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# ROSSFELDER CORPORATION

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(this email address has spaces to disturb the harvesting by bots. Please remove the spaces to send us email)

## UNDERWATER ELECTRICAL VIBROCORERS With BUOYANT FRAME



*PICTURE OF VT-6 ON BACK DECK OF R.V. LONGHORN*

### Our Models

(Click on each product for more information and Prices.)

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# UNDERWATER VIBROCORING SYSTEMS

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Vibrocoring is an efficient and versatile procedure for obtaining long, well-preserved cores in consolidated water-saturated sediments from wetlands, harbors and lakes to the deep ocean. It allows for deep penetration in a single deployment and a high core recovery where other approaches such as rotary-drilling, dart-coring, or cf-augering prove either inappropriate or impractical.



*Vibrocoring on Small Inflatables in Marsh*

For a long time, however, a more widespread use of vibrocoring techniques was hampered by the weight and bulk of the few existing vibrocorers with their cumbersome ancillaries and by the resulting high costs of their deployment.



*Vibrocoring on Pontoon Barge in  
San Diego Bay.*

Our SUBMERSIBLE ELECTRICAL VIBROCORERS, developed through years of fieldwork in distant waters, endeavored to correct this problem. They are sturdy and powerful, yet light and compact. They can be airfreighted at minimal cost anywhere in the world to be operated from local vessels-of-opportunity and even from inflatable barges or helicopters. Our patented "buoyant-frame" offers a practical way to set them upright on the seafloor and to guide them. Designed to withstand deep ocean pressures, rough seas and arctic cold, fully enclosed, easy to clean, our Vibrocorers have also become tools of choice for retrieving cores in contaminated sediments and hazardous environments.

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# SELECTING A VIBROCORER

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Our various submersible models, described in the center pages and further commented below, essentially differ in terms of portability, mode of vibration, force, power requirements and depth rating. However, the performance of a vibrocorer depends in the final analysis upon the capacity of the sediment particles to move and give way to the coretube with less energy spent than received. Therefore the best results will always be obtained in unconsolidated, water-logged, heterogenous sediments.

## **P-3**

This lightweight, mid-size model operates in a vibro-percussive mode and is intended for standard survey work in a variety of sediments. It is compact, easy to handle and very efficient. Its capabilities approach, in many sediments, the performances of the more powerful P-5. It requires a 3-phase, 230 volt or 460 volt, 50-60Hz current. The P-3 is deployed with a separate non-armored electrocable to about 350 feet (100 m) depths, but requires a kevlar center cored cable for greater depths.

## **P-5**

Our most powerful model, the P-5 houses a pair of vibrator motors, the same model of vibrator motor as in the P-3, but in a contra-rotating configuration that doubles the vertical motion of the unit. Its twin cylinder housing and compact shape offers easier access to its internal parts - should, for example, the vibrator motor's wiring harness be switched between 230v or 460v current.

## **Special Procedures**

The P-5 has provision for injecting water under pressure at the top of the coretube in order to perform such special procedures as water-jetting and incremental coring.

### ***\*An important note about the power requirements:***

*The P-3 and the P-5 require a 230-460 volt, 3-phase current. This is the voltage measured at the vibrohead. Voltage losses along the electrocable should be computed or tested, and taken into account. Usually, these motors will take an excess voltage of 10% above the rated voltage but may be damaged and even burnt if the voltage at the vibrohead is below 5% of this rated voltage. In view of such voltage loss, the 460v setting may be preferred for deepwater work.*

