



LAKSHMI ENGINEERING WORKS

Mfg & Supp of: Soil, Cement and Concrete Testing Equipment, Survey, Drawing, Hydrological, Metrological, Geological, Scientific Instruments **(All type of Water Current Meters)**

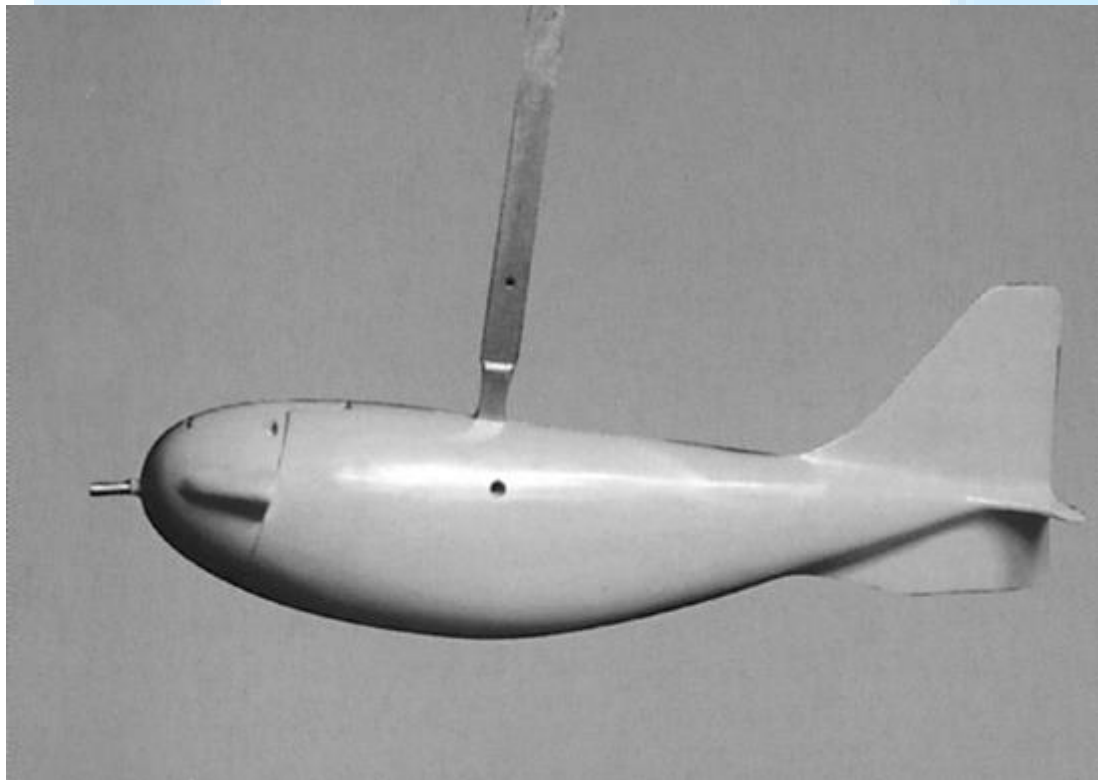
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US DH-74

This is a 64-pound (28 kg) sampler for suspension by cable, reel, and crane to take suspended-sediment samples in streams up to 18 feet (5.5 meters) in depth. The sampler has a cast bronze streamlined body 24 inches (61 cm) long, in which a pint or quart (0.47 or 0.95-liter) sample container is enclosed. These samplers also can be cast in aluminum instead of bronze. In this case, the sampler weighs 30 pounds (13.6 kg), and is designated as the US D-74AL. The sampling operation is identical to that of the DH-48.

The instrument is suspended on a hanger bar attached to a stainless steel cable and is lowered and raised by means of a sounding reel mounted on a crane, cable car or boat. Each nozzle is calibrated and supplied in 1/4 inch (0.64 cm), 3/16 inch (0.48 cm) and 1/8 inch (0.32 cm) green color coded nylon sizes. Shipment is made in a hinged, wooden box suitable for storing and transporting. The samplers can be supplied with a special epoxy coating. The US D-74 replaces the old model US D-49. The primary difference was the enlarging of the cavity for the sample container allowing the sampler to use the quart container or pint with adapter sleeve.



US DH-48

The US DH-488 is a lightweight hand-held depth-integrating sampler used for the collection of suspended-sediment samples in wadeable streams. The US DH-48 was one of the first samplers designed by FISP. Like all FISP suspended-sediment samplers, it is designed to sample isokinetically, meaning that water and sediment enters the nozzle at the same velocity as the stream being sampled in order to collect a representative sample.

The sampler is made of aluminum, weighs 3.5 lbs. and is approximately 10 in long. A pint milk bottle is used as the sample container. The pint milk bottle container is held in place and sealed against a rubber gasket by a hand operated, spring tensioned clamp at the rear of the sampler. A brass 1/4-in internal diameter intake nozzle extends horizontally from the nose of the sampler body. A streamlined projection on the side of the sampler that points toward the rear of the sampler accommodates the air exhaust port that allows air to escape from the sample bottle as it fills with sample.

A standard 1/2-in diameter wading rod is threaded into the top of the sampler body for suspending the sampler. To sample to depths greater than can be waded, wading rod extensions in 1- and 3-ft lengths can be added to the sampler. With the extensions, the sampler can be deployed from a low bridge or boat. The unsampled zone using the US DH-48 is 3.5 in. The sampler can be used in velocities that range from 1.5 to 8.9 ft/sec.



