

THE COP-SYSTEM: IMO MEPC 107(49) PERFORMANCE TEST REPORT

INTRODUCTION

The following tests were conducted in order to certify the COP-System according to IMO (International Maritime Organization) resolution MEPC.107(49), which replaces IMO resolution MEPC.60(33). By January 1st 2005, bilge alarms and oily water separators installed on board ships must comply with the new standard.

MEPC 107(49) states that, a 15 ppm Bilge Separator must be capable of handling any oily mixtures from the machinery space bilges and be expected to be effective over the complete range of oils which might be carried on board ship, and deal satisfactorily with oil of very high relative density, or with a mixture presented to it as an emulsion. Changing the feed to the 15 ppm Bilge Separator from bilge water to oil, bilge water to emulsified bilge water, or from oil and/or water to air (and irrespective of the oil content of the feed supplied to it) should not result in the discharge overboard of any mixture containing more than 15 ppm of oil.

MATERIAL:

A test rig was constructed. It included not only the COP-System but also the pumps, valves, flow meters, pipes and fittings as shown in figure 1.

The tests were performed using three grades of test fluids:

- **Test Fluid A** : which was a marine residual fuel oil "Bunker" ; density of 0.98
- **Test Fluid B** : which was a marine distillate fuel oil "Diesel" ; density of 0.87
- **Test Fluid C** : which was a mixture of an oil-in-fresh water emulsion, in a ratio whereby 1 kg of the mixture consisted of :
 - 947.8 g of fresh water ;
 - 25 g of Bunker ;
 - 25 g of Diesel ;
 - 0.5 g surfactant (sodium salt of dodecylbenzene sulfonic acid) ;
 - 1.7 g iron black ferrosferric oxide as suspended solids (SS)

Test Fluid C was prepared by mixing all the components through a centrifugal pump (at 3450 rpm) throughout the entire duration of the test with Fluid C, in order to create very stable chemical emulsions.

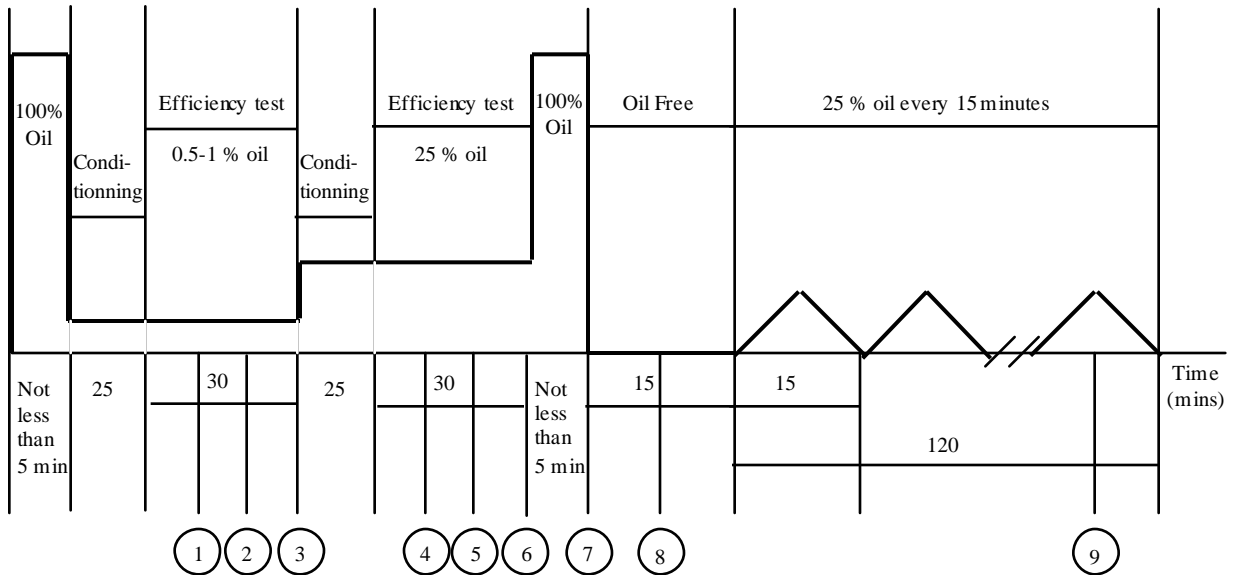
PROCEDURE:

A test was run with each individual fluid mentioned above. The tests were carried out as per the TEST CHART showed below:

TEST RESULTS AND TEST PROCEDURES

TEST FLUID A

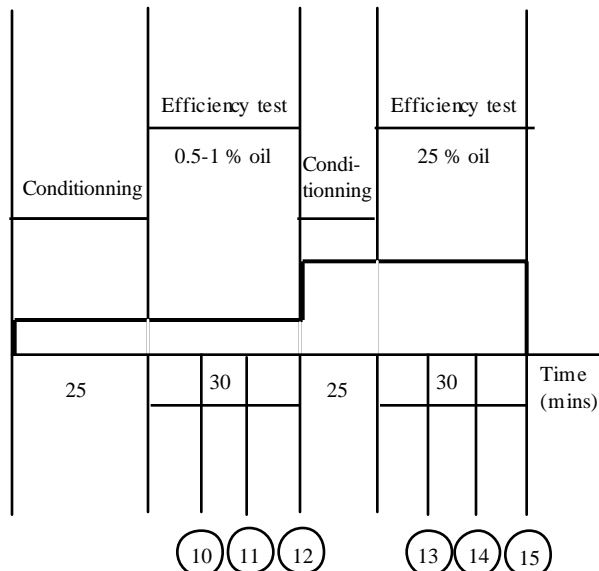
Bunker (d = 0.988)



	1	2	3	4	5	6	7	8	9
Influent (%)	0.5-1	0.5-1	0.5-1	25	25	25	100	0	25
Effluent (ppm)	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

TEST FLUID B

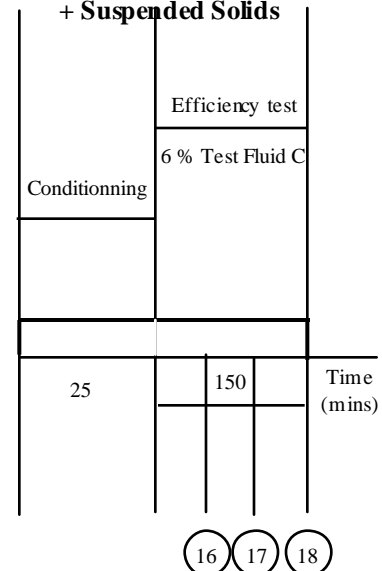
Marine Diesel (d = 0.87)



	10	11	12	13	14	15		16	17	18
Influent (%)	0.5-1	0.5-1	0.5-1	25	25	25		0.3	0.3	0.3
Effluent (ppm)	< 0.3	< 0.3	< 0.3	< 0.3	0.4	0.4		2.3	5.2	3.7

TEST FLUID C

Bunker + Diesel + Surfactants
+ Suspended Solids



RESULTS & CONCLUSION:

The results indicate that the COP-System separated mechanical emulsions (Fluids A & B) to a level below the limit of detection of the GC/FID method used to analyse the Total Petroleum Hydrocarbon content of the effluent samples, and this, irrespective of the oil content contained in the feed supplied to it. The oil concentrations of the influent varied from 0 to 100% with Bunker, and from 0.5 to 25 % with Diesel. Even at those elevated concentrations, all of the effluent samples were below 0.5 ppm (which is well below the 15 ppm required by the IMO regulations).

The third test with Fluid C was performed in order to determine the COP-System's performance efficiency when chemical emulsions and suspended solids are present in the feed source. The test was run for almost 3 hours at an average concentration of 3000 ppm of hydrocarbon content, 30 ppm of surfactant and 102 ppm of suspended solids (SS). Even at those operating conditions, all the effluent samples from the COP-System were below 5.3 ppm, which is well below the 15 ppm required by the IMO regulations.

The tests demonstrate that the COP-System is very efficient at handling both mechanical and chemical emulsions, irrespective of the oil content contained in the oily water fed to it. The results also demonstrate how efficient the COP-System's automatic backwash is, enabling the system to handle both suspended solids and very viscous/heavy oils such as "Bunker."