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# CORETUBES & LINERS

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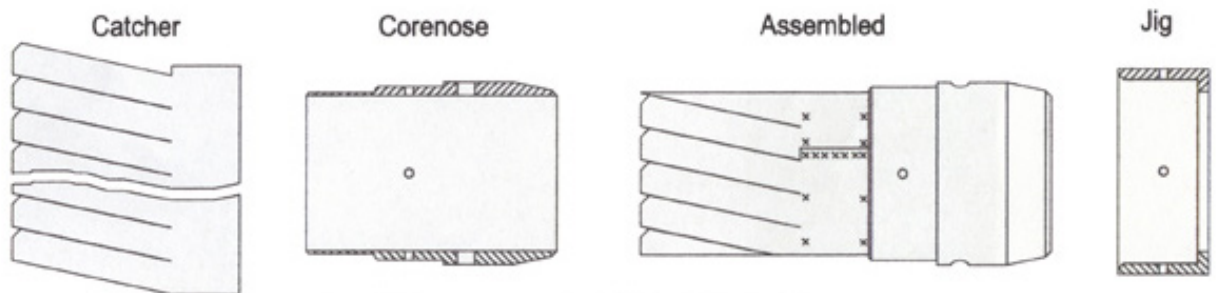
**CORE SAMPLE**

Our vibrocorers can be operated with steel or aluminum coretubes with or without liners.

If the metal coretube is intended to be used with a plastic liner, it is often difficult to find the matching tubes and liners off the shelf, i.e. a plastic liner with an OD smaller than the ID of the coretube (generally by some 0.060-0.080" or 1.5-2mm). In this case the best solution is to first select the coretube and to have the liner custom-made to match it. Most common liners are made of polycarbonate or CAB (cellulose-acetate butyrate). Note that in non-abrasive sediments a soft polyethylene tube (usually purchased in 6" wide x 1000 ft rolls) with a thickness of 6 mils for the P-3, can be an effective, easy-to-find alternate to a rigid plastic liner.

As a rule of thumb, optimum penetration is generally achieved with steel coretubes in the 3.5" to 4" (8.9 to 10.2cm) diameter and 0.083 to 0.120" (2 -3 in) wall thickness. However, in similar diameter, expendable linerless thin-wall aluminum

coretubes, e.g. 0.062 - 0.080" (1.5 - 2 mm) wall thickness, often are the most practical candidates for a vibrocoring project that requires a hard case to ship samples to a lab. Please Note: Aluminum core tubes can not be used with the P-5. Also, some of our clients have obtained excellent results with bare, stiff plastic Lexan coretubes, e.g. 4.0" OD. 0.125" wall, up to 20 ft long, without any metal coretubes or conrnoses, provided with a plastic core-catcher (orange-peel type) simply glued inside the tube.



4 Inch Corenose used with Hard Plastic Liner

## RETENTION OF THE CORE :

In order to maximize the core recovery, the retention of the core is a factor as important as the penetration achieved. To this effect, our vibrocoring systems incorporate a tight-sealing water-escape valve mounted within the vibrohead. Reusable plug-valve to fit the top of the coretube itself and also stainless-steel thinwall corenose with fingered (orange-peel) core-catcher can be delivered upon request for the diameters to be exactly specified by the client. The corenoses can be fabricated with a stepped shoulder for the seating of a hard internal liner.

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# BUOYANT FRAME AND RIGID FRAME

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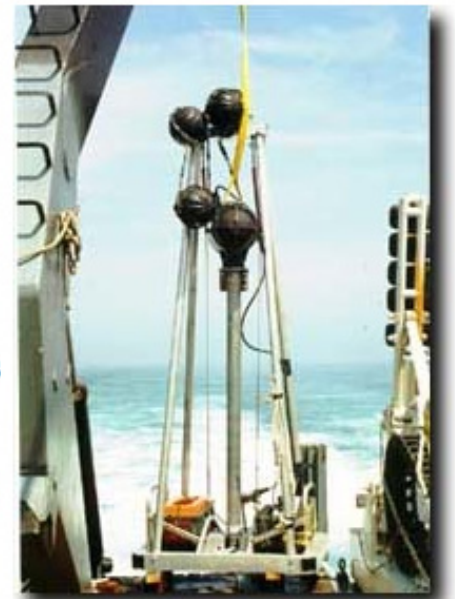
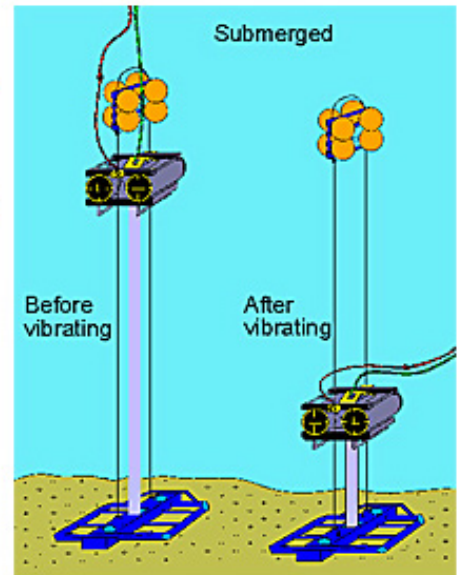
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All our vibrocorers can operate in shallow water, less than 20 meters, without the Buoyant-Frame system as long as the vessel remains stationary. Our patented well-received Buoyant-Frame mode arrangement is a very efficient and easy way to deploy the vibrocorers in deeper water where the vessel is free-anchored allowing the vibrocore to penetrate the sediment with a vertical coretube.