US DH-81

The US DH-81 is depth-integrating suspended-sediment and water-quality sampler fabricated using parts from other FISP approved suspended-sediment samplers. It meets the protocols for water-quality sampling as outlined in the USGS's National Field Manual for the Collection of Water-Quality Data⁷. The US DH-81A is a plastic adapter with a threaded insert that accepts a 1/2-in diameter wading rod and is used with a variety of caps, nozzles, and containers to assemble a hand-held sediment sampler designated as the US DH-81. The US DH-81A will accept a plastic US D-77 cap or a US D-95 tetrafluoroethylene (TFE) cap. The US D-77 cap is threaded to accept a container with Mason jar threads. The US D-95 cap is threaded to accept a 1-liter fluorinated ethylene propylene (FEP) bottle. US D-77 plastic and TFE nozzles with internal diameters of 3/16, 1/4, and 5/16 in can be used with the US D-77 and US D-95 caps. The metal wading rod used with the US DH-81A is covered with plastic heat-shrink tubing to help prevent contamination of samples for trace metal analysis in water-quality sampling.

The US DH-81 sampler will collect samples at an acceptable inflow efficiency in stream velocities ranging from 2.0 to 6.2 ft/sec with a 3/16-in nozzle, 1.5 to 7.6 ft/sec with a 1/4-in nozzle, and 2.0 to 7.0 ft/sec with a 5/16-in nozzle. Based on the recommended maximum volume of 800 ml the US DH-81 sampler will collect samples to a maximum recommended depth of 12 ft. The sampler can be used to a depth of 15 ft by collecting up to 1 liter of sample. To sample depths greater than can be waded, wading rod extensions in 1- and 3-ft lengths can be added to the sampler. With the extensions, the sampler can be deployed from a low bridge or boat. The unsampled zone using the US DH-81 is 4 in.



US DH-5912

The US DH-5912 is a medium-weight hand-line suspended-sediment sampler. The sampler can be lowered and raised, hand over hand, with a flexible suspension line. It can be used in stream depths up to 15 ft and in stream velocities ranging from 1.5 to 5.0 ft/sec.

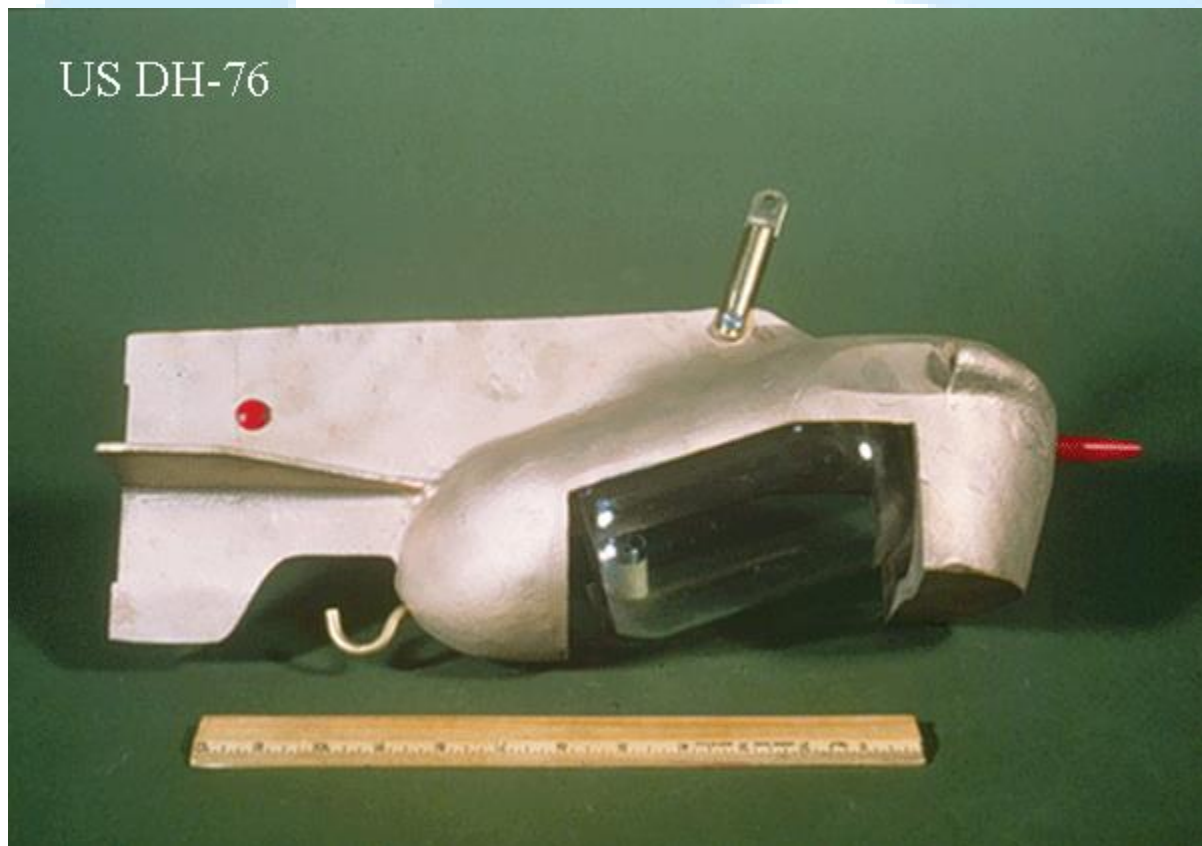
The sampler is a streamlined bronze casting that is 15 in long and weighs 22 lbs. The sampler uses a pint glass milk bottle. The bottle container is sealed against a gasket in the head cavity of the casting by pressure applied to the base of the bottle by a hand operated, spring tensioned, pull rod assembly at the rear of the sampler. The sampler uses a 3/16- or 1/4-in internal diameter intake nozzle that projects horizontally upstream from the head of the casting. As a sample is collected, the displaced air in the bottle is ejected downstream through the air exhaust tube integrally cast into the body and protected by a streamlined projection on the side of the head of the sampler. The unsampled zone using the US DH-59 is 4.5 in.



