TYPE APPROVAL CERTIFICATE

Certificate no.:
TAP00001X3
Revision No:
1

This is to certify:

that the 5 ppm Bilge Water Separator

with type designation(s)
ULTRA-SEP US250, ULTRA-SEP US500, US500C, US500G, ULTRA-SEP US1000, US1000C, US1000G, ULTRA-SEP US2000, ULTRA-SEP US3000, ULTRA-SEP US5000, ULTRA-SEP US7500, ULTRA-SEP US10000

issued to

Compass Water Solutions
Tustin, CA, USA

is found to comply with

DNV class programme DNV-CP-0208 – Type approval – 5 ppm bilge water separators
IMO Resolution MEPC.107(49) – Revised Guidelines and Specifications for Pollution Prevention Equipment for Machinery Space Bilges of Ships

Application:

This is to certify that the 5 ppm Bilge Water Separator listed above has been examined and tested in accordance with the requirements contained in the DNV programme for type approval, DNV-CP-0208. The Bilge Water Separator also complies with IMO Resolution MEPC.107(49).

System design limitations / limiting operating conditions imposed are described in this document.

A product approved by this certificate is accepted for installation on all vessels classed by DNV, including optional DNV class notation Clean(Design), unless otherwise instructed by relevant Maritime Administration.

Issued at **Høvik** on **2024-06-04**

This Certificate is valid until **2029-07-07**.
DNV local unit: **Long Beach**

Approval Engineer: **Anna Piotrowska**

for **DNV**
Digitally Signed By: Lehmann, Michael
Location: DNV Høvik, Norway

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Product description

The 5 ppm Bilge Water Separation System Type 'ULTRA-SEP' is intended for installation onboard ships or other marine units to reduce the oil content in bilge water to less than 5 ppm. The equipment is designed and tested to meet the requirements of DNV-CP-0208.

The 'ULTRA-SEP' system uses a dual stage separation process: i) incoming bilge water passes through a 'HELI-SEP' unit consisting of coalescers and a polishing pack, ii) the feed pump then pressurizes the partly treated bilge water for processing through a process filter. Then, the pressure and flow rate are adjusted by the process pump which drives the partly treated water into the 'SPIR-O-LATOR' membrane units at high velocity. The output is processed water with oil content less than 5 ppm.

The waste oil from the 'HELI-SEP' unit is held in an oil separation chamber which is discharged occasionally through an oil discharge line. The concentrate with rejected oils and waste from the 'SPIR-O-LATOR' units is recirculated back to the inlet of the process filter for reprocessing. A small proportion of this recirculate is continuously bled off to the bilge / bilge water holding tank.

Application/Limitation

Application:

Model	Max. Flowrate (m^3/h)	Supply Pump Capacity (*) (m^3/h)
US250	0.25	0.25
US500, US500C, US500G	0.50	0.50
US1000, US1000C, US1000G	1.00	1.00
US2000	2.00	2.00
US3000	3.00	3.00
US5000	5.00	5.00
US7500	7.50	7.50
US10000	10.00	10.00

Applicable to all Models	
Operating Pressure:	345 – 690 kPa
Operating Temperature of Bilge Water:	1 – 50 °C
Power Supply:	440 – 480 V / 60 Hz, 3-phase 380 – 415 V / 50 Hz, 3-phase
Inclination Range:	0 to 22.5 degrees

(*) The 'ULTRA-SEP' Series are fitted with an integral centrifugal supply pump and associated control valves. The pump capacity is configured by adjustments to the control valves and the correct values are set during the factory acceptance test.

Limitations:

The equipment is not permitted to be installed in spaces subject to explosion hazards.

The 'ULTRA-SEP' Series are fitted with an integrated 5 ppm Oil Content Meter required by DNV optional Class Notation Clean(Design). The 5 ppm Oil Content Meter shall be provided with separate DNV Type Approval Certificates (to standard DNV-CP-0485).

Pumps listed in the Type Examination Documentation may be exchanged for another manufacturer with the same performance characteristics. The new and old pump characteristics curves shall be included with the copy of this certificate delivered with the Bilge Water Separator.

