



# AMERICAN BUREAU OF SHIPPING

ABS Plaza – 16855 Northchase Drive  
Houston, TX 77060-6008

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Report No.: NP889938

Date: 26 Nov. 2007

Port: Naples, Italy

Prototype test of a 300 mm x 9,100 Mt Oil Suction and Discharge Submarine Hose, according to OCIMF 1991 4<sup>TH</sup> Edition, working pressure 225 PSI :



**MANUFACTURER** : ALFAGOMMA INDUSTRIAL S.P.A.  
**HOSE TYPE** : T-62A  
**DIMENSIONS** : 300 mm X 9,100 Mt  
**HOSE S. N.** : 1007063  
**RATED PRESSURE** : 225 PSI

carried out based on the requirements of the following specification:

- OCIMF 1991 SPECIFICATION 4<sup>TH</sup> EDITION.

The undersigned Surveyor of this Bureau, certifies that the above hose was found fully compliant with the requirements of the above referenced specifications, for a rated pressure of 225 PSI. The hose was subject the following tests with satisfactory results:

- 1) Adhesion tests
- 2) Carcass Adhesion test
- 3) Weight test
- 4) Minimum Bend radius test
- 5) Stiffness Test
- 6) Hydrostatic test
- 7) Kerosene test
- 8) Vacuum test
- 9) Electrical test
- 10) Collar test
- 11) Burst test

  
  
A. De Angelis Surveyor

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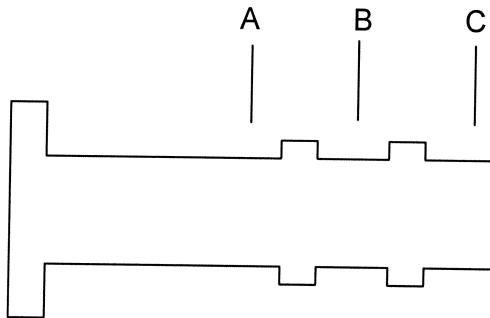
Port: Naples, Italy

## A.1) NIPPLE ADHESION TEST

Test according to: O.C.I.M.F. '91 4th Ed. : Par.2.4.1

Sample Nipple used: Size 150 mm

Locations chosen by the Inspector (s) – see Sketch :



### RESULTS

LOCATION	REQUIRED	ACTUAL
A	<ul style="list-style-type: none"> <li>Separation Strength greater than 8 N/mm</li> <li>Separation within rubber</li> </ul>	9.2 Separation within rubber
B	<ul style="list-style-type: none"> <li>Separation Strength greater than 8 N/mm</li> <li>Separation within rubber</li> </ul>	8.8 Separation within rubber
C	<ul style="list-style-type: none"> <li>Separation Strength greater than 8 N/mm</li> <li>Separation within rubber</li> </ul>	9.2 Separation within rubber

These results meet the requirements of the above mentioned specification.

  
  
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## A.2) CARCASS ADHESION TEST

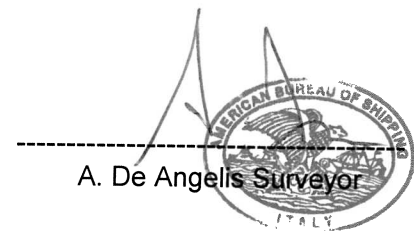
Test according to: O.C.I.M.F. '91 4th Ed. Par. 2.4.2; 1.11.2

### RESULTS

Layers	Required N/mm	Actual N/mm
1 <sup>st</sup> Lining- 1 <sup>st</sup> Breaker	6	12.0
1 <sup>st</sup> Breaker - 2 <sup>nd</sup> Lining	6	14.0
2 <sup>nd</sup> Lining - 1 <sup>st</sup> Cord	6	7.5
1 <sup>st</sup> Cord- 2 <sup>nd</sup> Cord	6	12.0
2 <sup>nd</sup> Cord-3 <sup>rd</sup> Cord	6	10.0
3 <sup>rd</sup> Cord-4 <sup>th</sup> Cord	6	10.4
4 <sup>th</sup> Cord-5 <sup>th</sup> Cord	6	8.0
5 <sup>th</sup> Cord-6 <sup>th</sup> Cord	6	8.8
6 <sup>th</sup> Cord- 1 <sup>st</sup> Filler	6	9.0
1 <sup>st</sup> Filler- 2 <sup>nd</sup> Breaker	6	16.0
2 <sup>nd</sup> Breaker – 2 <sup>nd</sup> Filler	6	9.2
2 <sup>nd</sup> Filler – 3 <sup>rd</sup> Filler	6	14.6
3 <sup>rd</sup> Filler- 1 <sup>th</sup> Auxiliary Cord	6	16.8
1 <sup>th</sup> Auxiliary Cord - 2 <sup>th</sup> Auxiliary Cord	6	8.7
2 <sup>th</sup> Auxiliary Cord - 4 <sup>rd</sup> Filler	6	7.4
4 <sup>rd</sup> Filler – 3 <sup>rd</sup> Breaker	6	12.0
3 <sup>rd</sup> Breaker – 4 <sup>th</sup> Breaker	6	10.0
4 <sup>th</sup> Breaker- Cover	6	7.4

These results meet the requirement of the above mentioned specification.

