservoir: A one piece fiberglass tank contains the system water supply and also serves to support the frame and the pump. The reservoir is fitted with a drain valve.

Pump and Piping: Two high volume, low head pumps are used. The pumps are of all bronze construction, fitted with a mechanical seal and close coupled to 3/4 HP, open drip proof motors, arranged for 115 volt, single phase, 60 Hz electric service (220 VAC/50 Hz units can be furnished at additional cost). The pumps each deliver 85 gallons (320 liters) per minute @ 25 ft. head (7.5 bar) for a maximum total flow of 0.42 cfs. Water is conveyed to the frame via PVC piping. Two orifice meters (high and low range flow) are fitted in one pump supply pipe line and a single high range meter is furnished in the second supply line. The deflection of water columns in on-board U-tube manometers can be related to the flow rate in the channel using the furnished calibration curves. Three bronze valves regulate the flow.

Control: A panel, located at the upstream end of the channel, contains the electrical controls for the pumps, headgate, sluicgate and the slope motor. Limit switches protect the motor driven assemblies from over-travel. A split level device indicates the slope of the channel bed.

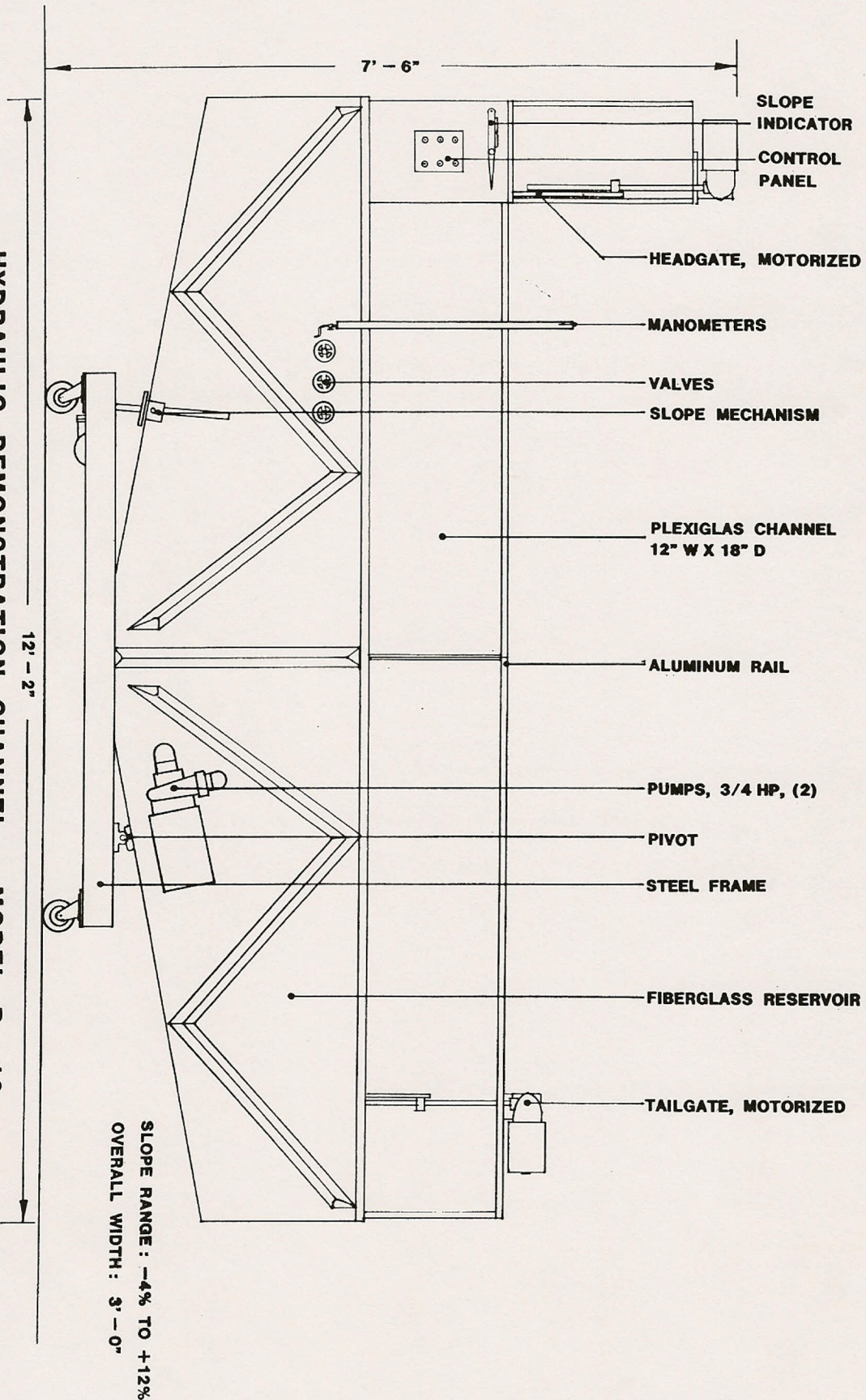
Accessory Model: In addition to the experiments which may be performed with the basic channel, a series of 15 models and instruments are available for use with the channel. Threaded, brass inserts are installed at 6" (150 mm) intervals along the length of the channel so that the various models can be easily installed for use. Models are supplied with 100 ft. marked scales.





