



Marine growth sample tool

VORTEX DREDGE SYSTEMS

PATENTS PENDING

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Marine growth sample tool

Introduction:

- This tool is designed to remove samples of marine growth from it's habitat, suck the samples from the removal area and contain the samples in one of seven numbered sample bags for the purpose of recovery to deck and further scientific analysis of the samples.
- The tool is used in conjunction with a Vortex dredge pump and 2 ½ inch Venturi to create the vacuum needed suck the samples to the bags.
- Sample 'bags' are built with cam lock fittings to minimize on deck time of the ROV when swapping out used sample bags for new ones.
- Sample bags are made of an inner liner with a sewn mesh with holes of approximately 1mm x 1mm square. The outer bag is a woven nylon mesh of approximately 1mm x 1mm square. The outer bag is only in place to protect the inner liner and its contents. The outer bag is re used on the next sample by fitting a new inner liner to lessen environmental footprint through recycling the outer bag.
- The tool is supplied in a frame to simplify interface with host ROV.

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Specifications.

- Hydraulic requirement:
- Dredge pump:
Pressure = 3000psi (206bar)
Flow = 10.5 gpm (40lpm)
- Carousel location cylinder:
Pressure = 500 psi (34 bar) minimum. 3000psi (206bar) maximum.
Flow = 1.5 gpm (6 lpm) Minimum (always set speed of cylinder as per following instructions)
- Weight of tool = 50kg in air
Weight of tool = 30kg in fresh water
- Individual sample bag size by volume = approximately 2 litres.
- This tool has been commissioned with 60psi (4.1bar) in the carousel and bag circuit.

NOTE:

- ALWAYS function test the carousel through one full rotation with dredge pump switched on after each launch at around 10mtr depth. This will bled out the air from the carousel components.

Marine growth sample tool operation.

- Mount frame to ROV in a safe and secure location. Ensure sample bags cannot be obstructed by thruster wash.
- Fit dredge pump in safe and secure location on ROV, connect hydraulics as per dredge pump manual.
- Connect hydraulic hoses from carousel location cylinder to ROV. Where applicable, fit flow control, / cross pilot relief block between ROV and cylinder as shown in following picture.
- Function test carousel location cylinder and set speed of cylinder to gentle smooth operation so as to allow operator to view carousel mechanism shifting to next sample bag.
- Install two tooling cameras to enable ROV operator to view carousel location indicator, mechanism, carousel bag numbers and importantly – observe the bags to ensure they are not being over filled.

NOTE: The sampling bags should not be run until full as over-filling the bags will damage the distributor valve surfaces, jam the distributor ports and compromise the function of the sampler.

NOTE:

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Marine growth sample tool operation continued.

- Launch ROV and function test carousel through one entire cycle with dredge pump running. (see below).
- On location, Check that carousel indicator is at bag number one. Confirm on dive log ROV depth, habitat position, recording DVD time.
- Start dredge pump at lowest hydraulic flow / pressure setting. Begin scraping samples from habitat, wind up dredge hydraulics so as to attain enough suction to ingest samples into scraping head and into suction hose.
- Log sample as per clients request. Shut down dredge pump, shift carousel to number 2 location. Confirm dive log data.
- Continue to next depth and habitat location.