US DH-76

The US DH-76 is a medium-weight hand-line suspended-sediment sampler. The sampler can be lowered and raised, hand over hand, with a flexible suspension line. It can be used in streams with depths up to 15 ft and in stream velocities ranging from 1.5 to 6.6 ft/sec. The US DH-76 is similar in design to the US DH-59, but uses a quart glass bottle for additional sample volume, as opposed to the pint bottle used in the US DH-59.

This sampler is a streamlined bronze casting that is 17 in long and weighs 25 lbs. The quart glass bottle sample container is sealed against a gasket in the head cavity of the casting by pressure applied to the base of the bottle by a hand operated, spring tensioned, pull rod assembly at the tail of the sampler. As the sampler collects a suspended-sediment sample, the displaced air in the bottle is ejected downstream through an air exhaust tube cast integrally in the body of the sampler and is protected by a streamlined projection alongside the head of the sampler. The sampler uses 3/16- and 1/4-in internal diameter nozzles. The unsampled zone using the US DH-76 is 4 in.



US DH-95TM14

The US DH-95TM14 is a hand-line suspended-sediment/water-quality sampler. The sampler can be lowered and raised, hand over hand, with a flexible suspension line. The US DH-95 meets the protocols for water-quality sampling as outlined in the USGS's National Field Manual for the Collection of Water-Quality Data⁷. The sampler can be used in stream depths up to 15 ft and in stream velocities ranging from 1.7 to 7.4 ft/sec.

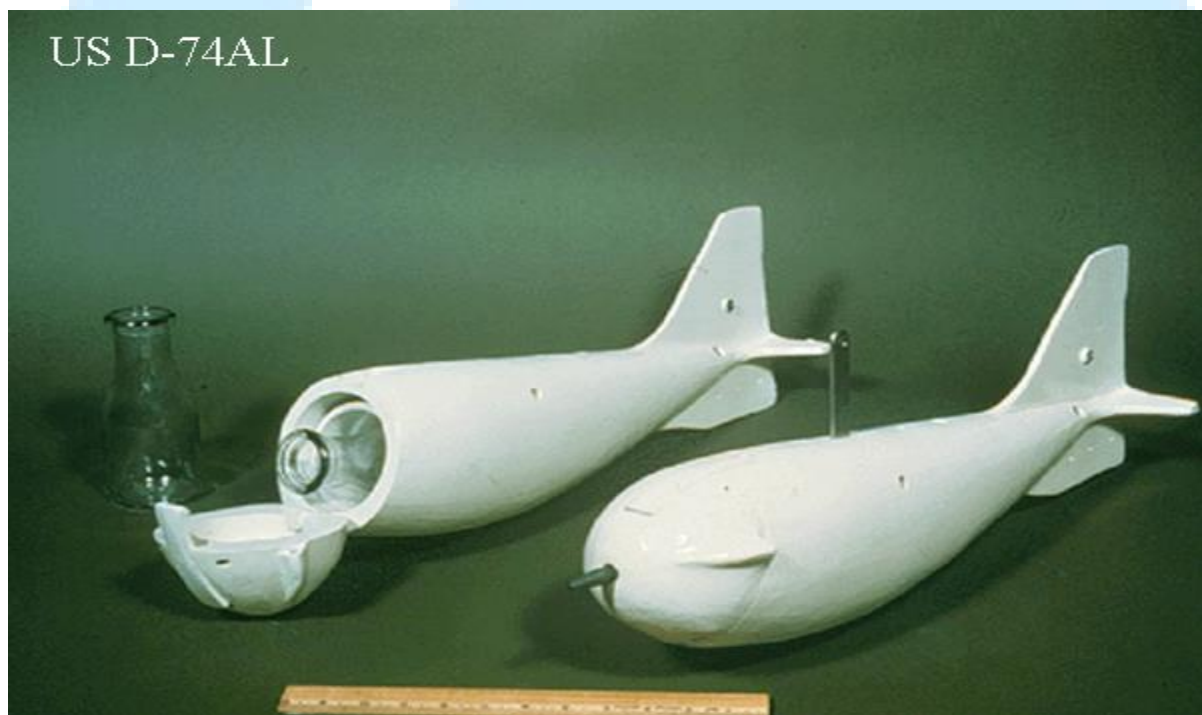
The US DH-95TM weighs approximately 29 lbs and is 22 in long with the bottle, cap, and nozzle in place. The bottle cavity is machined from a low-lead bronze casting that is coated with plastic. The tail section is made of high-density polyethylene plastic. The sampler is designed to use a 1-liter FEP or plastic bottle mated to the US D-95 CapTM or US D-77 sampler cap and nozzle. Plastic and TFE nozzles with 3/16-, 1/4-, and 5/16-in internal diameter are available. The recommended sample volume to be collected with the US DH-95TM sampler is 800 ml. The unsampled zone using the US DH-95TM is 4.8 in.