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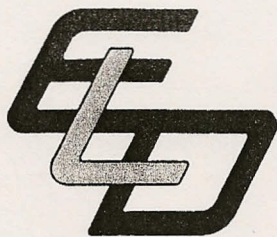
HYDRAULIC DEMONSTRATION CHANNEL - MODEL B - 12



SLOPE RANGE: -4% TO +12%

OVERALL WIDTH: 3' - 0"





## ENGINEERING LABORATORY DESIGN, INC.

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### SPECIFICATIONS

#### HYDRAULIC DEMONSTRATION CHANNEL - MODEL B-16

**General Description:** The system is a self contained, portable apparatus designed for use as a "hands on" student laboratory device and also as a demonstration teaching aid in support of classroom lectures. All flow variables can be controlled by the operator. The unit consists of a transparent flume, a headtank with adjustable, undershot gate, a movable tailgate, a reservoir, two circulating pumps, a flow meter and flow control valves. A motorized jacking system adjusts the slope of the channel bed. The complete assembly is mounted on a casted frame for easy portability. All of the wetted parts of the equipment are made of non-corrosive materials. The only utility required for operation is electric service. The overall dimensions of the system are: length, 16'-3" (4.95 M); width, 3'-2" (.96 M); height, 7'-6" (2.28 M). Net weight (dry) is 1350 lbs (612 Kg).

**Flume:** The working channel is 12" (30 cm) wide by 18" (90 cm) deep by 16'-0" (4.87 M) long and is fabricated of 1/2" (13 mm) thickness, clear plexiglass. A double bottom, box section floor is used. All construction joints are stainless steel fastened and solvent welded. Integral plexiglass flanges join the two channel modules at the center. An aluminum bar 2" (50 mm) by 3/4" (19 mm), stiffens the top edge of the channel side walls. The bar also serves as an instrument rail.

**Reservoir:** A one piece fiberglass tank contains the system water supply and also serves to support the flume and the pumps. The reservoir is fitted with a drain valve.

**Pump and Piping:** Two high volume, low head pumps are used. The pumps are of all bronze construction, fitted with mechanical seals and close coupled to 3/4 HP, open drip proof motors, arranged for 115 volt, single phase, 60 Hz electric service (220 VAC/50 hz units can be furnished at additional cost). The pumps each deliver 95 gallons (360 liters) per minute @ 25 ft. head (.75 bar) for a maximum total flow of 0.42 cfs. Water is conveyed to the flume via PVC piping. Two orifice meters (high and low range flow) are fitted in one pump supply pipe line and a single high range meter is furnished in the second supply line. The deflection of water columns in on-board U-tube manometers can be related to the flow rate in the channel using the furnished calibration curves. Three bronze valves regulate the flow.

**Controls:** A panel, located at the upstream end of the channel, contains the electrical controls for the pumps, headgate, tailgate and the slope motors. Limit switches protect the motor driven assemblies from over travel. A spirit level device indicates the slope of the channel bed.

