

Wet test in tank with Umbelweel
" test w Blyth " tether

C903RV

SOIL MACHINE DYNAMICS LIMITED



MONTEREY BAY AQUARIUM RESEARCH
INSTITUTE

TIBURON II ROV SYSTEM

REMOTELY OPERATED VEHICLE

FACTORY ACCEPTANCE TEST

SMD Reference C903-18-001

SMD Serial Number of Unit under test:

ROV (C903RV).....

Quote for training (mark).

Spares

Cost of dummy plugs from Deck.

Check on Shipping.

TABLE OF CONTENTS



3 ROV TEST RECORDS

All operations described in this procedure should be conducted in accordance with SMDH safety policy requirements. The load test area must be cordoned off to all personnel with the exception of those directly involved in the test.

3.1 LOAD TEST LIFT POINT

3.1.1 *Pre Load Test*

All component parts shall be visually examined prior to the load test for flaws, cracks, deformation and signs of defective manufacture. All welds in the load path shall be examined in accordance with drawing AB5465.

Note: - This will have been carried out as part of the fabrication process and may be carried out at the fabricators premises.

3.1.2 *Test Procedure*

The load test will be carried out on the ROV lift point in accordance with drawing number AB5465

3.1.3 *Post Load Test*

The lift point shall be visually examined for signs of flaws, cracks and permanent deformation.

3.2 LOAD TEST FRAME

3.2.1 *Pre Load Test*

All component parts shall be visually examined prior to the load test for flaws, cracks, deformation and signs of defective manufacture. All welds in the load path shall be examined in accordance with drawing AB4312.

Note: - This will have been carried out as part of the fabrication process and may be carried out at the fabricators premises.

3.2.2 *Test Procedure*

The load test will be carried out on the ROV frame in accordance with drawing number AB4312

3.2.3 *Post Load Test*

The frame shall be visually examined for signs of flaws, cracks and permanent deformation.

3.3 ACCEPTANCE CRITERIA

3.3.1 *Acceptance Checks*

All visual examinations shall reveal no damage or deformation or other evidence of failure.



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref : C903-18-001 - ROV FAT

3.3.3 Acceptance Certification

The following certification and records should be collated and passed to the project manager along with signed off copies of this document.

	Check
a. Pre-load test visual inspection results	
b. Pre-load test weld inspection results and NDT operator qualification certificates	
c. Load test certificate (report of thorough examination of lifting equipment)	
d. Load cell calibration certificate	
e. Post-load test visual inspection results	
f. Post-load test weld inspection results and NDT operator qualification certificates	



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref :C903-18-001 - ROV FAT

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
9.	Aux Cam 1	Confirm Operation			
10.	Aux Cam 2	Confirm Operation			
11.	Aux Cam 3	Confirm Operation			
12.	Aux Cam 4	Confirm Operation			

3.4.2 Pan & Tilts and Rotator

P&T units will be operated through its full range whilst checking for clearance with adjacent structure and free movement of harnesses. Confirm position feedback sensor operation. Item 15 will be used to test circuit in place of items 16 respectively.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
13.	P&T-25 (1)	- Confirm power @ pins 1&2 of harness +24VDC, pin 2 live. - Confirm RS485 link			
14.	P&T-25 (2)	- Confirm power @ pins 1&2 of harness +24VDC, pin 2 live. - Confirm RS485 link			
15.	P&T-10 (1)	Confirm Operation			
16.	P&T-10 (2)	Confirm Operation			

Well send 14 25
14 10.



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref :C903-18-001 - ROV FAT

3.4.3 Lamps & Ballast

Each lamp will be switched on briefly to confirm operation. Lamps 1-4 are designed to dim individually. Ensure HMI light head is submerged in water before striking the ballast, ballast must not be ignited in air for more than 15minutes. Wait 10 seconds between re-strikes.

Items 17 will be used to test Items 18 - 20. Item 21 will be used to test Items 22 – 26, though a single ballast.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
17.	Lamp 1 – On / Off Dimming	Confirm Operation (max 5 secs in air)			
18.	Lamp 2– On / Off Dimming	Confirm Operation (max 5 secs in air)			
19.	Lamp 3– On / Off Dimming	Confirm Operation (max 5 secs in air)			
20.	Lamp 4– On / Off Dimming	Confirm Operation (max 5 secs in air)			
21.	HMI Lamp 1– On / Off	Confirm Operation (max 5 mins in air)			
22.	HMI Lamp 2– On / Off	Confirm Operation (max 5 mins in air)			
23.	HMI Lamp 3– On / Off	Confirm Operation (max 5 mins in air)			
24.	HMI Lamp 4– On / Off	Confirm Operation (max 5 mins in air)			
25.	HMI Lamp 5– On / Off	Confirm Operation (max 5 mins in air)			
26.	HMI Lamp 6– On / Off	Confirm Operation (max 5 mins in air)			



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref: C903-18-001 - ROV FAT

3.4.7 Homer

Verify that Homer is appropriately secured to the vehicle. ^{PS} 232 signal is received from Homer to test PC.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
30.	Homer	Confirm Signal			

3.4.8 Doppler Velocity Log

Verify that it is appropriately secured to the vehicle. Ensure Altitude reading can be obtained from DVL as well as altimeter. Full operation to be confirmed during wet test.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
31.	DVL	Confirm Operation			

