

# Moving Vessel Profiler Operations LatMix R/V Endeavour



The Moving Vessel Profiler is a free-fall profiler that is pulled back to the surface with a 15 hp winch. The data returned is similar to a seasoar, though the principal of operation is different.

## Equipment:

The Moving Vessel Profiler consists of:

- A winch
- 640 m of conducting kevlar line
- A 170-lb in air fish equipped with oceanographic instrumentation

### Winch

- 440 V 3 phase, four wire, 17.6 A
- 15 HP hydraulic winch
- Drum operates in three modes
  1. Free-spool
  2. braked
  3. winch in
- Operated from
  - Deck

- Remotely from the lab

### **Kevlar Line**

- 4-conductors
- 640 m
- 0.24" diameter
- 3000-lb maximum break strength

### **Free-fall fish**

- 170 lb in air
- 965 mm long
- Sensors: SBE 39 CTD, Fluorometer, optical back scatter, oxygen

## **Installation**

- Winch secured to deck: *TBD*
- A cradle is mounted on the stbd side of the A frame (See picture above).
- Communication lines and power lines are run along rail:
  - power is connected to 440 V outlet outside the lab
  - communications go into lab

## **Description of Operations:**

### **Deployment**

*Requires two people*

*Requires less than 5 minutes*

The boom on the winch is articulated in and the MVP is on deck. Deployment is as follows:

1. Ship slows to 4kts or less over water and on course
2. Bridge okays deployment
3. Aft safety lines are dropped
4. Winch operator raises fish from cradle; deckhand helps guide it until deck is cleared
5. Winch operator articulates boom aft; deckhand guides it past stanchions
6. Winch operator lowers fish into water
7. Deckhand notifies bridge that fish is deployed.

### **Underway operation**

The fish goes up and down, depth depending on the ship speed and the maximum amount of line out. It is controlled by a simple control system:

1. Winch freewheels.
  - fish drops to pre-programmed depth or until max line is reached, indicated with a mechanical messenger on the line.
- Winch applies brake
  - Fish starts to come to surface due to line drag
- Winch pulls in

- Fish comes to surface until a messenger taped to the line trips a sensor on the sheave.

## Recovery

*Requires 3 people (2 if calm weather)*

*Requires less than 5 minutes*

1. Ship slows to less than 4 knts, maintaining heading
2. Fish is brought near the surface
3. Bridge radios ok to start recovery
4. Safety lines are lowered
5. One deckhand uses fending pole on line to help prevent swing
6. Second deckhand stands at inboard stanchion to guide fish past it
7. Winch operator brings fish up to near sheave
8. Winch operator articulates boom inboard
9. Fish is lowered to the cradle



## Operational Constraints

We recognize that the ship's safety is paramount. However if safety permits we prefer to operate under the following constraints to avoid damage to our gear. If at all possible please communicate changes to the MVP operators.

**Ship speed:**

- Must be making way through the water so line does not become caught in screws
- Should not be moving faster than 12 kts through water. 14 kts may be OK, but it would be best to communicate with MVP operators first.