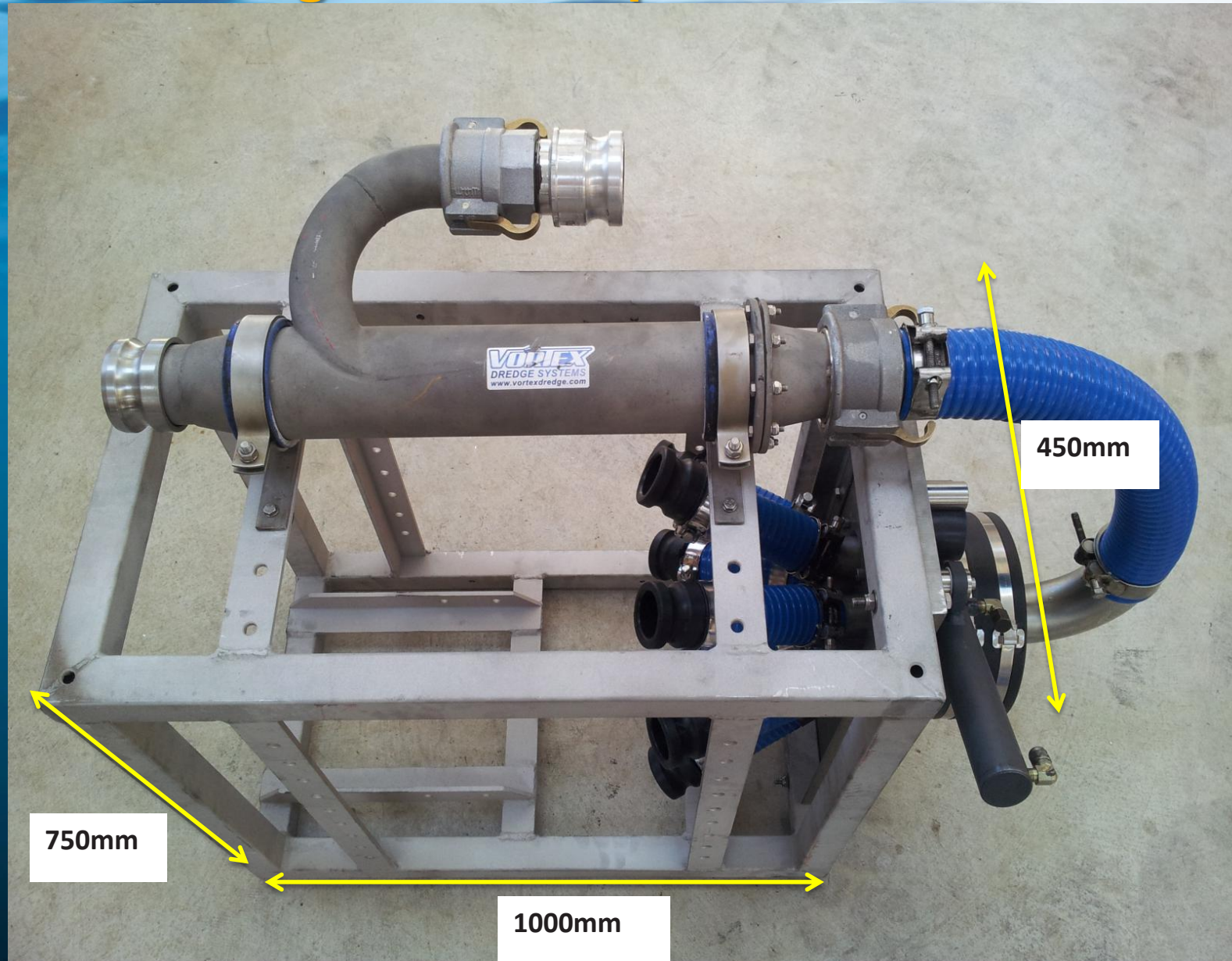
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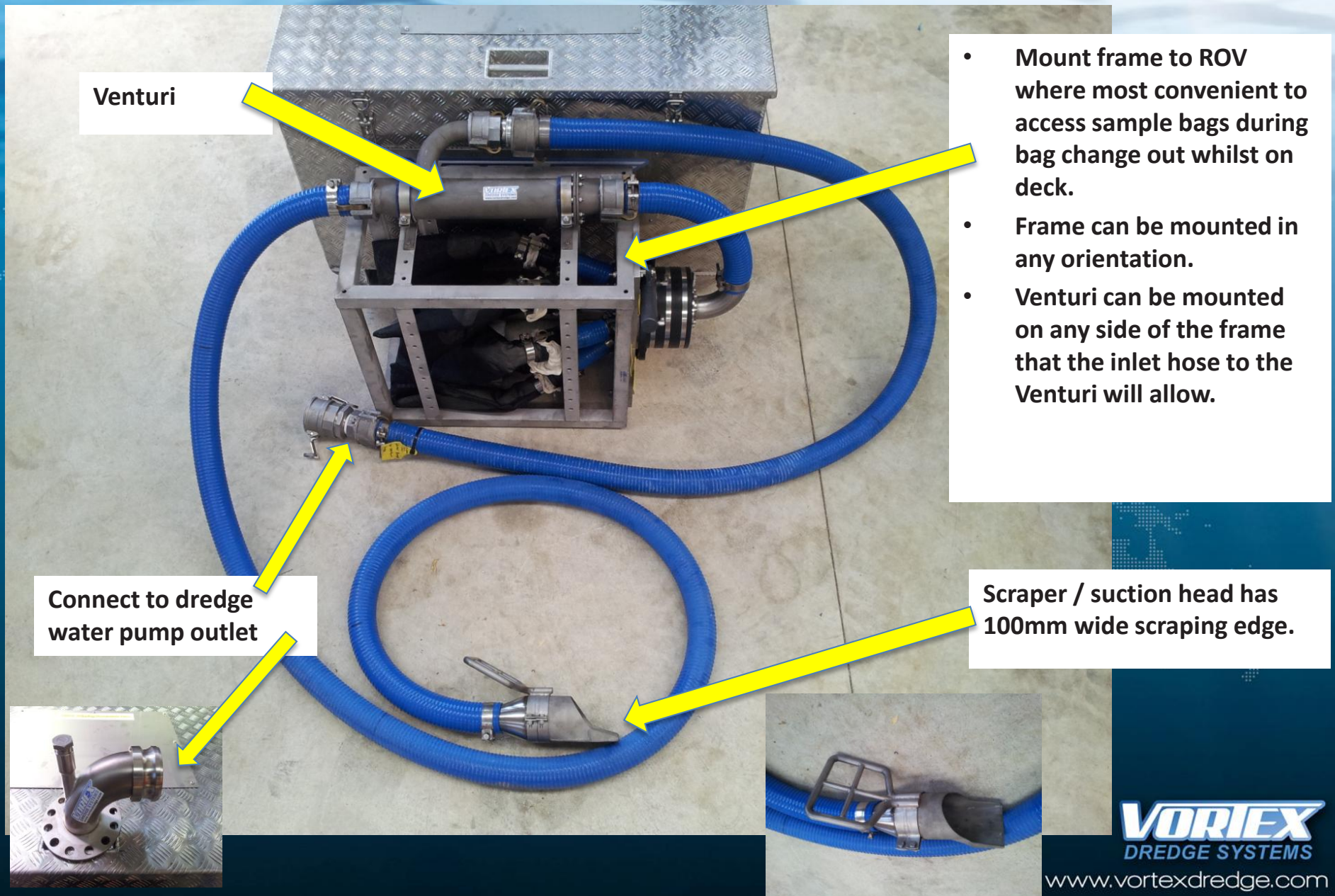
Marine growth sample tool installation.