**Accessory Models:** In addition to the experiments which may be performed with the basic channel, a series of 18 models and instruments are available for use with the channel. Threaded, brass inserts are installed at 6" (45 mm) intervals along the length of the channel so that the various models can be easily installed for use. Models are supplied with .100 ft. marked scales.

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**Available models include:**

- Pipe Flow Set
- SAF Stilling Basin
- Pipe Drop Inlet
- Hydraulic Jump Basin
- Sluice Gate with pressure tubes.
- V-Notch Weir
- Wave Generator
- Broad Crest Weir
- Spillway Section
- Inclined Slope
- Flow Nozzle/Pipe Orifice
- Venturi Meter
- Sudden Contraction/Expansion
- Gauge Carriage
- Pitot Tube
- Differential Manometer
- Reynolds Experiment Apparatus



General Description: The system is a self-contained, portable apparatus designed for use in a student laboratory device and also as a demonstration unit. The unit consists of a main channel bed, a flow meter and flow control valves. A motorized jacking system is mounted on a castor wheel. The complete assembly is made of non-corrosive materials. The only utility required for operation is electric service. The overall dimensions of the system are length, 18'-3" (4.95 M); width, 3'-2" (0.98 M); height, 7'-6" (2.28 M). Net weight (dry) is 1350 lbs (612 kg).

Flume: The working channel is 12" (30 cm) wide by 18" (90 cm) deep by 18'-0" (4.87 M) long and is fabricated of 1/2" (13 mm) thickness clear plexiglass. A double bottom, box section floor is used. All construction joints are stainless steel fastened and solvent welded. Integral plexiglass hangers join the two channel modules at the center. An aluminum bar 2" (50 mm) by 3/4" (19 mm) stiffens the top edge of the channel side walls. The bar also serves as an instrument rail.

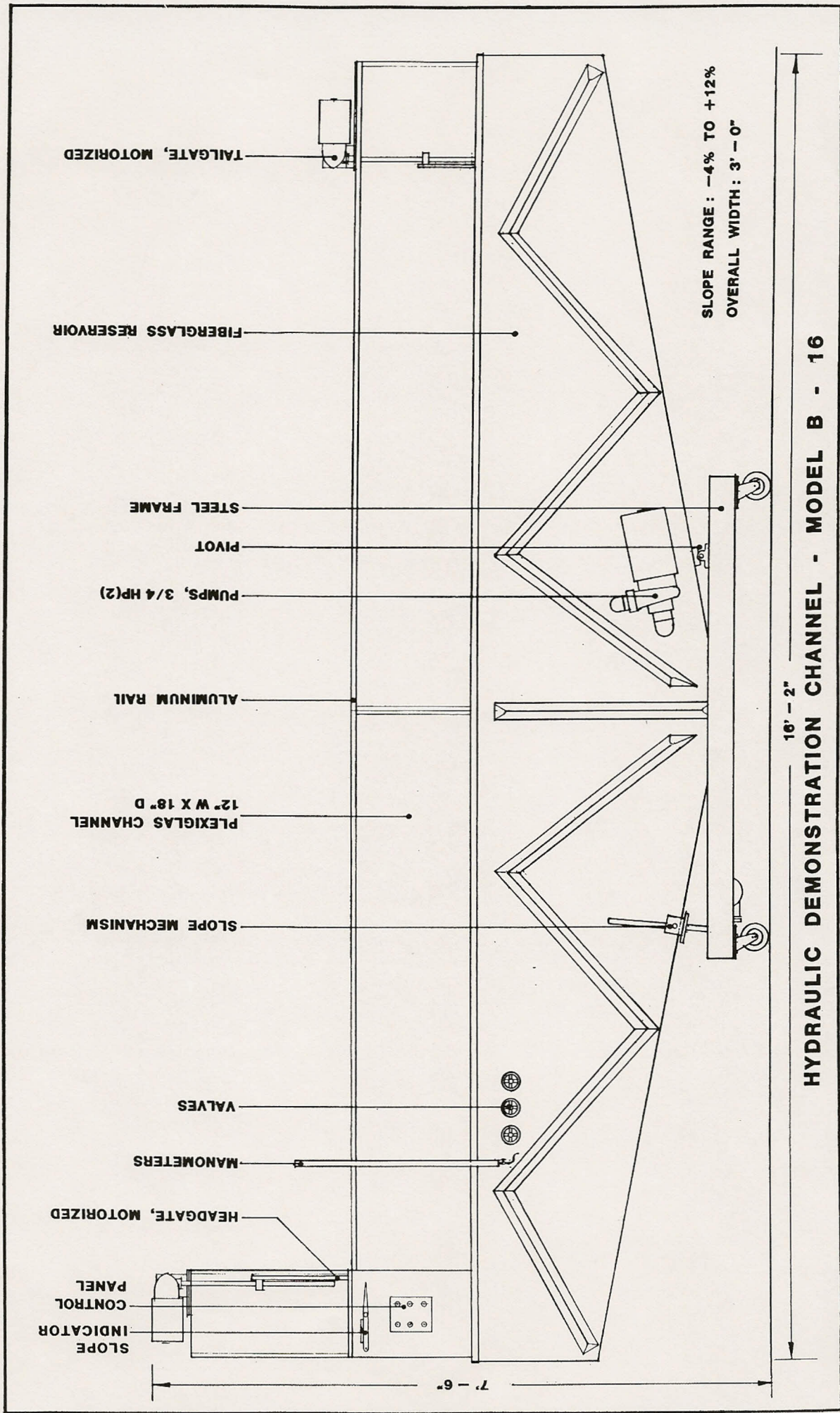
Reservoir: A one piece fibreglass tank contains the system water supply and also serves to support the flume and the pump. The reservoir is fitted with a drain valve.