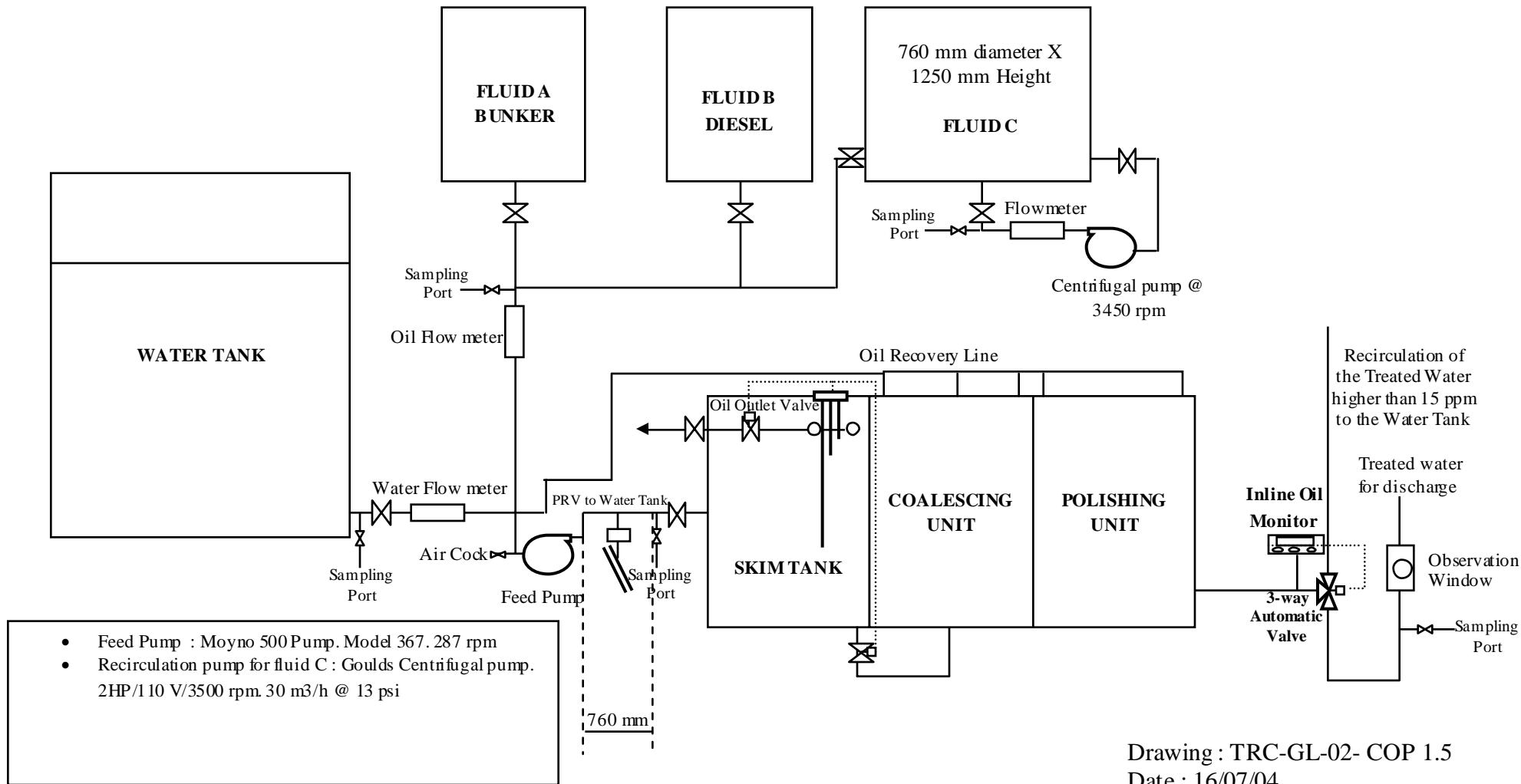


FIGURE 1: TEST RIG FOR TEST CERTIFICATION OF THE COP-SYSTEM