### Manoeuvring:

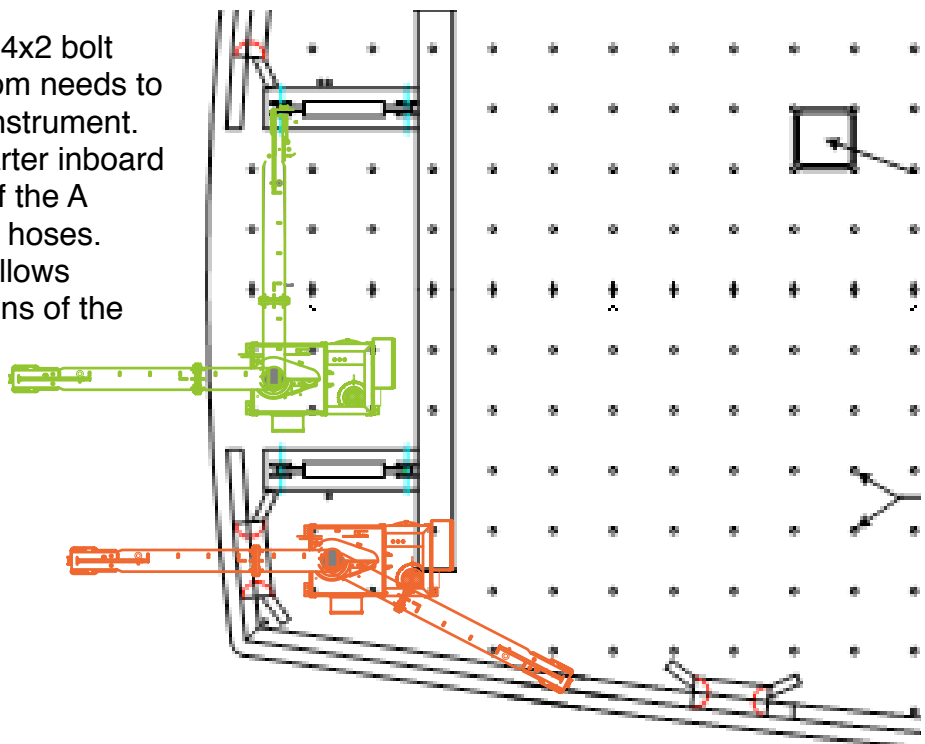
- Sharp manoeuvres are to be avoided if at all possible
  - large line angles are very effective at stripping the jacket.
  - In shallow water a sudden drop in line tension could allow the fish to drop too quickly.
- IF A SHARP TURN IS NECESSARY: Please try and warn the MVP operators
  - We can stop the fish and that will at least reduce a lot of the drag

### Objects in the water:

- Hitting deadheads or kelp balls is to be avoided if possible. If a collision is unavoidable:
  - If possible, slow the ship (without backing) this will reduce line drag
  - tell the MVP operators - they can stop upcasts and again reduce line drag.

