Environmental ES Systems

Environmental Systems Product - Info No. 4

ESSORP-Membrane Technology for the treatment of oily water / bilge water

In August 2007 Environmental Systems has successfully demonstrated, that the ES - Membrane – Technology, especially designed for the treatment of bilge water from ships, is in the position to purify this extremely difficult to handle oily water without any problems.
The cleaned water meets the requirements of the German Law for the discharge to the river or to the local sewage network system at any time.

For this demonstration a test plant was installed in a 20 feet container and integrated into the existing treatment concept of the Bominflot Bremerhaven Tanklager GmbH, a local company which is collecting sludge oil & oily water / bilge water from ships.

view into the 20 feet container with the installed Membrane-Test Plant

During a test period of 3 month various types of oily water has been treated with this pilot plant. For this purpose Environmental Systems received the oily water from a 500 m^3 storage tank from Bominflot, where the sludge oil and bilge water from the ships are collected. Therefore these tests could be carried out with numerousness different types of oily water / bilge water from different sources and different ships.
The test plant is designed as a flexible system and can be also integrated to other companies systems for a test run and for demonstration without any problems.

<u>Left sample:</u>
Treated water after the test plant.
The cleaned water meets the requirements of the German Law for the discharge to the river or to the local sewage network system.

<u>Right sample:</u>
Untreated water before inflow.

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Test results for the treatment of oily water / bilge water from ships by using a special Membrane – Technology

Parameter for discharge directly to the local sewage network system		Values according German Law & Local Law	Sample
		[mg/l]	[mg/l]
Temperature		35°C	30°C
pH-Value		6,5 - 10	7,66
Settleable solids		10 ml/l	<0,01
Antimony	Sb	1	< 0,001
Arsenic	As	0,1	< 0,0005
Barium	Ba	3	< 0,001
Lead	Pb	0,5	0,058
Cadmium	Cd	0,2	0,053
Chromate VI	Cr^{6+}	0,1	0,007
Chromium, total	Cr	0,5	0,033
Cobalt	Co	2	<0,0007
Cupper	Cu	0,5	0,085
Nickel	Ni	1	0,049
Mercury	Ag	0,05	<0,0001
Selenium	Se	1	< 0,001
Silver	Ag	2	<0,05
Vanadium	V	2	0,002
Zinc	Zn	2	0,176
Stannous	Sn	2	<0,0008
Chlorine, purgeable	Cl_2	0,5	< 0,01
Cyanide, easily purgeable	CN^-	0,1	< 0,01
Cyanide, total	CN^-	5	< 0,01
Fluoride	F^-	50	3,5
Sulphates	SO_4^{2-}	600	57,9
Sulphides	S^{2-}	1	< 0,05
Hydrocarbon, total		20	1,99
Low volatile lipophilic substances		150	<0,1
AOX Thereof individual substance C_2Cl_4 (described as Cl)		1 0,5	0,329 0,023
Phenol-Compounds (described as C_6H_5OH)		100	25
Benzene & Derivates		1	0,07
toxicity compared to fish eggs	G(low)	2	1
toxicity compared to Daphnia	G(low)	4	1
toxicity compared to luminous bacteria	G(low)	4	2
DOC-Elimination-degree		75 %	9,1

Additional Parameter for discharge directly to the river		Values German Law	∅ Sample
		[mg/l]	[mg/l]
COD		200	41,67
Nitrite nitrogene	NO_2-N	2	0,19
Nitrogen, total	N_{total}	30	5,06
Aluminium	Al	3	< 0,01
Iron	Fe	3	0,075
Fluoride, total	F^-_{ges}	3	0,07
Phosphorus, total	P_{total}	2	1,57
Phenol -Index		0,15	0,12
Conductivity		/	363,33

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