



## INSPECTION CERTIFICATE

**MANUFACTURER:** ALFAGOMMA INDUSTRIAL S.p.A.

**PLACE:** Nucleo Industriale S. Atto - 64020 S. Atto (TE) - ITALY

**SUBJECT:** **PROTOTYPE OCIMF T - 62 A**  
Diam. 300 mm x Leng. 9,100 mt, W. Pressure: 15 bar (225 Psi)

We hereby certify at request of Messrs **ALFAGOMMA INDUSTRIAL S.p.A.**, the undersigned Inspector to this Society did attend at **ALFAGOMMA INDUSTRIAL** workshop in **S. Atto (TE) Italy** from 22<sup>th</sup> October to 26<sup>th</sup> November 2007, for the purpose of inspecting the following equipments, **PROTOTYPE OCIMF T-62 A Oil Suction and Discharge Submarine Hose**, according to **OCIMF 1991 Ed. 4<sup>th</sup>**:

<b>MANUFACTURER</b>	<b>ALFAGOMMA INDUSTRIAL S.p.A.</b>
<b>HOSE TYPE</b>	<b>T - 62 A</b>
<b>DIMENSION</b>	<b>300 mm x 9,100 mt</b>
<b>HOSE SERIAL N.O</b>	<b>1007063</b>
<b>RATING W. PRESSURE</b>	<b>15 bar (225 psi)</b>

The undersign Surveyor of this certificates, that above hose was found fully compliant with requirements of the above reference specification, for a rated pressure of 15 bar (225 psi). The hose was subject the following tests with satisfactory results and were witnessed the test in accordance with **Spec. OCIMF 1991 Ed. 4<sup>th</sup>** :

1. Nipple Adhesion Test;
2. Carcass Adhesion Test (Dry);
3. Carcass Adhesion Test (Oil);
4. Weight Test;
5. Minimum Bend Radius Test;
6. Stiffness Test;
7. Hydrostatic Test;
8. Kerosene Test;
9. Vacuum Test;
10. Electrical Test
11. Collar Test;
12. Burst Test .



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## TESTS RESULTS

### A.1 Nipple Adhesion Test:

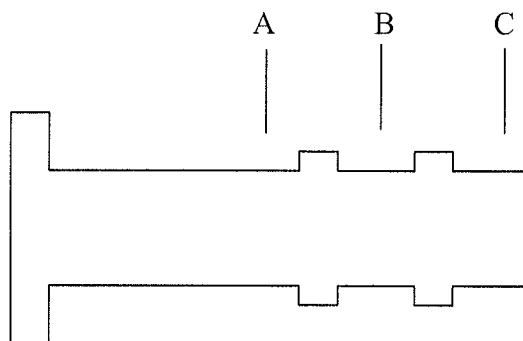
Test according to OCIMF Ed. 4<sup>th</sup> par. 2.4.1

The test was performed on:

Sample Nipple used: Size 150 mm

Inspection date on 23/10/07

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.

### A.2 Carcass Adhesion Test (Dry):

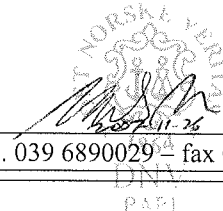
Test according to OCIMF Ed. 4<sup>th</sup> par.: 2.4.2 ; 1.11.2 .

Test is performed with procedure according to OCIMF Ed. 4<sup>th</sup> par. 1.11.2 .

The sample used had size 300 mm, made from materials taken from current manufacture for PROTOTYPE OCIMF T - 62 A; it was representative of PROTOTYPE OCIMF T - 62 A and prepared on the mandrel end of that hose.

Inspection date on 26/10/07 .

The adhesion strength between all composite plies of the base hose was determined with the followings results:





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## Carcass Adhesion Test (Dry) 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>th</sup> Filler	6	7.4
4 <sup>th</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.

### A.3 Carcass Adhesion Test (Oil):

Test according to OCIMF Ed. 4<sup>th</sup> par.: 2.4.2 and 1.11.2 .

Test is performed with procedure according to OCIMF Ed. 4<sup>th</sup> par. 1.11.2 and 2.4.2 .

The sample used had size 300 mm, made from materials taken from current manufacture for PROTOTYPE OCIMF T - 62 A; it was representative of PROTOTYPE OCIMF T - 62 A and prepared on the mandrel end of that hose.

The test was performed after 30 days exposure to ASTM D471 ref. oil No.2:

Inspection date on 26/11/07 .

The adhesion strength between all composite plies of the base hose was determined with the followings results:



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## Carcass Adhesion Test (Oil) 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.

### A.4 Weight Test:

Test according to OCIMF Ed. 4<sup>th</sup> par.: 2.4.4; 1.11.3; 1.6.4; 1.3.1 .  
The test was performed on LENGTH AND WEIGHT TEST:

Inspection date on 25/10/07 .