Installation:

The following shall be verified after installation:

1. An alarm in the 5 ppm Oil Content Meter is always activated whenever clean water is used for cleaning or zeroing purposes.
2. An alarm in the 5 ppm Oil Content Meter is always activated whenever no flow of sample through the Oil Content Meter is detected by the flow sensor.
3. Any alarm in the 5 ppm Oil Content Meter will activate the automatic stopping device preventing overboard discharge and lead to recirculation.
4. The overall response time (including the response time of the 5 ppm Oil Content Meter) between an effluent discharge from the Bilge Water Separator exceeding 5 ppm, and the operation of the Automatic Stopping Device preventing overboard discharge, shall be not more than 20 seconds.
5. Every access of the alarm (beyond check on instrument drift, repeatability of the instrument reading, and the ability to re-zero the instrument) requires breaking of a seal.

A copy of the operation, installation and maintenance manual shall be available on board the ship/marine unit at all times.

Type Approval documentation

Listed drawings / documents refer to all capacities, except as indicated.

Model US250

Dwg. No.	Date	Revision	Title
US200	2015-05-15	G	Installation
US201	2005-09-12	E	General assembly
US515-TSP	2012-11-13	H	Control panel assembly
US516-TSP	2012-11-13	D	Motor control center
US536	2007-03-08	A	Spir-o-lator assembly
US540-TSP	2008-02-14	H	Schematic
US541	2005-03-08	B	Single line diagram
US550	2015-05-18	G	Process flow diagram
US251	2015-05-15	G	P&ID
USMN250	2015-05	1.1	Installation, operation and maintenance manual

Model US500, US500C, US500G

Dwg. No.	Date	Revision	Title
US500-C	2015-05-15	L	Installation
US502-C	2015-05-18	G	General assembly
US515-C	2013-05-09	C	Control panel assembly
US519-C	2007-08-02	-	Cable schedule
US536-C	2010-05-04	A	Spir-o-lator assembly
US540-C	2013-05-08	B	Schematic
US541-C	2013-05-06	A	Single line diagram
US550-C	2015-05-15	C	Process flow diagram
US551-C	2015-05-15	K	P&ID
USMN-SERIES C	2015-05	7	Installation, operation and maintenance manual

Model US1000, US1000C, US1000G

Dwg. No.	Date	Revision	Title
US1000-C	2015-05-15	L	Installation
US1002-C	2015-05-18	I	General assembly
US1015-C	2013-05-09	A	Control panel assembly
US1019-C	2007-08-07	-	Cable schedule
US536-C	2010-05-04	A	Spir-o-lator assembly
US540-C	2013-05-08	B	Schematic
US541-C	2013-05-06	A	Single line diagram
US550-C	2015-05-15	C	Process flow diagram
US1051-C	2015-05-15	K	P&ID
USMN-SERIES C	2015-05	7	Installation, operation and maintenance manual

Model US2000

Dwg. No.	Date	Revision	Title
US2000	2015-05-15	K	Installation
US2001	2015-05-15	L	General layout
US2005	2006-06-16	A	Spir-o-lator layout
US-UCB2015	2017-06-28	B	Control panel assembly
US2016-STD4	2014-07-10	A	Motor control center
US2019-STD4	2014-12-02	-	Cable schedule
US2036	2018-05-07	D	Spir-o-lator assembly
US2040-STD4	2013-05-07	-	Schematic
US2041-STD4	2013-05-07	-	Single line diagram
US550	2015-05-18	G	Process flow diagram
US2051	2015-05-15	J	P&ID
USMN2000	2015-05	1.1	Installation, operation and maintenance manual

Model US3000

Dwg. No.	Date	Revision	Title
US3000	2015-05-15	J	Installation
US3001	2015-05-15	J	General layout
US3005	2005-09-27	-	Spir-o-lator layout
US-UCB2015	2017-06-28	B	Control panel assembly
US2016-STD4	2014-07-10	A	Motor control center
US2019-STD4	2014-12-02	-	Cable schedule
US2036	2018-05-07	D	Spir-o-lator assembly
US2040-STD4	2013-05-07	-	Schematic
US2041-STD4	2013-05-07	-	Single line diagram
US550	2015-05-18	G	Process flow diagram
US3051	2015-05-15	J	P&ID
USMN3000	2015-05	1.1	Installation, operation and maintenance manual