### Deck Layouts?

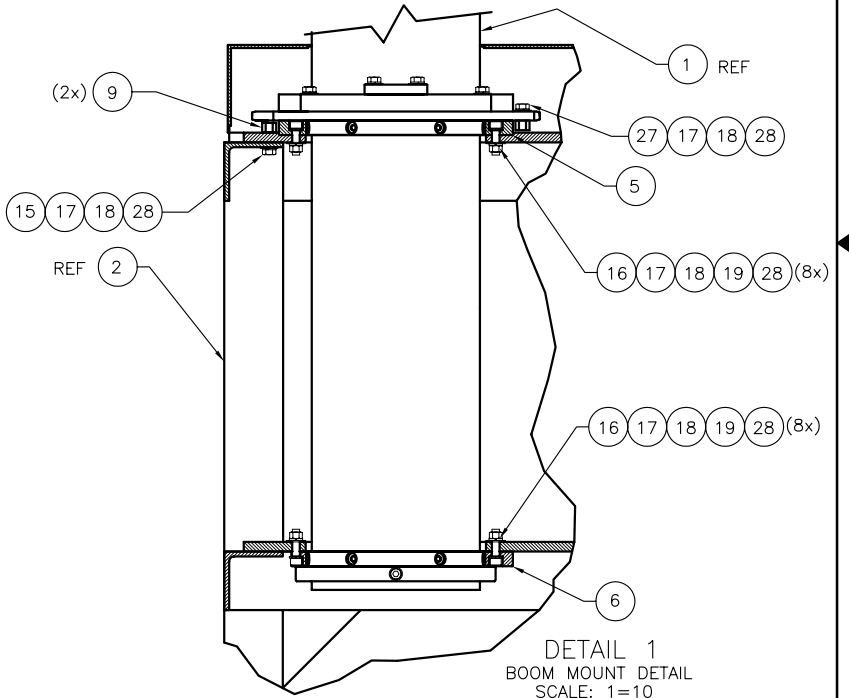
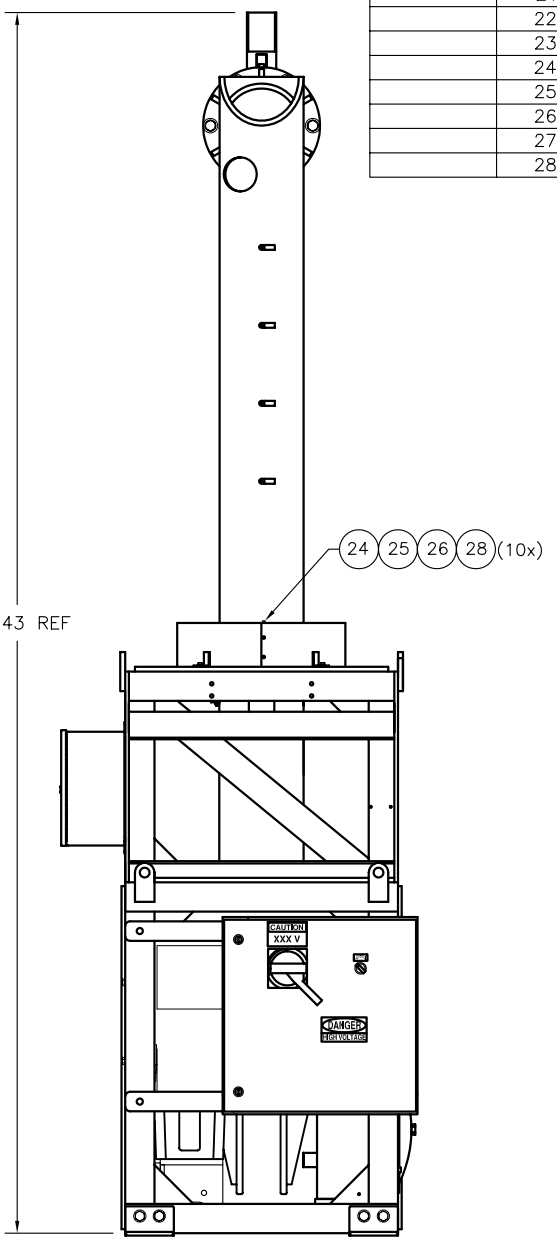
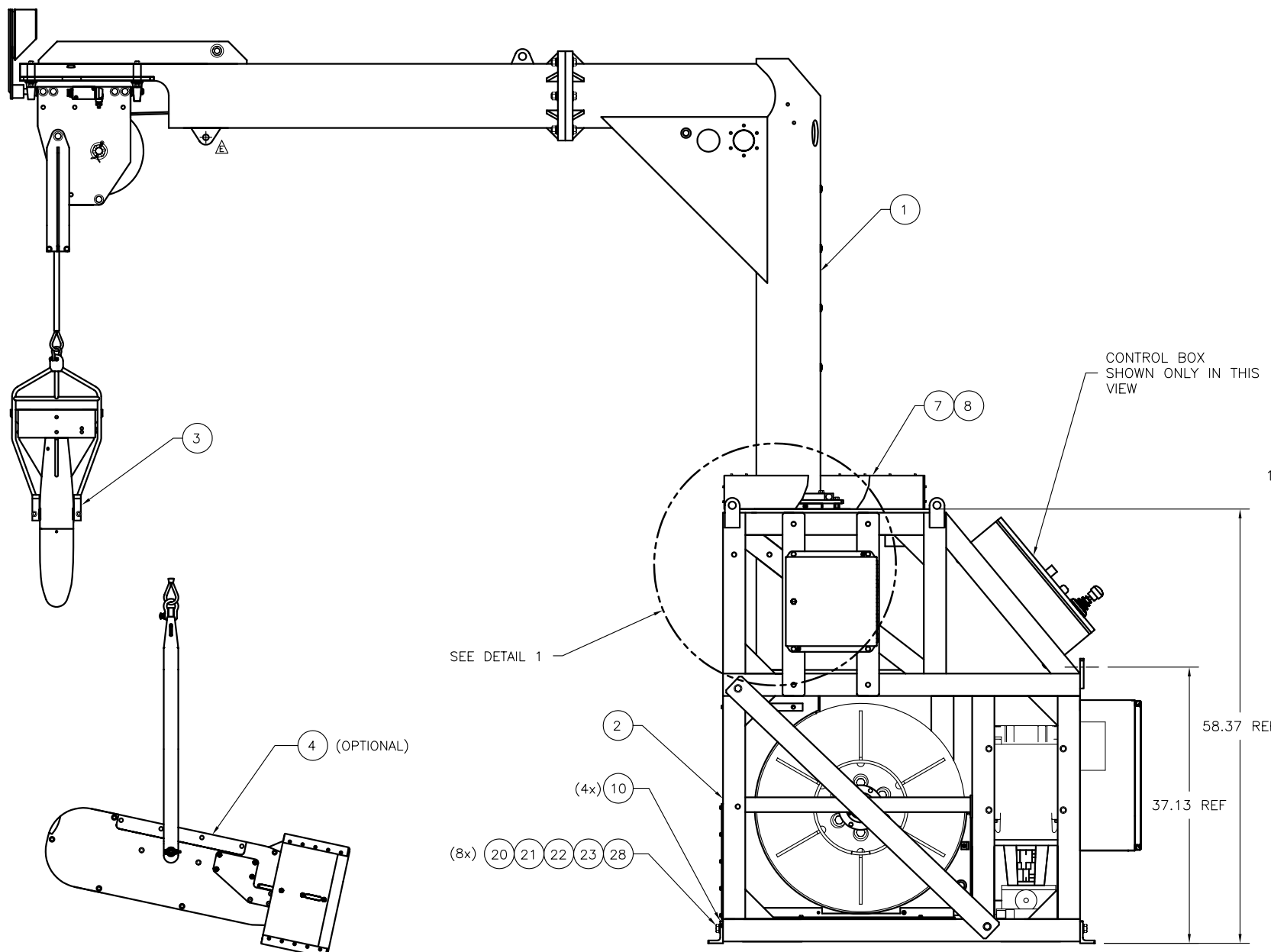
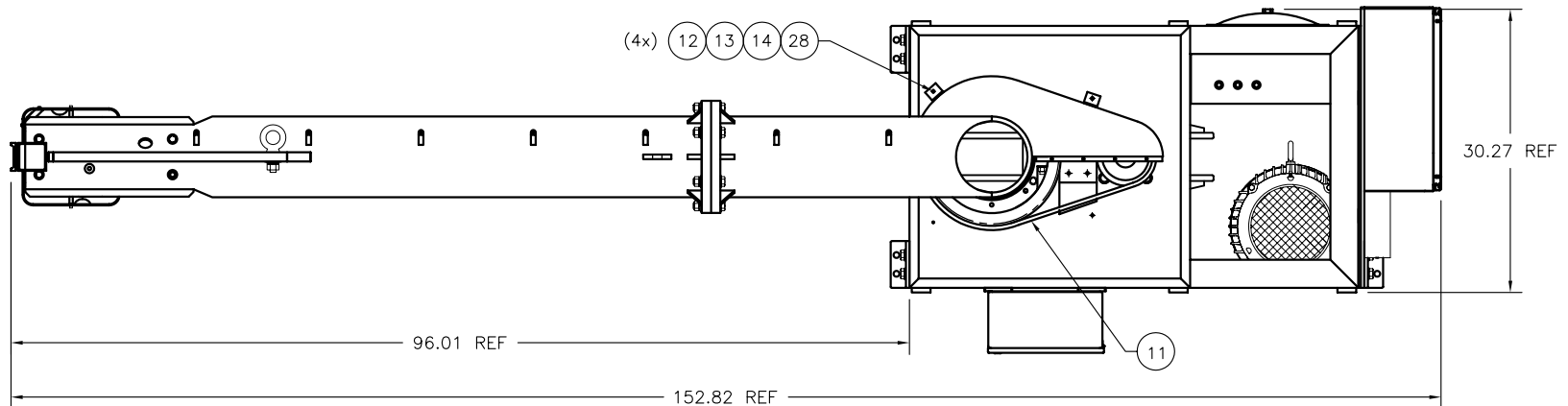
The winch should fit on a 4x2 bolt pattern. However, the boom needs to articulate to recover the instrument. Swinging from the aft quarter inboard seems difficult because of the A frame rams and hydraulic hoses. The alternatives are as follows depending on what sections of the bulwarks can be removed.