In some cases the vibrocorer's have been deployed in a custom built Rigid Frame system, however these rigid frames have proven to be problematic, very large and heavy so we no longer provide such systems. We can, however, provide advice for the design and discuss the problematic issues that must be overcome if customers decide to fabricate such a system for themselves.

With the Buoyant-Frame, the Vibrocorer is maintained in proper vertical position by two guidelines held taut between a Float Package and a Weightstand. The larger Weightstand is provided with ballast boxes so the easy-to-find ballasting material such as lead bags or scrap metal can be used in the field. For deployment, the Vibrocorer is lowered with the Weightstand hanging on its guidelines from the Vibrohead. The Float Package is hooked-up to the guidelines when the Vibrohead reaches the deck level. After coring and pull-out, the system is retrieved in the reverse way. In case of limited deck space or overhead clearance, or to further accelerated the procedure at sea, the Weightstand can be left in as overboard cradle.



## **TAINED SAMPLES FORM IRON RUST, LUBRICANTS. GREASES, OR CUTTING FLUIDS?**

Because our vibrocorers are 100% electrical with no external moving parts, they do not require any lubricants. The system is completely constructed from high grade aluminum and then anodized so there is no iron or lead associated with the system. Vibrocoring does not produce any waste cuttings requiring disposal. In fact, the boring hole usually collapses when the coretube is extracted.

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STANDARD SUBMERSIBLE MODELS	VIBRO-PERCUSSIVE	VIBRO-PERCUSSIVE
	P-3	P-5
WORKING DEPTH	To 600m (2,000 ft.)	To 600m (2,000 ft.)
POWER REQUIREMENTS	230 or 460v, 50-60 Hz, 3ph	230 or 460v, 50-60 Hz, 3ph
AVERAGE RUNNING AMPS while vibrocoring	4.5 Amps (low setting) to 7 Amps (high setting on 230v)	9Amps (low setting) to 14Amps (high setting) on 230v
FORCE 1 KN = 225 lbs	16.0 KN to 24.0 KN on 60 Hz 10.9 KN to 16.4 KN on 50 Hz	32.0 KN to 48.0 KN on 60 Hz 21.8 KN to 32.8 KN on 50 Hz
VIBRATION FREQUENCY	3,450 vpm on 60 Hz 2,850 vpm on 50 Hz	3,450 vpm on 60 Hz 2,850 vpm on 50 Hz
TYPICAL CORETUBE'S LENGTH/DIAMETER	6.0m/76mm (20ft/3.0") 4.5m/102mm (15ft/4.0")	6.0m/102mm (20ft/4.0")
STANDARD CLAMP	102mm (4.0")	102mm (4.0")
CLAMP ON REQUEST	from 76mm (3.0")	from 76mm (3.0")
VIBROHEAD WEIGHT	68 kg (150 lbs)	147 kg (325 lbs)
TYPICAL SHIPPING WEIGHT of an operating system	410 kg (900 lbs)	590 kg (1,300 lbs)
ADD WEIGHSTAND BALLAST	27 kg (60 lbs)	68kg (150 lbs)
ADD GENERATOR IF REQUIRED	10.5 KVA, 135 kg (300 lbs)	15 KVA, Vessel power