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Marine growth sample tool installation.



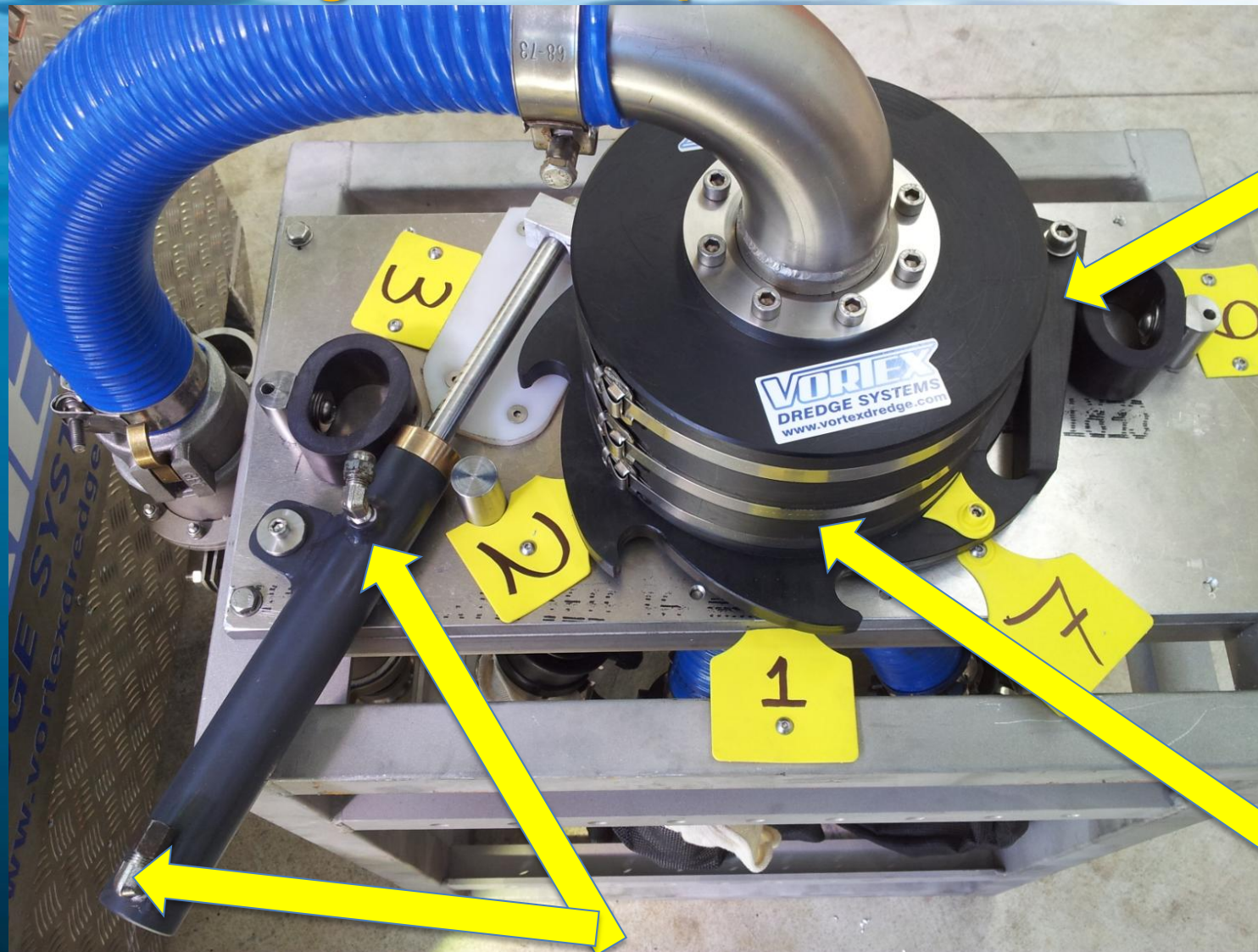
- Sample bag numbers 1 to 7.