Model US5000

Dwg. No.	Date	Revision	Title
US5000	2015-05-15	L	Installation
US5001	2015-05-15	H	General layout
US5005	2006-06-23	B	Spir-o-lator layout
US-UCB2015	2017-06-28	B	Control panel assembly
US2016-STD4	2014-07-10	A	Motor control center
US2019-STD4	2014-12-02	-	Cable schedule
US5036	2018-05-07	C	Spir-o-lator assembly
US2040-STD4	2013-05-07	-	Schematic
US2041-STD4	2013-05-07	-	Single line diagram
US550	2015-05-18	G	Process flow diagram
US5051	2015-05-15	J	P&ID
USMN5000	2015-05	1.1	Installation, operation and maintenance manual

Model US7500

Dwg. No.	Date	Revision	Title
US7500	2015-05-15	H	Installation
US7501	2015-05-15	G	General layout
US7505	2008-09-15	-	Spir-o-lator layout
US-UCB2015	2017-06-28	B	Control panel assembly
US2016-STD4	2014-07-10	A	Motor control center
US2019-STD4	2014-12-02	-	Cable schedule
US2036	2006-06-29	C	Spir-o-lator assembly
US5036	2018-05-07	C	Spir-o-lator assembly
US2040-STD4	2013-05-07	-	Schematic
US2041-STD4	2013-05-07	-	Single line diagram
US550	2015-05-18	G	Process flow diagram
US7551	2015-05-15	J	P&ID
USMN7500	2015-05	1.1	Installation, operation and maintenance manual

Model US10000

Dwg. No.	Date	Revision	Title
US10000	2015-05-15	J	Installation
US10001	2015-05-15	H	General layout
US10005	2009-09-09	A	Spir-o-lator layout
US-UCB2015	2017-06-28	B	Control panel assembly
US2016-STD4	2014-07-10	A	Motor control center
US2019-STD4	2014-12-02	-	Cable schedule
US5036	2018-05-07	C	Spir-o-lator assembly
US2040-STD4	2013-05-07	-	Schematic
US2041-STD4	2013-05-07	-	Single line diagram
US550	2015-05-18	G	Process flow diagram
US10051	2015-05-15	J	P&ID
USMN10000	2015-05	1.1	Installation, operation and maintenance manual

Tests carried out

- TEi–Testing Services - Plumbing Laboratory, Report of Test, Report No.: TS-P00322, dated 2004-05-24.

Marking of product

The marking shall give the following information:

- Identification of manufacturer
- Equipment type designation and model identification
- Maximum throughput and maximum influent pressure at which the separator is designed to operate
- Serial number
- Revision information, as applicable, for all firmware or software modules installed per hardware unit

Periodical assessment

Retention survey to be performed according to Type approval programme DNV-CP-0338:

- This certificate is valid for five years and periodical assessments will be required after 2 years (+/- 90 days) and 3.5 years (+/- 90 days).

Revision history

Revision	Date of issuance	Description
0	2019-07-08	Initial certificate
1	2024-06-04	Renewal of the certificate and minor editorial changes

APPENDIX – ULTRA-SEP 500

Test data and results of tests conducted on a 5 ppm Bilge Water Separator in accordance with DNV-CP-0208.

5 ppm Bilge Water Separator submitted by:	**Coffin World Water Systems, LLC (now Compass Water Solutions)**
Tested type:	**ULTRA-SEP 500**
Test location:	**TEi-Testing Services – Plumbing Laboratory, 4121 South 500 West, Salt Lake City, UT 84123, USA.**
Date:	**2004-04-20**
Organisation conducting the test:	**TEi-Testing Services – Plumbing Laboratory, 4121 South 500 West, Salt Lake City, UT 84123, USA.**
Test rig according to drawing:	**Test Rig Flow Diagram, ULTRA-SEP Bilge Separator, United States Coast Guard Certification Per MEPC.107(49). Drawing 559, Rev.D, date 03.11.2003.**
Diagram of sampling arrangement:	
Method of sample analysis:	**ISO 9377-2:2000**
Samples sealed and labelled by:	**TEi-Testing Services**
Samples analysed by:	**TEi-Testing Services**

Environmental testing of the electrical and electronic sections of the 5 ppm Bilge Water Separator has been carried out in accordance with Appendix B of DNV-CP-0208. The equipment functioned satisfactorily on completion of each test specified on the environmental test protocol.

Environmental test carried out at TEI-Testing Services, Test report No: TS-P00322, issued at Salt Lake City on 2004-05-24.

Manufacturer's recommendations and information concerning the use of cleansing agents:
See Installation, Operation and Maintenance Manual: Recommended cleaners are 10% Sodium Hypochlorite, CWS Alkaline Orange Cleaner and Muriatic Acid or CWS Acid Cleaner.