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# OPERATIONS - Further Notes

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## **Selection and availability of coretubes and liners**

A client must decide if they want to use a steel coretube + liner or a bare aluminum coretube. This decision is to be made in part as a function of what is locally available. For overseas work, due to the fragility and bulkiness of liners, one needs to see if liners can be found locally, off-the-shelf, or can be locally extruded to custom specs. Air shipment of a few adequate steel tubes and corenoses to fit the liners are not an expensive proposition. We stress that the diameter clearance between the coretube's ID and the liner's OD should be in the order of 1-2mm (0.020" to 0.040").

## **Length of coretubes vs. length of sample**

If a client wants a 15ft. (4.5m) core sample, the coretube needs to be 16ft. (4.8m). This is because some 6" are lost when inserting the coretube into the vibrohead and another 6" are lost with the attachment of the corenose and retainer.

## **Vessel operations and drawworks**

The size of the vessel does not have as much relevance as does its maneuverability, although it must be large enough to support an A-frame of adequate size along with working deck space.

Taking a core with our vibrocorers is a relatively fast, but not an instantaneous operation, therefore the vessel must be able to maintain its position in the core site and remain on position while the vibrocorer is deployed and coring. The vibrocorer is deployed from the vessel with the winch line and the vibrocorer's electrical cable. If the vessel drifts away from the vibrocorer operating on the sea floor, the tension on the winch line can pull the vibrocorer over or the electrical cable may not have sufficient length and may snap. This will damage the connectors and could cause an electrical short or damage the vibrocorer's motors.

Also, if the vessel drifts or swings on its anchor chain, the vessel will not be over the vibrocorer during the extraction of the coretube from the sediment resulting in the winch cable's vibrocorer-to-ship angle not being vertical. This can make the recovery process very difficult. Bent coretubes, and/or loss of coretubes and samples can be expected.

All this means, the vessel must have either the ability to deploy several anchors to maintain position or in the case of deep water coring, a good real time maneuverability.

Nighttime operation: If a client wishes to work during the evening hours the working area on the deck must be well lit and with lights on top of the A-frame to cover the work area behind the stern.

A-frame size and load capacity: To determine the necessary height needed for a vibrocoring operation, please use this following calculation: Length of coretube + 4ft. (1.2m) for the vibrohead, lifting bridle, shackle and lifting eye in the end of the winch line (most eyes are made with 3 cable clamps, making them approximately 10-12 inches long that will not pass through the sheave under load.)

The measurement is made below the sheave hanging from the A-frame. Example: To get a 15ft. core sample, use a 16ft. coretube +4ft, thus a total of 20ft. working height required. Please note that if a pivoting A-frame is used that working height is measured not when the A-frame is vertical over the deck, but rather when it is tilting over the stern clearing the deck.

Two types of A-frames or crane: A pivoting A-frame is preferred. If a fixed A-frame is used, the vessel must provide a second winch to pull the vibrocorer aboard the vessel. If a sea crane is to be used, it must be able to work at sea with the roll of the vessel not affecting the boom's position or length and it must have its own winch, not a winch at some other location on the deck.

Both the drawworks and the winch and wire line must be able to handle a minimum working load of 2 tons. If sand is expected, a 3 ton system should be used.

#### **Penetration capabilities of the P-5 Vibrocorer**

Penetration depths and recovery rates depend on many factors such as the water content of the sediment, particle size and shapes, compaction / density, and even calcification. There is no core site that is exactly the same, thus predicting correct penetration depths can not be done. However, the following examples will attempt to define the P-5's capabilities. All cases used a 4"OD steel coretube 20ft in length with a 0.083" or 0.120" wall thickness and liner during various operations from 1990-95.