Pump and Piping: Two high volume, low head pumps are used. The pumps are of all purpose construction, fitted with mechanical seals and close coupled to 3/4 HP, open drip proof motors, arranged for 115 volt, single phase, 60 Hz electric service. (120 VAC/50 Hz unit can be furnished at additional cost). The pumps each deliver 95 gallons (350 liters) per minute @ 25 ft. head (7.5 bar) for a maximum total flow of 0.42 cfs. Water is conveyed to the flume via PVC piping. Two orifice meters (high and low range flow) are fitted in one pump supply pipe line and a single high range meter is furnished in the second supply line. The deflection of water columns in on-board U-tube manometers can be related to the flow rate in the channel using the furnished calibration curves. Three pressure valves regulate the flow.

Controls: A panel, located at the upstream end of the channel, contains the electrical controls for the pumps, headgates, tailgate and the slope motor. Limit switches protect the motor driven assemblies from over travel. A spirit level device indicates the slope of the channel bed.

Accessory Models: In addition to the experiments which may be performed with the basic channel, a series of 15 models and instruments are available for use with the channel. Threaded, brass inserts are installed at 6" (152 mm) intervals along the length of the channel so that the various models can be easily installed for use. Models are supplied with .100 in. marked scales.





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## SPECIFICATIONS

### SEDIMENT TRANSPORTATION/DEMONSTRATION CHANNEL

**General Description:** The system is a self contained, recirculating channel designed for use as a student laboratory flume and for smaller scale sediment transportation studies. All flow variables can be controlled by the operator. The unit consists of a transparent walled flume, a headtank with adjustable, undershot gate, a movable tailgate, a reservoir, circulating pumps, a flow meter and flow control valves. A motorized jacking system adjusts the slope of the channel bed. The flume assembly is carried by a steel supporting beam. All of the wetted parts of the equipment are made of non-corrosive materials. The only utility required for operation is electric service. The overall dimensions of the system are:

Version I: length, 18'-9" (5.71 M); width, 8'-10" (2.69 M); height, 6'-8" (2.03 M).

Version II: length, 23'-6" (7.16 M); width, 10'-5" (3.17 M); height, 7'-2" (2.18 M).

**Flume:** The working channel is: Version I; 12" (30 cm) wide by 18" (45 cm) deep by 15'-0" (4.57 M) long or, Version II; 18" (45 cm) wide by 18" (45 cm) deep by 19'-0" (5.79 M) long and is fabricated of 1/2" (13 mm) thickness, clear plexiglass. A double bottom, box section, floor is used. All construction joints are stainless steel fastened and solvent welded. Integral plexiglass flanges join the two channel modules. An aluminum bar, 2" (50 mm) by 3/4" (19 mm), stiffens the top edge of the channel side walls. The bar also serves as an instrument rail.