Note: *The public copy of this certificate, visible in DNV Approval Finder on the DNV website, does not include information considered as proprietary details. All information is contained in the signed original certificate, owned by the manufacturer.)*

Test fluid "A"

Density at 15 °C:	**989 kg/m^3**
Viscosity at 100 °C:	**35.0 Centistokes**
Flashpoint:	**60.0 °C**
Ash content:	**0.12 weight %**
Water content at start of test:	**0.5 weight %**

Test fluid "B"

Density at 15 °C:	**845 kg/m^3**
Viscosity at 40 °C:	**5.5 Centistokes**
Flashpoint:	**62 °C**
Ash content:	**<0.01 weight %**
Water content at start of test:	**0.2 weight %**

Test fluid "C"

Surfactant:	**Sodium salt of dodecylbenzene sulfonic acid in dry form**
Iron Oxides:	**Black ferroferric oxide (Fe_3O_4) with particle size distribution of which 90% is less than 10 microns, the remainder having maximum particle size of 100 microns**

Test water

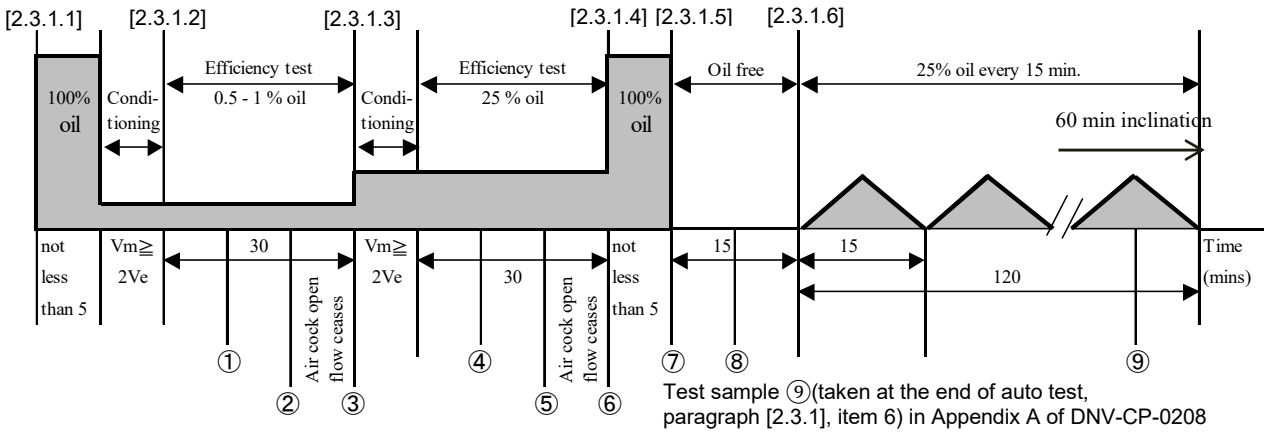
Density at 20 °C:	**1012 kg/m^3**
Solid matter present:	**0.05%**

Test temperature

Ambient:	**25 – 28 °C**
Test fluid "A":	**34 – 35 °C**
Test fluid "B":	**28 – 29 °C**
Test fluid "C":	**22 – 23 °C**
Test water:	**18 – 20 °C**

TEST RESULTS AND TEST PROCEDURES

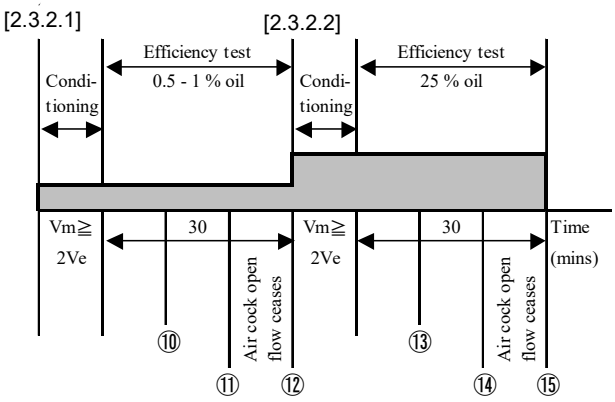
Test Fluid "A"