#### **Pure coral sands and reef debris**

i.e. Red Sea, South pacific atolls and reefs, West coast of Australia. Water depths 60-400ft. The penetration depths ranged between 6-12ft. As the percentage of shell fragments increase and the calcite sand percentage drops the depth decreases. This may be due to larger angular fragments that will not rearrange themselves allowing passage into the corenose. Also, the more abundant calcium could be cementing the fragments. Be aware these core sites require the most force to remove the coretube from the sediment compared to any other. Small vessels under 50ft. will have difficulty extracting the coretube from the sea floor. There is always a chance that the coretube will be lost when coring in this sediment type.



**Arctic till and glacier debris:**

Arctic ocean, Bering Sea, Gulf of Alaska, Hudson River, The Great Lakes of N. America. Water depths 50-500ft. The penetration depths will range between 3-15ft. As the debris increase into cobble size the penetration depth decreases. Retention of the sample will vary greatly. A large cobble logged in the corecatcher can allow the fine particles to be lost, however it can also completely seal the catcher yielding 100% recovery.

**Shallow Continental shelf sand & silts**

West and East coast of N. America, Mediterranean Sea, Strait of Gibraltar. Water depths 20-800ft. In these sediments the percentage of sand vs. silt will determine the penetration depth. A pure silica sand, large homogeneous grain size, will compact during vibration. Sample penetration can range between 8-20ft. with the longer core being achieved in deeper water depths (lower energy levels during deposition.) As the percentage of silt increases the coring penetration will also increase. Heterogeneous sediments will core the best. In many cases using a 20ft. coretube the final penetration depth will stop after the coretube has encountered a clay horizon. The P-5 can usually recover a 2-5ft. terminal plug of a stiff dry clay. Stiff dry friable clay is defined by us as "pushing a screw driver into the sample is very difficult". A clay with higher water content will allow a longer plug.

**Deep Ocean Sediments**

Gulf of Mexico, China Sea, North Atlantic, East coast of Africa, Indonesia. Water depths 600-1200ft. The P-5 vibrocorer has for many years been used as a backup tool for the piston corer and dart corer during hydrocarbon surveys. When the dart corer encounters sand deposits, 1000-3000ft. water depths, penetration and recovery are usually zero. The coretube of the dart corer becomes bent upon impact with the sea floor. When this happens the P-5 is deployed. Penetration and recovery rates in these water depths depend more upon the ability of the vessel remaining exactly on location, not pulling the vibrocorer over, and also the water currents dragging on the winch and electrical power cable. The P-5 has the coring power for a 20ft. core in this condition, but there is still a chance of a washout of the sample from the corecatcher during the long travel back to the surface. Water swirling around the corenose can wash the coretube clean even with a perfect vacuum seal on the top of the coretube. A provision or modification to the corecatcher and or weightstand to prevent washout should be considered. Many 10ft. and 20ft. samples have been recovered in this depth of water.

Penetration capabilities of the P-3 Vibrocorer: 10%-30% less than the P-5

## UNDERWATER VIBROCORER

230/460 volts, 50-60 Hz, 3-Phase, 6 amps on 230 volts.....**\$31,000.00**

**Includes:** pressure-housed vibrohead with terminal power cable section, 4.0" (or 100mm) coretube clamp, water stop valve and control-box with initial power cable connections.



**P-3 Deployed Over Stern of Boat**

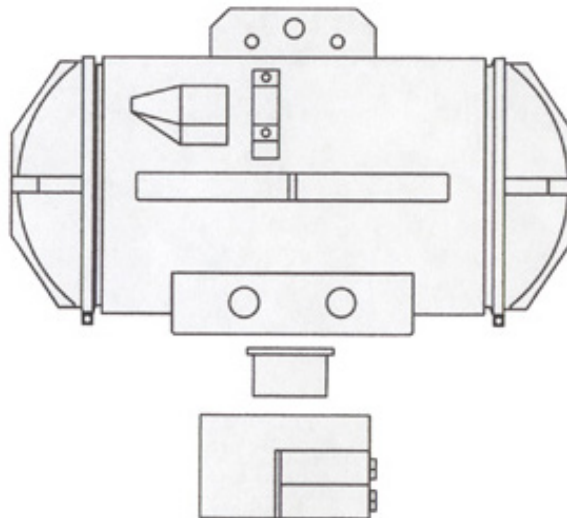
## BUOYANCY FRAME SYSTEM..... **\$4,100.00**

**Includes:** weightstand, "200-fathom" float package, guidelines and runners for buoyant-frame mode operation. Does not include: upper beam and rigid-frame legs, ballasting material for weightstand.