**Reservoir:** Fabricated of a composite lamination of fiberglass with a rigid PVC foam core. The reservoir is arranged with a sloping floor, to prevent sediment "lodging", and pump suction elbows at each side. A drain valve is provided.

**Pumps and Piping:** High volume, low head pumps are used. The pumps are of all bronze construction, fitted with mechanical seals and close coupled to 1 1/2 HP (version I), open drip proof motors, arranged for 208/230 volt, three phase, 60 Hz electric service (220 VAC/50 hz units can be furnished at additional

cost). The pumps each deliver 170 gallons (640 liters) per minute @ 25 foot head (.75 bar). Version II is fitted with two, 3 HP pumps, each delivering 300 gallons (1135 liters) per minute. Bronze fitted, cast iron case pumps can be furnished in lieu of the standard all bronze construction pumps.

Water is conveyed to the flume via PVC piping. Two venturi meters (high and low range flow) are fitted in the supply piping. The deflection of water columns in on-board U-tube manometers can be related to the flow rate in the channel using the furnished calibration curves. Two bronze valves regulate the flow.

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**Controls:** A panel, located at the upstream end of the channel, contains the electrical controls for the pumps and the slope, head gate and tailgate motors. A spirit level device indicates the slope of the channel bed. All drives are protected from over travel by limit switches.

**Accessory Models:** Models from the standard "B" series can be used with Version I of the sediment channel. Threaded brass inserts are installed at 6" (45 mm) intervals along the length of the channel so that the various models can be easily installed for use. Models are supplied with .100 ft. or SI marked scales.