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A. De Angelis Surveyor



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## A.2) CARCASS ADHESION TEST (OIL)

Test according to: O.C.I.M.F. '91 4th Ed. Par. 2.4.2; 1.11.2

### RESULTS

Layers	Required N/mm	Actual N/mm
1 <sup>st</sup> Lining- 1 <sup>st</sup> Breaker	6	12.2
1 <sup>st</sup> Breaker - 2 <sup>nd</sup> Lining	6	14.6
2 <sup>nd</sup> Lining - 1 <sup>st</sup> Cord	6	9.5
1 <sup>st</sup> Cord- 2 <sup>nd</sup> Cord	6	7.9
2 <sup>nd</sup> Cord-3 <sup>rd</sup> Cord	6	9.1
3 <sup>rd</sup> Cord-4 <sup>th</sup> Cord	6	7.9
4 <sup>th</sup> Cord-5 <sup>th</sup> Cord	6	7.7
5 <sup>th</sup> Cord-6 <sup>th</sup> Cord	6	8.3
6 <sup>th</sup> Cord- 1 <sup>st</sup> Filler	6	10.5
1 <sup>st</sup> Filler- 2 <sup>nd</sup> Breaker	6	11.6
2 <sup>nd</sup> Breaker – 2 <sup>nd</sup> Filler	6	15.6
2 <sup>nd</sup> Filler – 3 <sup>rd</sup> Filler	6	9.1
3 <sup>rd</sup> Filler- 1 <sup>th</sup> Auxiliary Cord	6	10.7
1 <sup>th</sup> Auxiliary Cord - 2 <sup>th</sup> Auxiliary Cord	6	7.8
2 <sup>th</sup> Auxiliary Cord - 4 <sup>rd</sup> Filler	6	7.0
4 <sup>rd</sup> Filler – 3 <sup>rd</sup> Breaker	6	11.8
3 <sup>rd</sup> Breaker – 4 <sup>th</sup> Breaker	6	11.4
4 <sup>th</sup> Breaker- Cover	6	7.5

These results meet the requirement of the above mentioned specification.

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## A.3) WEIGHT TEST

Test according to: O.C.I.M.F. '91 4th Ed. Par. 2.4.4; 1.11.3; 1.6.4 and 1.3.1

### HOSE LENGTH

Nominal drawing	Actual	Variation [%]	Max allowed [%]
9100 mm	9120 mm	0.2	1

### WEIGHT IN AIR (EMPTY HOSE)

Nominal drawing	Actual	Variation [%]	Max allowed [%]
960 kg	970 kg	1.04	5

### UNDER WATER WEIGHT WITH THE HOSE FILLED WITH SEA WATER (UWW).

Nominal drawing	Calculated on prototype	Variation [%]	Max allowed [%]
- 470 kg	- 491.33 kg	4.53	8

Calculation of the UWW with the hose filled with sea water (specific weight 1.025). This weight has been calculated by measuring the value of the circumferences along the hose length.

Calculations

$$UWW = E - (DH - WW)$$

E = Hose weight  
DH = Displacement  
WW = Water weight

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## A.4) MINIMUM BEND RADIUS

Test according to: O.C.I.M.F. '91 4th Ed. Par. 2.4.5; 1.11.4; 1.4.1

Applicable bend radius: 1200 mm

Results: After completion of flexibility test (5 cycles of hose bending) the hose has not shown defects or permanent deformations such as kinking, flattening or ovaling when returned to its original straight position.

These results meet the requirements of the above mentioned specifications.