Emergency hatches  
(flush with deck)  
Must not be blocked

1"-8 (UNC) on  
2 foot centers



COTS/IMC #	ITEM NO.	QTY.	DESCRIPTION	SPECIFICATION/ PART #/MRN	REV.	MANUFACTURER/ NSCM
	1	1	BOOM AND SHEAVES ASSEMBLY	001021003	D	BOT
	2	1	WINCH FRAME ASSEMBLY	001025000	G	BOT
	3	1	SINGLE SENSOR FISH ASSEMBLY	00102B000		BOT
	4	1	MULTI SENSOR FISH ASSEMBLY	00104C000		BOT
	5	1	ROTATOR BEARING RING	001035103		BOT
	6	1	BOTTOM BEARING RING	001025101		BOT
	7	1	CHAIN GUARD (MALE HALF)	001035101	A	BOT
	8	1	CHAIN GUARD (FEMALE HALF)	001035102	A	BOT
	9	2	BOOM STOP NUT	001038008		BOT
	10	4	FRAME ANGLE	001025018		BOT
	11		#60 CHAIN 41 LINKS + 1 MASTER LINK	S.S.		
	12	4	1/4-20UNC x 3/4" HEX BOLT	S.S.		
	13	4	1/4" FLAT WASHER	S.S.		
	14	4	1/4" LOCK WASHER	S.S.		
	15	1	3/8-16UNC x 1-1/2" HEX BOLT	S.S.		
	16	16	3/8-16UNC x 1-1/2" SHCS	S.S.		
	17	18	3/8" FLAT WASHER	S.S.		
	18	18	3/8" LOCK WASHER	S.S.		
	19	16	3/8-16UNC HEX NUT	S.S.		
	20	8	5/8-11UNC x 2" HEX BOLT	S.S.		
	21	16	5/8" FLAT WASHER	S.S.		
	22	8	5/8" LOCK WASHER	S.S.		
	23	8	5/8-11UNC HEX NUT	S.S.		
	24	10	#8-32UNC x 1/2" SHCS	S.S.		
	25	10	#8 FLAT WASHER	S.S.		
	26	10	#8 LOCK WASHER	S.S.		
	27	1	3/8-16UNC x 1" HEX BOLT	S.S.		
	28	A/R	ANTI SEIZE	SILVER		LOCTITE

REV.	DATE	REMARKS
E	JAN 10/07	UPDATED FRAME AS PER ECO-01574 & 01558
D	JUNE 26/06	UPDATED FRAME AS PER ECO-1466
C	JAN. 08/04	UPDATED FRAME AS PER ECO-1189
B	APR. 29/03	CHANGED MATERIAL LIST AS PER ECO-1036
A	FEB. 19/03	CHANGED BOOM AS PER ECO-0933
	MAY 09/01	PRODUCTION ISSUE

NSCM		 <b>BROOKE OCEAN TECHNOLOGY LTD.</b> 50 THORNHILL DRIVE, UNIT 11 DARTMOUTH, NOVA SCOTIA CANADA B3B 1S1 TEL: (902) 468-2928 FAX: (902) 468-1388	
UNLESS OTHERWISE NOTED 1. DIMENSIONS IN INCHES 2. X.X ± 0.025" 3. X.XX ± 0.010" 4. X.XXX ± 0.003" 5. FRACTIONS ± 1/32" 6. ANGLES ± 1/2" 7. ECCENTRICITY .003 MAX 8. FLATNESS 0.003" T.I.R. 9. SURFACE FINISH 125/ 10. BREAK EDGES	DESIGNED BOT DRAWN DW CHECKED ME APPROVED AF QA	PROJECT <b>MOVING VESSEL PROFILER</b> TITLE <b>GENERAL ASSEMBLY</b>	REVISIONS B PROJECT NO. 0010 DRAWING NO. 0010-2-1-0-01 SCALE 1:20 DATE MAY 09/01 SHEET 1 OF 1 REVISION E