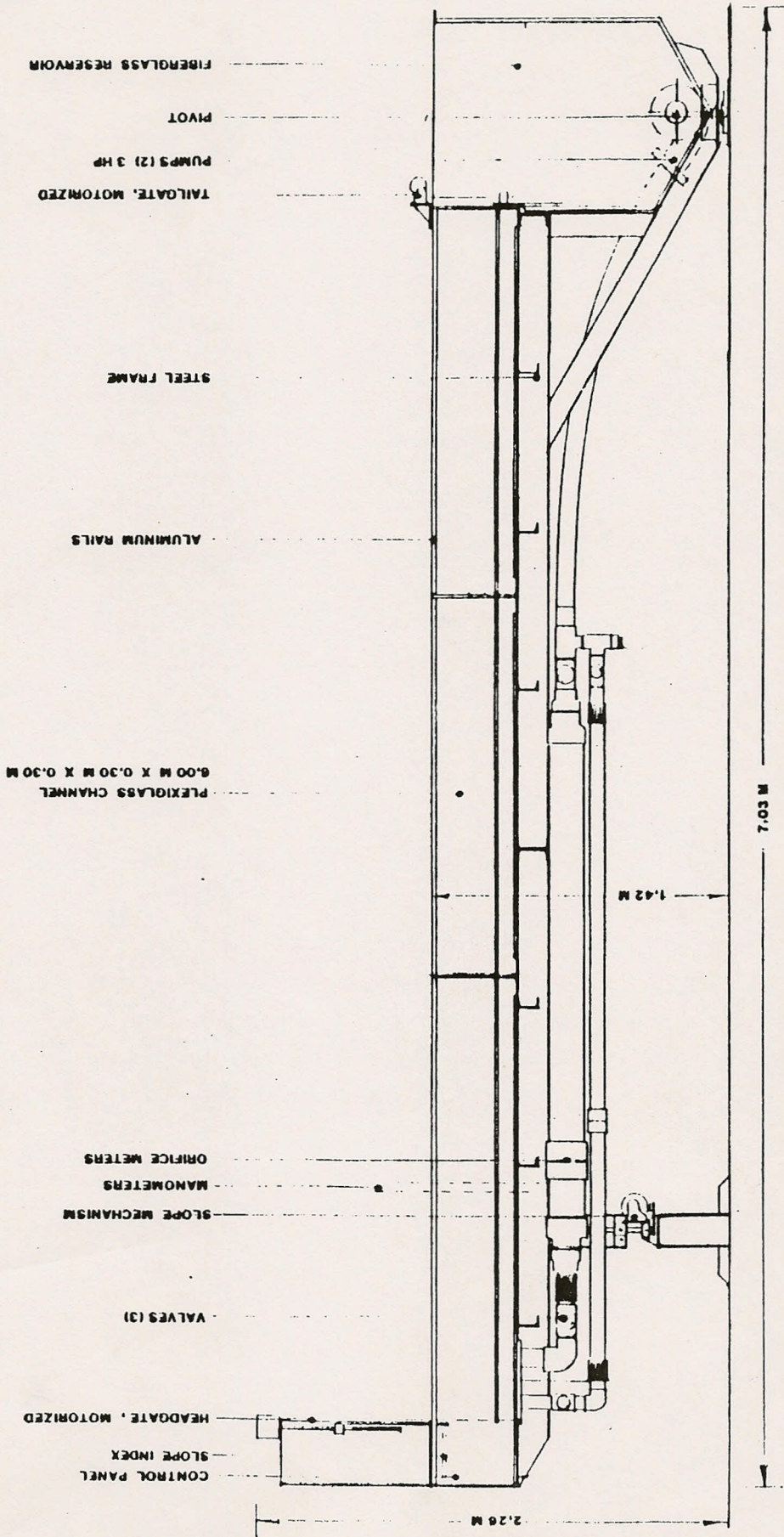
**Available models include:**

- Pipe Flow Set
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- ✓ V-Notch Weir
- Wave Generator
- Broad Crest Weir
- Spillway Section
- Inclined Slope
- Flow Nozzle/Pipe Orifice
- Venturi Meter
- Sudden Contraction/Expansion
- Gauge Carriage
- Pitot Tube
- Differential Manometer
- Reynolds Experiment Apparatus

**Shipment/Installation:** The equipment will be shipped disassembled, via motor freight, to the installation site. Some portions of the apparatus will require the use of a fork lit truck for off loading and assembly. Assembly instructions will be furnished. Two or three technician/mechanics should be able to perform the installation in 3 to 4 working days. Alternatively, ELD can furnish one representative to supervise and participate in the unloading, site selection, assembly and start up of the system.

It will be the responsibility of the buyer to provide and install the permanent electrical wiring from the building service to the pump magnetic motor starters.





**HYDRAULIC DEMONSTRATION / SEDIMENT TRANSPORTATION CHANNEL**



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# ENGINEERING LABORATORY DESIGN, INC.

Designers and Manufacturers of Quality  
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## SPECIFICATIONS

### 24 FOOT (7.3 METER) WAVE CHANNEL

**General Description:** The system is a self contained apparatus designed for use as a "hands on" student laboratory device and also as a demonstration teaching aid. The unit consists of a transparent channel, a support frame and a wave generator and beaches. All of the wetted parts of the equipment are made of non-corrosive materials. The only utility required for operation is electric service. The overall dimensions of the system are: length, 24'-0" (7.31 M); width, 12" (.30 M); height, 5'-0" (1.52 M). Net weight (dry) is 450 lbs (204 Kg).

**Channel:** The working channel is 6" (15 cm) wide by 16" (40.6 cm) deep by 24'-0" (7.31 M) long and is fabricated of 1/2" (13 mm) thickness, clear plexiglass. A double bottom, box section floor is used. All construction joints are stainless steel fastened and solvent welded. Integral plexiglass flanges join the three channel modules. An aluminum bar 2" (50 mm) by 3/4" (19 mm), stiffens the top edge of the channel side walls. The bar also serves as an instrument rail. Brass inserts, installed at regular intervals along the floor of the channel, permit installation of models and fixtures.