### HOSE LENGTH

Nominal drawing	Actual	Variation [%]	Max allowed [%]
<b>9100 mm</b>	<b>9120 mm</b>	<b>0.2</b>	<b>1</b>

### WEIGHT IN AIR (EMPTY HOSE)

Nominal drawing	Actual	Variation [%]	Max allowed [%]
<b>960 kg</b>	<b>970 kg</b>	<b>1.04</b>	<b>5</b>

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

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



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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

These results meet the requirement of the above mentioned specification.

## A.5 Minimum Bend Radius Test:

Test according to OCIMF Ed. 4<sup>th</sup> par.: 2.4.5; 1.11.4; 1.4.1; 3.6.1 .

Test is performed with equipment and procedure according to OCIMF Ed. 4<sup>th</sup> par. 1.11.4

Applicable bend radius: 1200 mm

Inspection date on 25/10/07 .

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.6 Stiffness Test:

Test according to OCIMF Ed. 4<sup>th</sup> par.: 2.4.7; 1.11.5; 3.6.3 .

Test is performed with equipment and procedure according to OCIMF Ed. 4<sup>th</sup> par. 1.11.5 for fives cycle.

Inspection date on 25/10/07 .

Hose length (L) = 9.12 m  
Angle (Z) = 118 Deg  
Length of moment bar (A) = 1.83 m

Results:

	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
<b>Average</b>		<b>13.74</b>	<b>13.74</b>	<b>1.242</b>



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$$\text{Stiffness (E x I) calculation} = \frac{P \times L^2 \times A \times \sin Z \times 9.81}{8 \times H} = \frac{P \times L^2 \times 1.83 \times \sin 118^\circ \times 9.81}{8 \times H}$$

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

These results meet the requirements of the above mentioned specifications.

## A.7 Hydrostatic Test:

Test according to OCIMF Ed. 4<sup>th</sup> par.: 2.4.6; 1.11.6; 1.3.3; 1.5.3; 3.6.2 .

Test is performed in according to OCIMF Ed. 4<sup>th</sup> par. 1.11.6

Inspection date: 26/10/07 , Results:

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 .

## A.8 Kerosene Test:

Test according to OCIMF Ed. 4<sup>th</sup> par.: 2.4.8; 1.11.7; 3.6.4 .

Test is performed in according to OCIMF Ed. 4<sup>th</sup> par. 1.11.7 .

Inspection date: 30/10/2007 , Results:

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.



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## A.9 Vacum Test:

Test according to OCIMF Ed. 4<sup>th</sup> par.: 2.4.9; 1.11.8; 3.6.5 .

Test is performed in according to OCIMF Ed. 4<sup>th</sup> par. 1.11.8 .

Inspection date: 30/10/2007 .

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.

## A.10 Electrical Test:

Test according to OCIMF Ed. 4<sup>th</sup> par.: 1.11.9; 3.6.6 .

Test is performed in according to OCIMF Ed. 4<sup>th</sup> par. 1.11.9 .

Inspection date: 30/10/2007 .

Test 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 .

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

## A.11 Collar Test:

Test according to OCIMF Ed. 4<sup>th</sup> par.: 2.4.10 .

Test is performed in according to OCIMF Ed. 4<sup>th</sup> par. 2.4.10 .

Inspection date: 26/11/2007 .

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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## A.12 Burst Test:

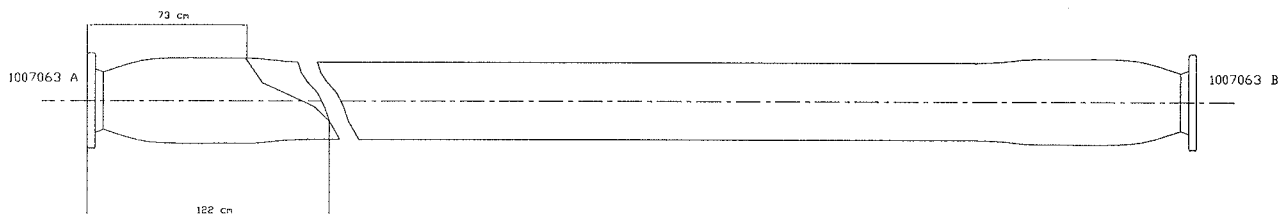
Test according to OCIMF Ed. 4<sup>th</sup> par.: 2.4.11 .

Test is performed in according to OCIMF Ed. 4<sup>th</sup> par. 2.4.11 .

Inspection date: 30/11/2007 .

Results:

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



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

## Conclusion:

On satisfactory completion of above mentioned prototype tests, all the relevant certificates and charts were stamped and signed .

**We hereby certify that the hose, PROTOTYPE OCIMF “T - 62 A” Oil Suction and Discharge Submarine Hose, detailed in this certificate have been manufactured and tested in accordance with Spec. OCIMF 1991 Ed. 4<sup>th</sup> , with satisfactory results .**

Place: S. Atto (TE)- Italy

Date: 2007.11.26

D.N.V. Italia Surveyor :  
*A. Miccolis*  
A. Miccolis

1864  
DNV  
BARI