US D-74AL

The US D-74AL is a cable-suspended suspended-sediment sampler. The sampler is lowered and raised by means of a suspension system such as a reel and crane or bridge board. It could also be used with a cableway. The sampler can be used in stream depths up to 15 ft and in stream velocities ranging from 1.5 to 5.9 ft/sec.

The sampler has a cast aluminum, streamlined body that is 24 in long and weighs 42 lbs. A pint or quart glass bottle sample container is used with the sampler. The head of the sampler is hinged to permit access to the sample container. Tail vanes are provided to orient the instrument into the stream flow. The US D-74AL uses 3/16- and 1/4- in internal diameter intake nozzles that project into the current for collecting a sample. A port, which points downstream, is located on the side of the sampler head from which air escapes as it is displaced by the sample being collected in the container. The unsampled zone using the US D-74AL is 4.1 in.



US D-95TM17

The US D-95TM17 suspended-sediment and water-quality sampler is a depth-integrating sampler designed for use in streams not exceeding 15 ft in depth. It meets the protocols for water quality sampling as outlined in the USGS's National Field Manual for the Collection of Water-Quality Data⁷. The sampler is lowered and raised by means of a suspension system such as a reel and crane or bridge board. The sampler is designed to sample at an acceptable inflow efficiency in stream velocities ranging from 1.5 to 7.5 ft/sec.

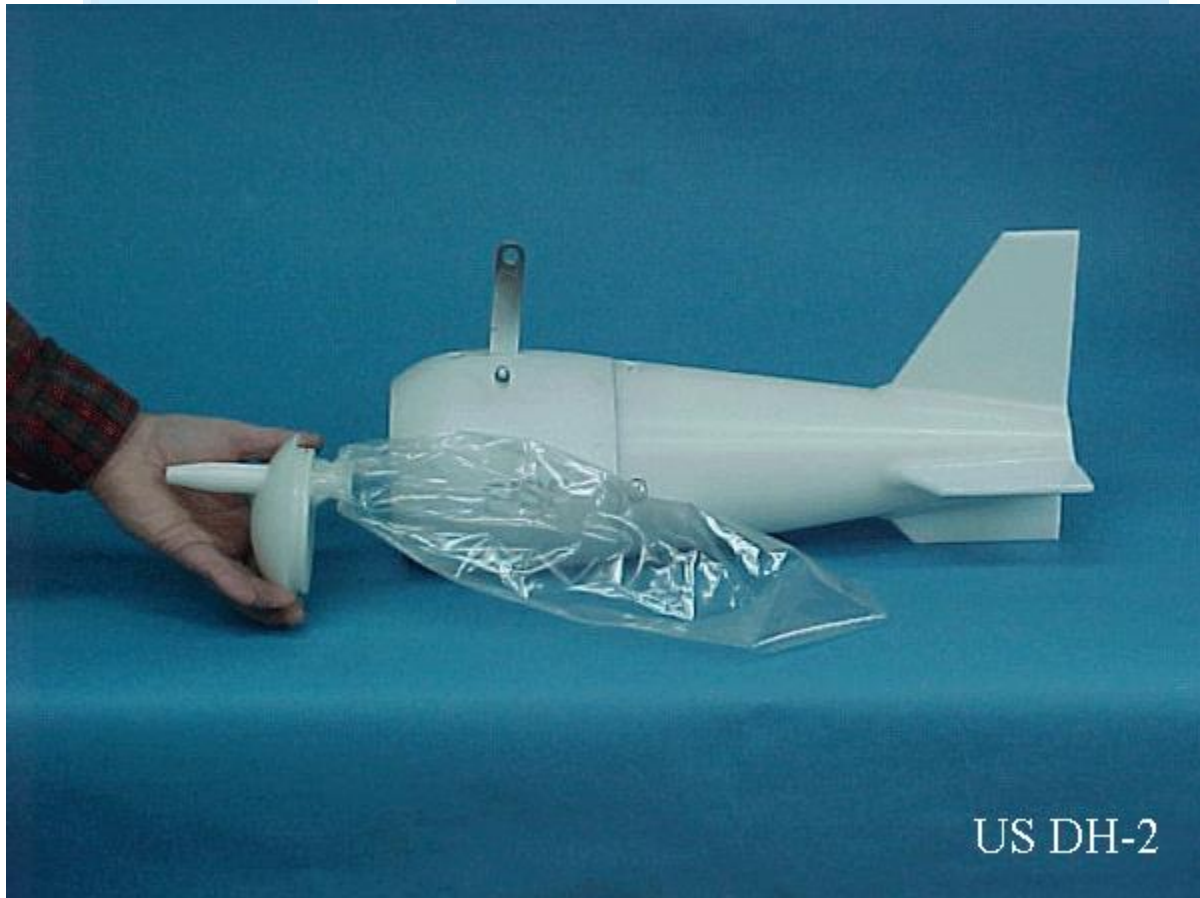
The sampler weighs 64 pounds and is 26 in long with the bottle, cap, and nozzle in place. The bronze body casting is coated with plastic and the tail section is constructed from plastic to help avoid metal contamination during water quality sampling. The sampler is designed to use a 1-liter Teflon or plastic bottle mated to the US D-95 CapTM or US D-77 sampler cap and nozzle. Plastic and TFE nozzles with 3/16-, 1/4-, and 5/16-in internal diameter are available. The unsampled zone using the US D-95TM is 4.8 inches. The recommended sample volume to be collected with the US D-95TM sampler is 800 ml.