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*MVP Load Test Report*

**Project No.:** 06101  
**MVP Model:** MVP200  
**Serial No.:** 10541  
**Date:** December 2007  
**Customer:** University of Victoria

**Approval that the assemblies listed meets BOT assembly standards:**

Description	Safe Working Load	Proof Load (1.25:1)	Test Approved
Winch Proof Load Test	400 lbs. (182 kg)	500 lbs. (227 kg)	ME
Lifting Sling Proof Load Test	2000 lbs. (909 kg)	2500 lbs. (1136 kg)	See Attached
Lift Point Proof Load Test	400 lbs. (182 kg)	500 lbs. (227 kg)	ME
Boom Proof Load Test	400 lbs. (182 kg)	500 lbs. (227 kg)	ME
Outer Sheave Proof Load Test	282 lbs. (128 kg)	353 lbs. (160 kg)	ME
Inner Sheave Proof Load Test	282 lbs. (128 kg)	353 lbs. (160 kg)	ME
Towcable Proof Load Test	600 lbs. (273 kg)	750 lbs. (341 kg)	ME
Cable Termination Proof Load Test	300 lbs. (136 kg)	375 lbs. (170 kg)	ME
Fish Shackle Proof Load Test	300 lbs. (136 kg)	375 lbs. (170 kg)	ME
Fish Bridal Proof Load Test	300 lbs. (136 kg)	375 lbs. (170 kg)	ME

**DECLARATION:**

We certify that the above items described in this document have been proof tested to exceed the values noted above.



**I.M.P GROUP LTD**

ADDRESS: 120 Thornhill Drive  
 Burnside Industrial Park  
 Dartmouth  
 Nova Scotia, Canada  
 B3B 1S3

**WIRE ROPE & RIGGING DIVISION**

PHONE: (902) 468-2111  
 FAX: (902) 468-3077  
 EMAIL: info@impmarine.com  
 WEBPAGE: www.impmarine.com

Certificate Number	Tag Number
185-0014853	IMP-21141

Inspection Certificate

Description
BRIDLE 4 LEGGED, 2 LEGS - 3/8" x 102" & 2 LEGS - 3/8" x 86" ALL LEGS C/W HA16 mm MASTERLINK ASSEMBLY AND 4 X G2130 SHACKLES

Model Number	Serial Number	Lot Number	Manufacture Date

Product SKU	Date of Record	Proof Load	Proof Test Factor
	20070115	4 TON	2:1

Standards	Vert	Basket	Choker	Working Load Limit	Safety Factor
ASME				2 TON	5:1

Date Tested	Invoice Number	Status	Inspector	Comments
20070115		Passed	John Snook	

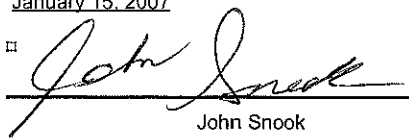
Markers and Suppliers			
Account Name	BROOK OCEAN TECHNOLOGY	Location	BROOK OCEAN TECHNOLOGY (1)
Address	50 THORNHILL DR DARTMOUTH, NOVA SCOTIA, CANADA B3B-1S1	Address	11-50 THORNHILL DRIVE DARTMOUTH, NOVA SCOTIA, CANADA B3B1S1

Examination Company	
Name	IMP Group - Dartmouth
Address	120 Thornhill Drive Dartmouth, Nova Scotia, Canada B3B 1S3

I certify that the above item(s) were visually inspected as detailed above on:

January 15, 2007

For inspection company:

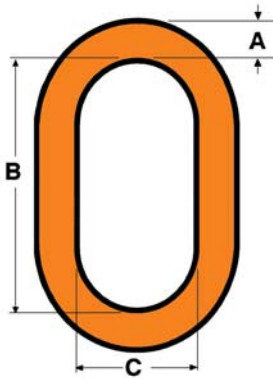
  
 John Snook



Master Links and Quad Assemblies for use in DNV 2.7-1 Wire Rope Slings

### Master Links

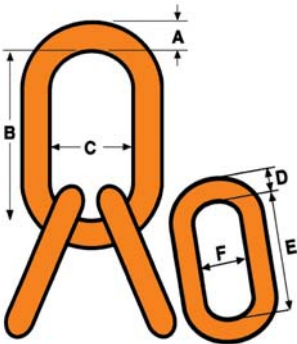
Certified to DNV 2.7-1  
& EN 1677-4



Part Code	Description	Dimensions mm			WLL t	Mass kg	Price £
		A	B	C			
330.160	HA16ML	16	150	75	4.1	0.7	5.83
330.22S	HA22MS	22	162	90	8.5	1.5	9.50
330.220	HA22ML	22	270	140	5.8	2.3	13.00
330.250	HA25ML	25	270	140	8.83	3.3	14.90
330.28S	HA28MS	28	200	110	14.5	3	15.42
330.280	HA28ML	28	270	140	11.8	3.8	17.50
330.320	HA32ML	32	270	140	17.1	5.1	22.92
330.360	HA36ML	36	270	140	23	6.5	29.00
330.400	HA40ML	40	280	155	28.1	8.5	39.17
330.450	HA45ML	45	320	175	35	12.2	55.00
330.500	HA50ML	50	350	195	45	16.6	75.83
330.600	HA60ML	60	430	230	65	29.2	150.00
330.700	HA70ML	70	480	260	85	44.3	333.35
330.900	HA90ML	90	500	300	150	86	995.00

### Quad Assemblies

Certified to DNV 2.7-1  
& EN 1677-4



Part Code	Description	Dimensions mm						WLL t	Mass kg	Price £
		A	B	C	D	E	F			
350.160	HA16QA	16	150	75	13	90	50	4.1	1.3	16.50
350.220	HA22QA	22	162	90	20	140	70	8.5	3.6	24.33
350.230	HA23QA	22	270	140	16	150	75	5.8	3.8	25.42
350.250	HA25QA	25	270	140	20	140	70	8.83	5.3	27.50
350.260	HA26QA	28	270	140	20	140	70	11.8	5.9	32.00
350.280	HA28QA	28	200	110	22	140	70	14.5	5.5	31.50
350.320	HA32QA	32	270	140	26	185	90	17.1	9.7	46.17
350.360	HA36QA	36	270	140	28	190	100	23	11.9	55.37
350.400	HA40QA	40	280	155	32	200	110	28.1	16.4	80.83
350.450	HA45QA	45	320	175	36	225	125	35	23.5	125.00
350.500	HA50QA	50	350	195	40	260	130	45	32.3	175.00
350.600	HA60QA	60	430	230	50	350	195	65	63.9	366.67
350.700	HA70QA	70	480	260	60	410	220	85	102.6	633.33
350.900	HA90QA	90	500	300	70	400	200	150	164	1725.00

### Welded Chain Sling

Certified to DNV 2.7-1  
& EN 1677-4



Part Number	S.W.L. Tonnes	Length /mtr	Chain size mm	No. of legs	Mass kg	Price £
W 13.402	6.2	2	13	4	34	285.00
W 13.403	6.2	3	13	4	48	360.00
W 13.404	6.2	4	13	4	62	420.00
W 13.405	6.2	5	13	4	76	484.00
W 16.403	12.4	3	16	4	73	516.00
W 16.404	12.4	4	16	4	97	640.00
W 16.405	12.4	5	16	4	121	740.00
W 20.404	22.4	4.5	20	4	171	1170.00
W 20.406	22.4	6	20	4	222	1500.00
W 13.502	6.2	2	13/22	5	46	400.00
W 16.503	12.4	3	16/26	5	91	685.00