3.4.9 Altimeter

Verify that it is appropriately secured to the vehicle. Ensure altitude reading can be obtained with Altimeter as well as DVL. Full operation to be confirmed during wet tests.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
32.	Altimeter	Confirm Operation			

3.4.10 CTD

Verify that it is appropriately secured to the vehicle; verify depth reading can be obtained with CTD as well as Depth Sensor. Full operation to be confirmed during wet tests.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
33.	CTD	Confirm Operation			



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref :C903-18-001 - ROV FAT

3.5 Instrumentation

3.5.1 Pressure Transducers

Pressure transducer operation will be checked using an external test gauge at an appropriate test point. Appropriate measurements will be taken to confirm the transducer calibration.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
39.	System Pressure (Thruster circuit)	Confirm Operation			
40.	System Pressure (12 Station 1)	Confirm Operation			

3.5.2 Temperature Sensors

A resistor box will be used to check the temperature scale.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
41.	Motor Winding Temp	Confirm Operation			
42.	Thruster circuit oil temp	Confirm Operation			
43.	Pod Temp	Confirm Operation			



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref :C903-18-001 - ROV FAT

3.5.4 Moisture Sensors

Moisten each sensor and verify that the relevant alarm is activated. Ensure that the sensor is positioned in a suitable place where water would be expected to collect first in the event of ingress.

ID	Item /Function	Procedure	Comments	Witness SMD Client	
49.	Main Pod	Confirm Operation			
50.	Thruster Control Unit	Confirm Operation			
51.	HCU	Confirm Operation			
52.	STBD Junction Box	Confirm Operation			
53.	PORT Junction Box	Confirm Operation			
54.	Lamp Dimming Box	Confirm Operation (Cabling only)			
55.	Umbilical Termination	Confirm Operation (Cabling only)			

3.6 General Hydraulic Tests & Power Pack

3.6.1 General

The following procedure will be followed for each hydraulic function:

- 1) Operate through full working range.
- 2) Check for leaks.
- 3) Check free movement of associated hoses and cables.
- 4) Observe correct operation of appropriate transducers. Verify calibration and graphics screen representation.

Confirm that flow control settings are acceptable, where applicable.

Use flow meter to check each hydraulic line.



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref :C903-18-001 - ROV FAT

3.7 Hydraulic Circuit

Connect a portable deck HPU to the circuit and confirm operation of all functions.

3.7.1 Thrusters

All thrusters operate from the thruster control unit (TCU) located at the rear of the vehicle.

ID	Item /Function	Procedure	Comments	Witness	
				SMD	Client
61.	ROV Forward (FWD)	Confirm Operation			
62.	ROV Reverse (REV)	Confirm Operation			
63.	ROV Port Lateral (P.L)	Confirm Operation			
64.	ROV Starboard Lateral (S.L)	Confirm Operation			
65.	Roll Clockwise (R.C)	Confirm Operation			
66.	Roll Counter-Clockwise (R.CCW)	Confirm Operation			
67.	ROV Ascend (AC)	Confirm Operation			
68.	ROV Descend (DC)	Confirm Operation			
69.	Spare servo station FWD	Confirm Operation			
70.	Spare servo station REV	Confirm Operation			

3.7.2 12-ST VT

Connect the deck cart the circuit and confirm operation of all functions on this circuit. These include: -

- 12F Directional valve pack



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref :C903-18-001 – ROV FAT

ID	Item /Function	Procedure	Comments	Witness SMD Client	
78.	Spare #6	Confirm Operation	Record max flow (lpm).....		
79.	Spare #7	Confirm Operation			
80.	Spare #8 Prop	Confirm Operation			
81.	Spare #9 Prop	Confirm Operation			
82.	Spare #10 Prop	Confirm Operation			
83.	Spare #11 Prop	Confirm Operation	Record max flow (lpm).....		

3.7.6 Variable Buoyancy

Confirm power at terminals. Full functionality to be tested during wet tests. → Turn pump on

ID	Item /Function	Procedure	Comments	Witness SMD Client	
84.	Variable Buoyancy	Confirm Operation Per SMD SMD			

4 ROV TEST RECORDS

4.1 Weight and Trim Analysis

Connect a single 6 tonne sling to the ROV lift set to ensure sufficient length of sling (min 6m.) between the crane hook and ROV to allow free movement of the ROV during testing. SMDH test tank contains fresh water.

→ with tool steel → the lead to simulate item moving

ID	Item /Function	Comments	Witness SMD Client	
85.	Overall Height of ROV (mm) Measure and record			
86.	Overall Length of ROV (mm) Measure and record.			
87.	Overall Width of ROV (mm) Measure and record.			



MONTEREY AQUARIUM BAY RESEARCH INSTITUTE

TIBURON II – Ref :C903-18-001 - ROV FAT

6 APPENDIX: TEST CERTIFICATES

A copy of the following test certificates is attached.

Part No	Cert No	Description
		SMD Work Instruction 63
		Load cell calibration certificate
		ROV Lifting Set certificate
		ROV Load Test certificate
		Pod pressure vessel test
		Motor test certificate
		Certificate of conformity (Quantum ROV Buoyancy Module)



EXCELLENCE
IN
UNDERWATER