US DH-2

The US DH-2 is a hand-line suspended-sediment/water-quality collapsible-bag sampler capable of collecting a 1-liter sample. The sampler can be lowered and raised, hand over hand, with a flexible suspension line. The US DH-2 meets the protocols for water quality sampling as outlined in the USGS's National Field Manual for the Collection of Water-Quality Data⁷. The sampler can be used in stream depths up to 37 ft using a 3/16-in internal diameter nozzle, 20 ft using a 1/4-in internal diameter nozzle, and 13 ft using a 5/16-in internal diameter nozzle. The sampler can be used in stream velocities ranging from 2.0 to 6.0 ft/sec.

The US DH-2 is fabricated from cast bronze and high-density polyethylene and is plastic coated. It is 19 in long and weighs 29 lbs. The sampler uses plastic or TFE nozzles and plastic or PFA bags. The unsampled zone using the US DH-2 is 4 in.



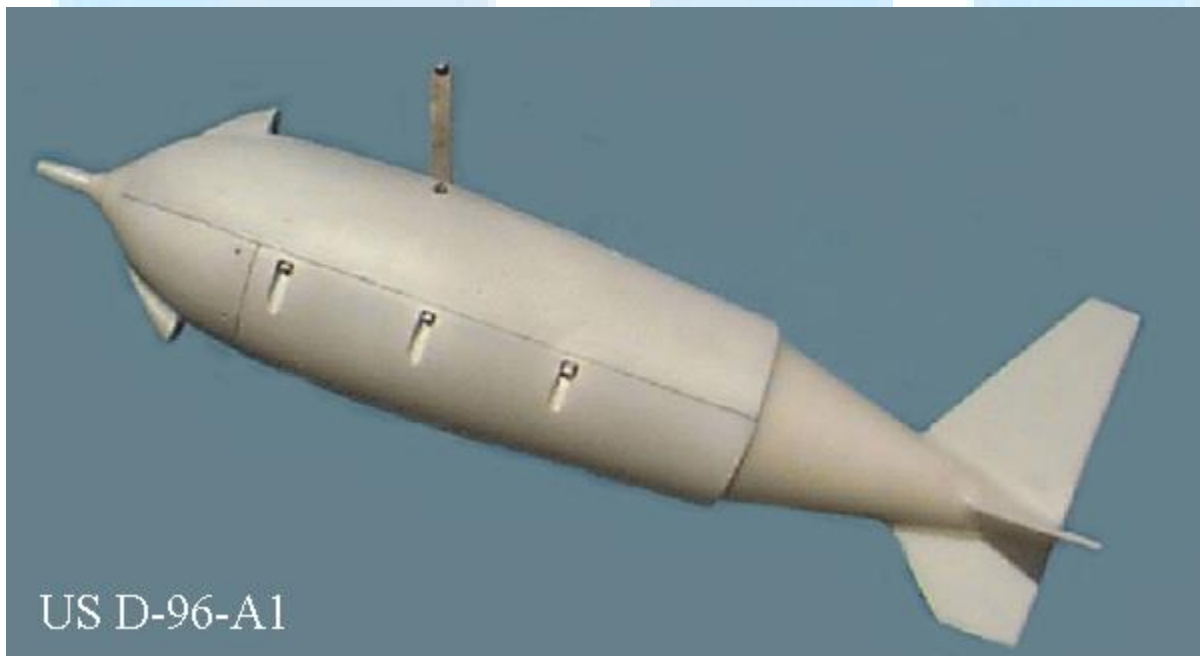
US D-96

The US D-9620,21 is a collapsible-bag suspended-sediment/water-quality sampler capable of collecting a 3-liter sample. It is 35 in long, weighs 132 lbs, and has a hollow cavity inside the sampler body. It is fabricated from bronze and aluminum castings with a high-density polyethylene tail. All metal parts are plastic coated. The sampler employs a sliding tray that supports the bag and holds the nozzle holder with nozzle in place. The bag is attached to the nozzle holder with a hook-and-loop strap. The sampler uses a plastic or TFE nozzle and a plastic or PFA bag as the sample container. The US D-96 meets the protocol for water-quality sampling as outlined in the USGS's National Field Manual for the Collection of Water-Quality Data⁷. The sampler is protected by US Patent No. 6,216,549 B1.

The US D-96 sampler will collect acceptable flow-weighted samples in streams velocities ranging from 2.0 to 12.5 ft/sec. Extreme care should be practiced when deploying the sampler at stream velocities above 10 ft/sec. The US D-96 sampler is capable of sampling to a depth of 39 ft with a 5/16-in internal diameter nozzle, 60 ft with a 1/4 in internal diameter nozzle, and 110 ft with a 3/16-in internal diameter nozzle. The unsampled zone using the US D-96 sampler 4 in.