- Carousel location indicator.
- Sample bag number 5 being filled in this location.

- Mount ROV tooling camera to give best view of carousel location indicator and sample bag numbers.

Marine growth sample tool installation.



Latch prevents carousel rotating in opposite direction.

Carousel has distributor ports inside this round body.
Ports are non-metallic sliding valves to save weight, so care must be taken not to over fill bags and have debris jam the sliding valves.

Connect carousel location cylinder to ROV.

It is the ROV operator responsibility to ensure hydraulic flow to actuating cylinder is slowed appropriately to a manageable speed according to water depth and pressure to allow steady transition from one sample bag to the next.

Marine growth sample tool installation.

-4 JIC female swivel connections connect to ROV solenoid pack. Hose length 3 mtr long. 3000psi maximum input.

Cross port relief valves are pre set to limit torque on carousel rotating body in case of rock jams in ports.

Connect these hoses to carousel location cylinder.

Depending on application, versions of this tool can be supplied with flow control valves used to adjust speed of carousel location cylinder.

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Marine growth sample tool. Bag assembly.



1. Sample bag components.
Inner liner (white)
Outer bag (black)
Cam lock / hose tail
Hose clamp
2. Slide inner liner evenly into outer bag. Slide female cam lock into inner liner.
3. Roll entire assembly around hose tail of cam lock. Slide hose clamp over assembly.
4. Tighten hose clamp securely over hose tail and assembly.

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Marine growth sample tool inventory.

1. One frame complete with marine sample tool carousel and 7 assembled bags
2. 2 x 3000mm long -4 jic hydraulic hoses, 2 x 300mm long -4 jic hydraulic hoses, cross port relief valve.
3. 1 x scraper head with 'D' shape ROV manipulator handle.
4. 1 x 4700mm long 2 ½ inch suction hose with female cam lock on one end.
5. 1 x 3200mm long 2 ½ inch water pump to Venturi hose with female cam lock at both ends.
6. 1 x 3 inch female to 2 ½ inch male reducing cam lock.
7. 2 x spare male to hose tail 2 inch cam locks.
8. 15 x spare female to hose tail 2 inch cam locks.
9. 18 spare 56mm to 59mm hose clamps.
10. 1 x spare 52mm to 55mm hose clamp.
11. 92 spare inner liner bags.
12. 9 spare outer bags.
13. 1 x 800mm x 800mm x 1200mm shipping box
14. 1 x operations manual.

Additional equipment required to operate this tool:

- Vortex dredge water pump.
- Vortex 2 ½ inch dredge Venturi.

Consumables to be replaced at clients cost:

- Inner liners.
- Outer bags.
- Hose clamps.
- All water hoses.
- Cam locks.

Servicing:

- Ensure entire assembly is washed down with fresh water after each dive.

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Notes:

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