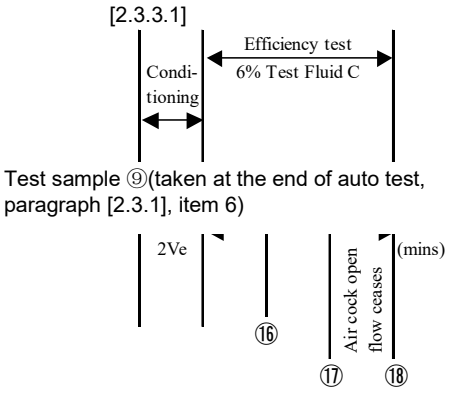
Test sample ⑨(taken at the end of auto test, paragraph [2.3.1], item 6) in Appendix A of DNV-CP-0208

	1	2	3	4	5	6	7	8	9
Influent (%)	**1.0**	**1.0**	**-**	**25**	**25**	**-**	**0**	**0**	**25**
Effluent (ppm)	**5.0**	**4.5**	**4.0**	**3.5**	**3.5**	**3.0**	**4.5**	**1.5**	**1.5**

Test Fluid "B"



Test fluid "C"



Test sample ⑨(taken at the end of auto test, paragraph [2.3.1], item 6)

	10	11	12	13	14	15	16	17	18
Influent (%)	**1.0**	**1.0**	**-**	**25**	**25**	**-**	**6.0**	**6.0**	**-**
Effluent (ppm)	**2.5**	**2.0**	**2.0**	**1.5**	**1.5**	**2.5**	**1.5**	**1.5**	**1.5**

V_e - volume of oily water separator (OWS)
V_m - oil/water mixture passed through OWS

APPENDIX – ULTRA-SEP 7500

Test data and results of tests conducted on a 5 ppm Bilge Water Separator in accordance with DNV-CP-0208.

5 ppm Bilge Water Separator submitted by:	**Coffin World Water Systems, LLC (now Compass Water Solutions)**
Tested type:	**ULTRA-SEP 7500**
Test location:	**TEi-Testing Services – Plumbing Laboratory, 4121 South 500 West, Salt Lake City, UT 84123, USA.**
Date:	**2004-05-13**
Organisation conducting the test:	**TEi-Testing Services – Plumbing Laboratory, 4121 South 500 West, Salt Lake City, UT 84123, USA.**
Test rig according to drawing: Diagram of sampling arrangement:	**Test Rig Flow Diagram, ULTRA-SEP Bilge Separator, United States Coast Guard Certification Per MEPC.107(49). Drawing 559, Rev.D, date 03.11.2003.**
Method of sample analysis:	**ISO 9377-2:2000**
Samples sealed and labelled by:	**TEi-Testing Services**
Samples analysed by:	**TEi-Testing Services**

Environmental testing of the electrical and electronic sections of the 5 ppm Bilge Water Separator has been carried out in accordance with Appendix B of DNV-CP-0208. The equipment functioned satisfactorily on completion of each test specified on the environmental test protocol.

Environmental test carried out at TEI-Testing Services, Test report No: TS-P00322, issued at Salt Lake City on 2004-05-24.

Manufacturer's recommendations and information concerning the use of cleansing agents:
See Installation, Operation and Maintenance Manual: Recommended cleaners are 10% Sodium Hypochlorite, CWS Alkaline Orange Cleaner and Muriatic Acid or CWS Acid Cleaner.

Note: *The public copy of this certificate, visible in DNV Approval Finder on the DNV website, does not include information considered as proprietary details. All information is contained in the signed original certificate, owned by the manufacturer.)*

Test fluid "A"

Density at 15 °C:	**989 kg/m^3**
Viscosity at 100 °C:	**35.0 Centistokes**
Flashpoint:	**60.0 °C**
Ash content:	**0.12 weight %**
Water content at start of test:	**0.5 weight %**

Test fluid "B"

Density at 15 °C:	**845 kg/m^3**
Viscosity at 40 °C:	**5.5 Centistokes**
Flashpoint:	**62 °C**
Ash content:	**<0.01 weight %**
Water content at start of test:	**0.2 weight %**

Test fluid "C"

Surfactant:	**Sodium salt of dodecylbenzene sulfonic acid in dry form**
Iron Oxides:	**Black ferroferric oxide (Fe_3O_4) with particle size distribution of which 90% is less than 10 microns, the remainder having maximum particle size of 100 microns**