**WORKING DEPTH** is **650 m (2,000 ft)** for the Vibrohead and **400 m (1,200 ft)** for the standard "200- fathom" Float Package accompanying the Buoyancy frame system. Floats rated to 500 m and to 800 m are available on special request.

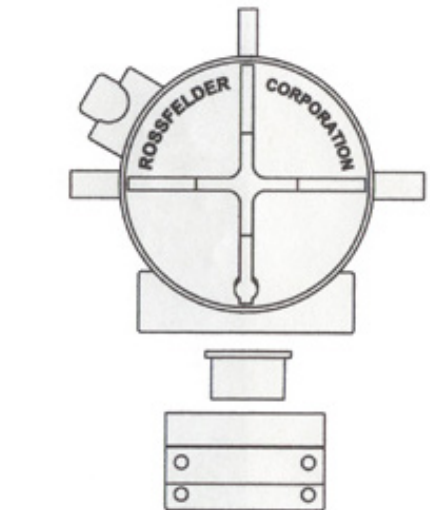
\* See Parts & Accessories for underwater power cables, generators and corenoses.

All prices FOB, San Diego California USA.



Length = 22 in

Width = 14 in



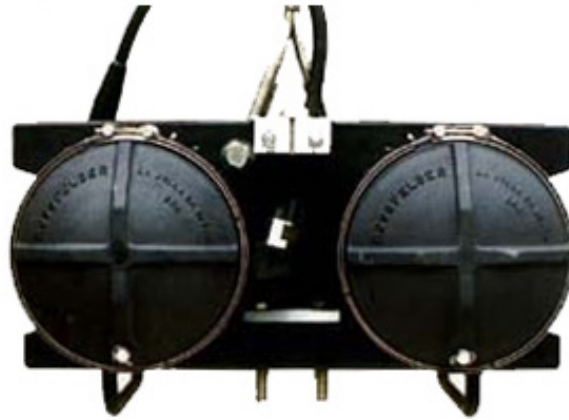
Height = 13 in

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## UNDERWATER VIBROCORER

230/460 volts, 50-60 Hz, 3-Phase, 10-16 amps\* on 230 volts.....\$44,000.00

**Includes:** pressure-housed vibrohead with terminal power cable section, 4.0" (or 100mm) coretube clamp, water stop valve and control-box with initial power cable connections.



## BUOYANCY FRAME SYSTEM.....\$5,000.00

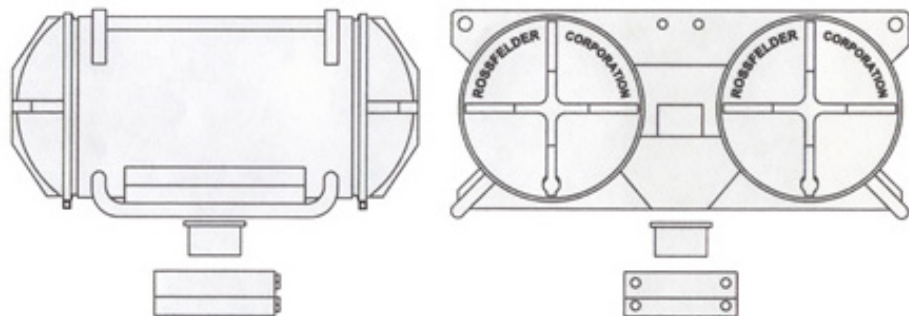
**Includes:** weightstand, "200-fathom" float package, guidelines and runners for buoyant-frame mode operation. Does not include: upper beam and rigid-frame legs, ballasting material for weightstand.