Where and how the sampler is deployed in the field is as important as the fundamental design of the sampler. Additional information about how to properly use this sampler can be found in the following references:

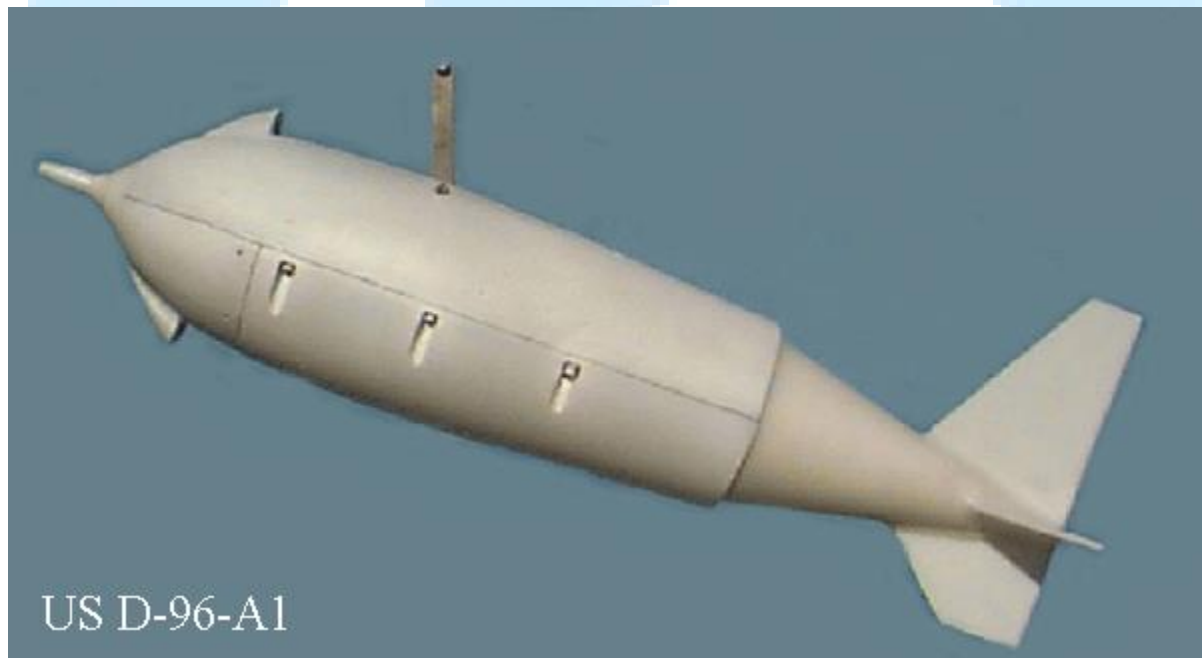
Operator's Manual for the US D-96 Depth-Integrating Collapsible-Bag Suspended-Sediment Sampler²², available at the FISP website: <http://fisp.wes.army.mil>.



US D-96-A1

The US D-96-A123 is a collapsible-bag suspended-sediment/water-quality sampler capable of collecting a 3-liter sample. It is 35 in long, weighs 82 lbs, and has a hollow cavity inside the sampler body. It is fabricated from aluminum and bronze castings with a high-density polyethylene tail. All metal parts are plastic coated. The sampler employs a sliding tray that supports the bag and holds the nozzle holder with nozzle in place. The bag is attached to the nozzle holder with a hook-and-loop strap. The sampler uses a plastic or TFE nozzle and a plastic or PFA bag as the sample container. The US D-96-A1 meets the protocol for water-quality sampling as outlined in the USGS's National Field Manual for the Collection of Water-Quality Data⁷. The sampler is protected by US Patent No. 6,216,549 B1.

The US D-96-A1 sampler will collect acceptable flow-weighted samples in stream velocities ranging from 2 to 6 ft/sec. The US D-96-A1 sampler is theoretically capable of sampling to a depth of 39 ft with a 5/16-in internal diameter nozzle, 60 ft with a 1/4-in internal diameter nozzle, and 110 ft with a 3/16-in internal diameter nozzle. However, in field use in streams with high velocities, obtainable sampling depths will likely be less than theoretical due to the large drift angle created by the sampler in high stream velocities. The unsampled zone using the US D-96-A1 sampler is 4 in.



US D-99

The US D-99 is a collapsible-bag suspended-sediment/water-quality sampler capable of collecting a 6-liter sample. It is 39 in long, weighs 275 lbs, and has a hollow cavity inside the sampler body. It is fabricated from a bronze casting with a high-density polyethylene tail. It has a hinged head that closes horizontally and holds the nozzle holder and nozzle in place. All metal parts are plastic coated. The bag is attached to the nozzle holder with a hook-and-loop strap. The sampler uses a plastic or TFE nozzle and a plastic or PFA bag as the sample container. The US D-99 meets the protocol for water quality sampling as outlined in the USGS's National Field Manual for the Collection of Water-Quality Data⁷.

The US D-99 sampler will collect acceptable flow-weighted samples in stream velocities ranging from 3.0 to 15 ft/sec. Extreme care should be practiced when deploying the sampler at stream velocities above 10 ft/sec. The US D-99 sampler is capable of sampling to a depth of 78 ft with a 5/16-in internal diameter nozzle, 120 ft with a 1/4-in internal diameter nozzle, and 220 ft with a 3/16-in internal diameter nozzle. The unsampled zone using the US D-99 is 9.5 in.