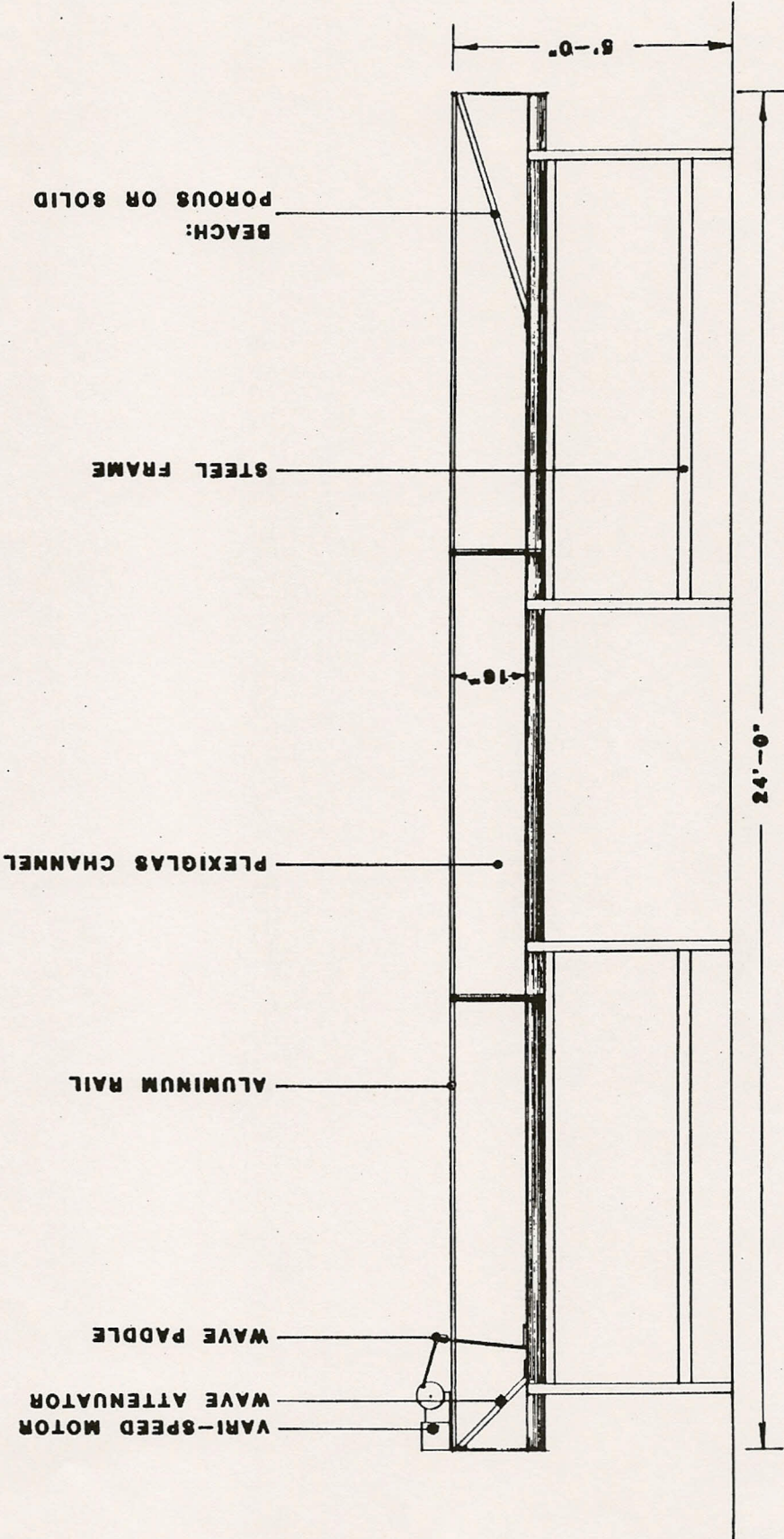
**Supporting Frames:** The channel sections are supported by a frame set, fabricated of structural steel tubing whose elements are joined by welding. The frames are etched, prime coated and spray finished with acrylic enamel. Each leg is fitted with an adjustable leveling pad.

**Wave Generator Set:** A hinged plate type wave generator, driven by a variable speed gearmotor, is furnished. A heavy flywheel, arranged with connecting rod attachment points at seven radial locations, permits generation of waves with a broad range of frequency and amplitude. Two "beaches" are furnished; a solid surface and a porous, energy absorbing surface. A wave attenuator is fitted at the head of the channel to absorb waves generated behind the generator plate.

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# 24 FOOT WAVE CHANNEL



ENGINEERING LABORATORY DESIGN, INC. • BOX 278 • LAKE CITY, MN 55041





# ENGINEERING LABORATORY DESIGN, INC.

Designers and Manufacturers of Quality

Engineering Laboratory Equipment since 1962.