**WORKING DEPTH** is 650 m (2,000 ft) for the Vibrohead and 400 m (1,200 ft) for the standard "200- fathom" Float Package accompanying the Buoyancy frame system. Floats rated to 500 m and to 800 m are available on special request.

\*On 60Hz current, frequency is 3500vpm, nominal force is 48kN (10,800 lbs) at high eccentric setting and 32kN (7,200 lbs) on low setting. On 50 Hz current, frequency is 2900vpm, nominal force is 32kN (7,200 lbs) at high eccentric setting and 22kN (5,000 lbs) on low setting. Standard settings are at 32kN in either case.

\* See Parts & Accessories for underwater power cables, generators and corenoses.

All prices FOB, San Diego California USA.



Length = 26 in      Width = 23 in      Height = 12 in

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Effective January 2008  
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### Non-armoured Underwater Electrical Power Cable

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main section connecting with the initial control-box section and the terminal vibrohead section.

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### P-3, P-5

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Standard length 50 meters (165 ft), underwater connectors at each end	<b>\$ 1,100.00</b>
Per additional meter (up to a total of 150 meter lengths)	<b>\$ 8.00 / meter</b>
For Kevlar cored center SM cable (required for cables 150 and over)	<b>\$ 48.00 / meter</b>

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### Riveted Corenoses, Catchers & Parts

*IMPORTANT: Client is to specify exact OD and wall thickness of coretube and, if applicable, of liner. Send samples if possible.*

<i>* Corenoses with orange-peel core-catcher for linerless coretubes with an OD of:</i>	<b>3.0" (75mm)</b>	<b>3.5" (90mm)</b>	<b>4.0" (100mm)</b>
Set of 5 corenoses w/ catchers, stainless steel	\$1,700*	\$1,725*	\$1,820*
Core-catcher (spare, each) stainless steel	\$55	\$59	\$62
Jig for hole alignment in coretube	\$210.00	\$220.00	\$230.00
Rivet tool, Heavy duty	\$300.00	\$300.00	\$300.00

*\* Add 20% for corenoses made for coretubes with liners. Sample of the coretube and of the liner are required for exact fit.*

**Portable Generators:** Price upon request

ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE  
All prices FOB, Poway California USA

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## INDEMNIFICATION NOTICE

The coring equipment sold by ROSSFELDER Corporation is meant to be operated or handled by persons versed in the utilization of oceanographic, coring and drilling equipment and from vessels or platforms properly equipped to this end. By accepting the delivery of the equipment, the client agrees to indemnify and hold harmless ROSSFELDER Corporation, its officers and employees from and against all claims, damages, losses and expense, including reasonable attorney's fees, which are for bodily injury or death or for property damage including loss of use, arising out of or in connection with the operation of such equipment at sea or otherwise.

## ONE YEAR LIMITED WARRANTY

All ROSSFELDER Corporation Vibrocoring units are warranted for a period of one year (12 months) from date of purchase for the original owner. We will repair at our facility, without charge for parts or labor, any defects due to faulty materials or workmanship. This warranty does not apply to accessories or damage caused by improper usage, electrical damage caused by improper current supplies or voltage loss due to long power cable lengths. This warranty also does not cover leaks or water damage to vibrator motor or electrical controls. A complete vacuum inspection of the vibrohead and O-ring inspection of all connections prior to each day of operation is recommended.

To obtain warranty service the customer must receive a return authorization from Rossfelder Corporation and the unit must be shipped **PREPAID**. Rossfelder Corporation will not accept **COLLECT** freight. Unit must be packaged in a wood crate with forklift skids and insured. All warranty work will be returned *freight collect*.

While great effort has been made to provide guidelines and energy outputs for each model, ROSSFELDER Corporation cannot warrant its vibrocoring units to penetrate a specific water saturated substrate to a particular depth. Customers are cautioned that core-depth-penetration is greatly affected by water content, grain size and shape, type of material, depositional environment, cementation, etc. Therefore the suitability of a unit for a specific application must be determined by the customer and cannot be warranted by ROSSFELDER Corporation.

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