US P-61-A1

The US P-61-A1 is a point-integrating suspended-sediment sampler that has an electrically operated valve for starting and stopping the collection of a sample. The sampler is lowered to the desired depth in the water column, the sample collected by remotely opening and closing the valve, and then the sampler is raised to the surface for removal of the sample container.

The sampler has a streamlined cast bronze body 28 in long that weighs 105 lbs. It has tail fins to orient the sampler so that the intake nozzle in the head points directly into the approaching flow. The sampler head is hinged to provide access to the pint or quart bottle sample container located in a cavity in the sampler body. An exhaust port pointing downstream on the side of the sampler head permits escape of air from the sample container as it is displaced by the sample being collected. The sampler uses a 3/16-in internal diameter nozzle and can be used in stream velocities ranging from 1.5 to 10 ft/sec. It can be used to a depth of 180 ft with a pint container and 120 ft with a quart container.

To eliminate a sudden inrush of sample due to hydrostatic pressure, the diving bell principle is used to balance the air pressure in the bottle with the hydrostatic pressure at the nozzle prior to opening the valve at the start of sampling. The “diving bell” in the sampler is the body cavity behind and surrounding the sample container. It is connected by ports through the valve system to the surrounding stream and to the sample bottle.

The operating current may be supplied by the US RBP-95 rechargeable battery pack, which is sold separately.



US P-72

The US P-72 is a point-integrating suspended-sediment sampler that has an electrically operated valve for starting and stopping the collection of a sample. The sampler is lowered to the desired depth in the water column, the sample collected by remotely opening and closing the valve, and then the sampler raised is to the surface for removal of the sample container.

The sampler has a streamlined cast aluminum body 28 in long that weighs 41 lbs. It has tail fins to orient the sampler so that the intake nozzle in the head points directly into the approaching flow. The sampler head is hinged to provide access to the pint or quart bottle sample container located in a cavity in the sampler body. An exhaust port pointing downstream on the side of the sampler head permits escape of air from the sampler container as it is displaced by the sample being collected. The sampler uses a 3/16-in internal diameter nozzle and can be used in stream velocities ranging from 1.5 to 5.3 ft/sec. It can be used to a depth of 72 ft with a pint container and 51 ft with a quart container.

To eliminate sudden inrush at a selected sampling point below the water surface, the diving bell principle is used to balance the air pressure in the bottle with the hydrostatic pressure at the nozzle prior to opening the valve at the start of sampling. The “diving bell” in the sampler is the body cavity behind and surrounding the sample container. It is connected by ports through the valve system to the surrounding stream and to the sample bottle.

The operating current may be supplied by the US RBP-95 rechargeable battery pack, which is sold separately.



US P-63

The US P-63 is a point-integrating suspended-sediment sampler that has an electrically operated valve for starting and stopping the collection of a sample. The sampler is lowered to the desired depth in the water column, the sample collected by remotely opening and closing the valve, and then the sampler is raised to the surface for removal of the sample container.

The sampler has a streamlined cast bronze body 37 in long that weighs 200 lbs. It has tail fins to orient the sampler so that the intake nozzle in the head points directly into the approaching flow. The sampler head is hinged to provide access to the pint or quart bottle sample container located in a cavity in the sampler body. An exhaust port pointing downstream on the side of the sampler head permits escape of air from the sample container as it is displaced by the sample being collected. The sampler uses a 3/16-in internal diameter nozzle and can be used in stream velocities ranging from 1.5 to 15 ft/sec, and to a depth of 180 ft with a pint container and 120 ft with a quart container.

To eliminate a sudden inrush of sample due to hydrostatic pressure, the diving bell principle is used to balance the air pressure in the bottle with the hydrostatic pressure at the nozzle prior to opening the valve at the start of sampling. The “diving bell” in the sampler is the body cavity behind and surrounding the sample container. It is connected by ports through the valve system to the surrounding stream and to the sample bottle.

The operating current may be supplied by the US RBP-95 rechargeable battery pack, which is sold separately.



US RBMH-80

The US RBMH-80 is a hand-held rotary-scoop bed-material sampler with a semi-cylindrical bucket for collecting the sample. Operation is simple: the sampler is placed on the streambed and the lever on the handle closes the bucket, collecting the sample. The sampled material is protected from washing out while rising through the water column. The sampler is approximately 56 in long and weighs 8 lbs.

The sampler can be used in sand-bed and gravel-bed streams up to approximately 3 ft deep. It will collect a sample volume of approximately 15 in³ (250 cm³) of material and will sample to a maximum bed material depth of 1.75 in.



US BMH-53

The US BMH-53 is a hand-held piston-type bed-material sampler. The sampler is used to collect a sample of material from the bed of a shallow stream. The overall length of the tubular sampler is 46 in and it weighs 7.5 lbs.

The lower end of the sampler contains a 2-in diameter, 8 in long cylinder that is pressed into the stream bed to collect the sample. A handle for pressing the cylinder into the bed is on the upper end, and passes through the sampler frame to the piston inside. The suction created by the piston holds the sample in the cylinder. The sample is pushed out of the cylinder by the piston.

The US BMH-53 sampler will not work for some bed materials, such as coarse sands and gravels.



US BMH-60

The US BMH-60 is a hand-line bed-material sampler. It is used to collect samples from the bed of a stream, lake, or a reservoir. Penetration into the bed material is approximately 1.7 in. The sampler can be suspended from a flexible line and lowered and raised by hand. The weight of the sampler limits its use to tranquil streams and moderate or slightly compacted sand and pebble bed materials.