Test water

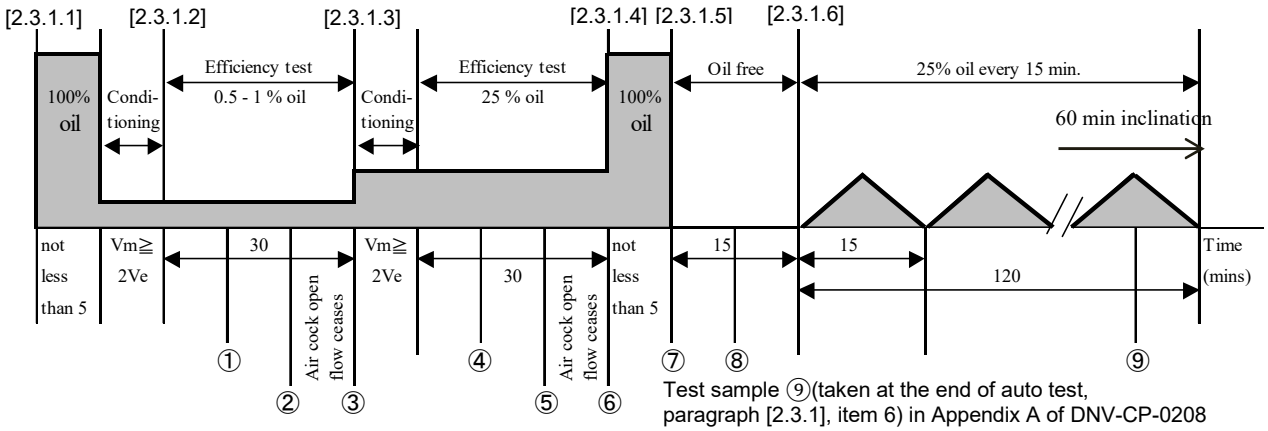
Density at 20 °C:	**1012 kg/m^3**
Solid matter present:	**0.05%**

Test temperature

Ambient:	**25 – 28 °C**
Test fluid "A":	**34 – 35 °C**
Test fluid "B":	**28 – 29 °C**
Test fluid "C":	**22 – 23 °C**
Test water:	**18 – 20 °C**

TEST RESULTS AND TEST PROCEDURES

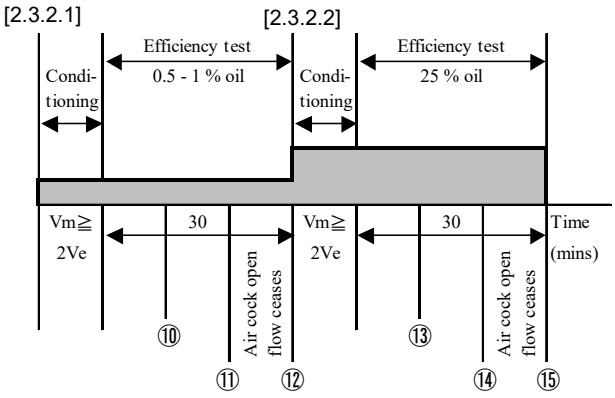
Test Fluid "A"



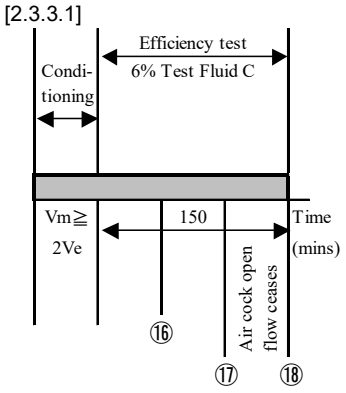
Test sample ⑨(taken at the end of auto test, paragraph [2.3.1], item 6) in Appendix A of DNV-CP-0208

	1	2	3	4	5	6	7	8	9
Influent (%)	**1.0**	**1.0**	**-**	**25**	**25**	**-**	**0**	**0**	**25**
Effluent (ppm)	**4.5**	**4.5**	**4.5**	**4.0**	**4.0**	**4.5**	**3.5**	**2.5**	**3.5**

Test Fluid "B"



Test fluid "C"



	10	11	12	13	14	15	16	17	18
Influent (%)	**1.0**	**1.0**	**-**	**25**	**25**	**-**	**6.0**	**6.0**	**-**
Effluent (ppm)	**3.5**	**3.0**	**2.5**	**3.5**	**3.0**	**2.5**	**2.5**	**1.5**	**2.0**

V_e - volume of oily water separator (OWS)
V_m - oil/water mixture passed through OWS