## A.5) STIFFNESS TEST

Test according to: O.C.I.M.F. '91 4th Ed. Par. 2.4.7; 1.11.5

Hose length (L) = 9.12 m

Angle (Z) = 118 Deg

	Z (Req. 118°±1°)	P	P1 (Req. P±1%)	H
Cycle	Degrees	kg	kg	m
1	118	20.0	20.0	1.215
2	118	10.0	10.0	1.235
3	118	9.0	9.0	1.220
4	118	18.0	18.0	1.270
5	118	13.0	13.0	1.270
Average		<b>13.74</b>	<b>13.74</b>	<b>1.242</b>

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$$\text{Stiffness (E x I) calculation} = \frac{P \times L^2 \times 1.83 \times \text{Sin Z} \times 9.81}{8 \times H} \quad \text{Nm}^2$$

$$\underline{\underline{E \times I = 1824 \text{ Nm}^2}}$$

## A.6) HYDROSTATIC TEST

Test according to: O.C.I.M.F. '91 4th Ed. Par. 2.4.6; 1.11.6; 1.3.3; 1.5.3

Parameter	Unit	Required	Actual
Length at 0.7 bar	mm	-	9108
Pressure increase from 0 to 7.5 bar – Visual inspection	visual	No Leak within 10 minutes	No Leak Observed
Pressure increase from 0 to 15 bar – Visual inspection	visual	No Leak within 10 minutes	No Leak Observed
Temporary elongation at 15 bar	%	Max 2.5	1.23
Permanent elongation at 0.7 bar	%	Max 0.7	0.02
Twist angle	°/m	Max 1.5	0.17
Bolt holes displacement ( max 1 Hole diameter)	mm	Max 24.7	4.0

These results meet the requirements of the above mentioned specifications.

  
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## A.7) KEROSENE TEST

Test according to: O.C.I.M.F. '91 4th Ed. Par 2.4.8; 1.11.7

Parameter	Unit	Required	Actual
Pressure increase from 0 to 15 bar Visual inspection	visual	No Leaks or Defects within 6 hours	No Leaks or Defects observed within 6 hours
Pressure decrease from 15 to 7.5 bar Visual inspection	visual	No Leaks or Defects within 12 hours	No Leaks or Defects observed within 12 hours

These results meet the requirements of the above mentioned specifications.

## A.8) VACUUM TEST

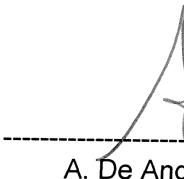
Test according to: O.C.I.M.F. '91 4th Ed. Par. 2.4.9; 1.11.8

Test results:

Following 10 minutes at - 0.85 bar vacuum the hose bore was carefully examined.

No leaks, blisters or delaminations were detected.

The test results meet the requirements of the above mentioned specification.

  
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## A.9) ELECTRICAL TEST

Test according to: O.C.I.M.F. '91 4th Ed. Par 1.11.9

Results: The electrical continuity was checked and found to be electrically continuous between the fitting ends using a 4 V/ 0.3 Ampere lamp connected to a 4.5 Volt battery. The lamp lit shown following the electrical connection indicated that the hose meets the requirements of the above mentioned specifications.

## A.10) COLLAR TEST

Test according to: O.C.I.M.F. '91 4th Ed. Par. 2.4.10

The test was made on hose sample n° 1007064.

The test was made on the hose in a horizontal position; the load of 1200 kg measured with a calibrated load cell gauge was applied in horizontal position on a collar using a metallic frame instead of the float.

RESULTS: After the test the area was closely examined and no failure was found on the retaining collar or in the collar - to - hose bond.

These results meet the requirements of the a/m specifications.

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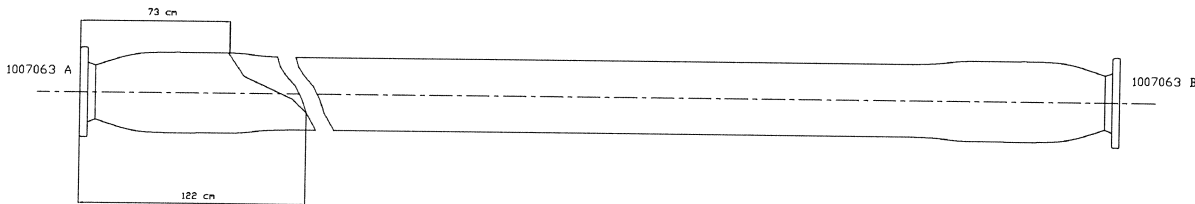
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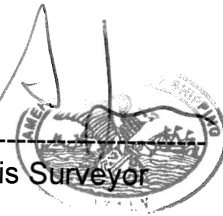
## A.11) BURST TEST

Test according to: O.C.I.M.F. '91 4th Ed. Par. 2.4.11

Parameter	Unit	Required	Actual
Pressure increase from 0 to 75 bar – Visual inspection	visual	No failure within 15 minutes	No failure within 15 minutes
Burst pressure	bar	Greater than 75	108.5
Mode and Location of burst	-	-	See Sketch



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