US BMH-60

The US BMH-60 is 22 in long and weighs 32 lbs. The body of the sampler is made of aluminum. Ballast makes the sampler nose heavy by about four pounds to assist the sampling bucket mechanism in penetrating the bed material of the stream. The sampling bucket accommodates approximately 11 in³ (175 cm³) of material and is spring loaded by cross-curved, constant-torque, motor-type springs. Tension on the hand suspension line or use of a specially made safety yoke allows the bucket to be cocked in the open position by means of a wrench. Once the bucket is fully retracted within the body shell of the sampler, it is ready to take a sample. As long as the safety yoke is in place, the bucket mechanism cannot be released. For sampling, the safety yoke is removed and the sampler lowered by the hand line until the sampler rests on the bottom of the stream. Once the tension on the suspension line is reduced to a specified amount, the spring-loaded cocking device will release the bucket mechanism. The rapidly closing bucket penetrates the streambed and completely encloses a sample of the bed material. Gaskets prevent loss or contamination of the trapped sample. Once the sampler is raised to the surface, the bed material sample can be transferred to a container.



US BM-54

The US BM-5430 is a cable-suspended bed-material sampler. It is used to collect sand and gravel samples from the bed of a stream, lake, or a reservoir. Penetration into the bed material is approximately 2 in.

The US BM-54 is 22 in long and weighs 100 lbs. The body of the sampler is made of cast iron. The spring-loaded sampling bucket accommodates approximately 18 in³ (300 cm³) of material. Tension on the cable suspension line allows the bucket to be cocked in the open position by means of a wrench. Once the bucket is fully retracted within the bodshell of the sampler, it is ready to take a sample. To collect a bed-material sample, the sampler is lowered by reel until it rests on the bottom of the stream. Once the tension on the cable is reduced to a specified amount, the spring-loaded cocking device will release the bucket mechanism. The rapidly closing bucket penetrates the streambed and completely encloses a sample of the bed material. Gaskets prevent loss or contamination of the trapped sample. Once the sampler is raised to the surface, the bed material sample can be transferred to a container.



US BLH-84

The US BLH-84 is a wading-type hand-held bedload sampler. The sampler consists of an expanding nozzle, a sample bag, and a wading rod assembly. The sampler design enables collection of particle size nozzle and an area expansion ratio (ratio of nozzle exit area to entrance area) of 1.4. A polyester mesh bag with mesh openings of 0.25 mm is attached to the rear of the nozzle assembly with a rubber “O” ring.

The sampler is constructed of aluminum, weighs 10 lbs and is 28 in long.



US BL-84

The US BL-84 is a cable-suspended bedload sampler used to collect samples from streams that cannot be waded. The sampler consists of an expanding nozzle mounted on a frame, and a sampler bag. The sampler design enables collection of particle sizes larger than the bag mesh opening and smaller than 1.5 in (38 mm) at stream velocities up to 9ft/sec. The sampler has a 3 by 3 in entrance nozzle and an area expansion ratio (ratio of nozzle exit area to entrance area) of 1.4. A 295 in² polyester mesh sample bag 18 in long with mesh openings of 0.25 mm is attached to the rear of the nozzle assembly with a rubber “O” ring.

The US BL-84 is constructed of stainless steel and aluminum, weighs 32 lbs and is 36 in long. It is equipped with tail fins that orient it into the stream-flow. The sampler must be supported by a steel cable and reel to be lowered into a river or stream for taking a bed load sample. At high stream velocities, a tether line may be required.



LIST OF EQUIPMENTS AVAILABLE WITH US:

- Automatic Weather Station
- Digital Rainfall Recorder
- Digital Rain Gauge
- Digital Evaporation rate recorder
- Automatic Soil Erosion Monitoring System
- Digital Snow Water Equivalent recorder
- Digital Solar Radiation Recorder (Pyranometer)
- Digital Water level Recorder
- Digital Water level Recorder (Pressure type)
- Digital Water level Recorder (Ultrasonic type)
- Water velocity indicator without sensor
- Water Current Meter
- Soil moisture indicator with sensor
- Soil moisture and temperature recorder
- Leaf Wetness, Air temperature and Humidity recorder
- Plant Canopy Analyzer
- Suspended Solids Indicator
- Digital Soil Tensiometer
- Soil Infilltrometer
- Water Level Indicator
- Cup Counter Anemometer (Mechanical Type)
- Wind Vane (Mechanical Type)
- Open Pan Evaporimeter
- Ordinary Rain Gauge
- Tree Height Gauge
- Stevenson Screen (Single)
- Stevenson Screen (Double)
- Aneroid Barometers
- Sunshine Recorder
- Punjab type Silt Sampler
- Winch (80 Kg)
- Maximum - Minimum Thermometer
- Wet & Dry Thermometer
- GPS
- Temperature and humidity sensor
- Wind speed sensor
- Wind direction sensor
- Rainfall sensor
- Water temperature sensor
- Soil temperature sensor
- Solar radiation sensor (Silicon)
- Atmospheric pressure (Barometer) sensor
- Water level sensor (Shaft encoder)
- Water level sensor (pressure)
- Water level sensor (Ultrasonic)
- Evaporation sensor
- Soil moisture sensor
- Snow Water Equivalent (Snow Gauge)
- Leaf Wetness sensor
- Digital Soil Tensiometer sensor

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