## HYDRAULIC DEMONSTRATION CHANNEL

### STANDARD MODEL SET DESCRIPTION

<u>MODEL</u>	<u>DESCRIPTION</u>
<b>Inclined Slope</b>	The inclined slope illustrates various types of flows encountered in open channels. The inclined slope is used to provide a point of control in the establishment of critical depth. The Froude number and its uses can be demonstrated with this model.
<b>Pipe Drop Inlet</b>	The inlet is an illustration of a typical outflow structure used in a reservoir. The model demonstrates the flow limiting properties of such structures.
<b>Pipe Entrances</b>	This model allows conduit inlets of various geometries and capacities to be compared. The unstable flow conditions which may exist with certain types of entrances are demonstrated.
<b>Sudden Contraction and Expansion</b>	The effect on the energy content of a flow through a conduit with a sudden expansion or contraction is illustrated with this model. Along with the rapid changes in the momentum measured, the associated increase in turbulence can be observed with and resultant energy loss in the separation zone.
<b>Hydraulic Jump Basin</b>	A stilling basin lacking energy dissipating devices is demonstrated with this model. The energy reduction obtained with the basin is solely through the means of a hydraulic jump, whose location is unstable and completely dependent on the height of the tail water.
<b>SAF Stilling Basin</b>	This model demonstrates the improved flow conditions and cost savings that can be obtained by using properly design energy dissipation outlet structures in the conveying of high energy flows from reservoirs to downstream channels, either natural or artificial.
<b>Sluice Gate</b>	A sluice gate is a type of underflow gate to regulate discharge. The model demonstrates the methods used in determination of the static and dynamic forces acting on submerged surfaces. An array of pressure tubes mounted to the downstream side of the gate allows a visual interpretation of the imposing forces.
<b>Broad-Crested Weir</b>	This model allows calibration of a broad-crested weir with a rounded upstream corner. The principles of flow measurement based upon the fixed relationship between critical flow depth and discharge.

Post Office Box 278 • 2021 South Highway 61 • Lake City, Minnesota 55041 USA

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<u>MODEL</u>	<u>DESCRIPTION</u>
<b>Straight Weir</b>	The head-discharge relationship for a sharp crested suppressed weir is determined with this model. Other factors which can be measured include the coefficient of discharge and head factor exponent.
<b>V-Notch Weir</b>	The relationship between the head on the weir and the flow over the weir is experimentally determined using this model.
<b>Wave Generator</b>	The basics of wave physics along with the energy dissipation properties of a solid and porous surface can be demonstrated with this model. Both the frequency and amplitude of the waves can be controlled.
<b>Orifice and Flow Nozzle</b>	The principles of using both a sharp edged orifice and a radiused flow nozzle as a metering element can be demonstrated. The difference in pressure drop characteristics between the two devices at various flow rates can be demonstrated. These results can be compared to those obtained with the <b>Venturi Meter</b> to illustrate the advantages and disadvantages of each type of element.
<b>Venturi Meter</b>	This model is a direct application of the Bernoulli Equation and demonstrates the use of this type of meter for monitoring flow rates. The relationship between the discharge and the pressure differential developed between the upstream section and the throat of the meter can be measured.
<b>Reynolds Experimental Apparatus</b>	A dye filament can be injected into the center of a long tube allowing the observations performed by Osborne Reynolds to be duplicated. These experiments demonstrate the differences between laminar and turbulent pipe flow, the conditions under which these conditions exist as well as the conditions necessary to transition from one flow state to the other.
<b>Pitot-static Tube</b>	Used in conjunction with a differential manometer or pressure transducer and a gauge carriage the tube allows the total, static, or dynamic pressure at any point within the working section of the channel to be measured.
<b>Digital Point Gauge</b>	The height of the flow within the channel can be measured with this point gauge. Output can be easily switched between SI and English units.
<b>Gauge Carriage</b>	A carriage that moves along the top rail of the channel. Either the Pitot-static tube, differential manometer, and digital point gauge can be mounted to the carriage.

In addition to the models described, special models can be provide to meet customer specifications. Please consult with an ELD representative for further information.