



Lloyd's
Register

Type Approval Certificate Extension

This is to certify that Certificate No. 15/00070(E3) for the undernoted products is extended and renumbered as shown.

This certificate is issued to:

PRODUCER	ERMA FIRST ESK ENGINEERING SOLUTIONS S.A
PLACE OF PRODUCTION	Schisto Industrial Park (VIPAS) Block 13 Keratsiniou - Skaramagas Ave 18863, Perama Greece
DESCRIPTION	ERMA FIRST BWTS FIT 75-3000 using Filtration (FILTERSAFE or FILTREX or HYDAC) and electrolytic disinfection with a neutralizing medium
TYPE	ERMA FIRST BWTS FIT 75-3000 and incorporating with Treated rated capacity (TRC) = 90-3740 m3/h (Higher flow rates are applicable with a combination of models)
APPLICATION	For treatment of ship's ballast water
STANDARD	Lloyd's Register Rules and Regulation for the Classification of Ships Part 5, Chapter 25 and LR TA procedure TA 14
RATINGS	Type and model designation: ERMA FIRST BWTS FIT 75-3000 and incorporating with Treated rated capacity (TRC) = 90-3740 m3/h (Higher flow rates are applicable with a combination of models) Salinity: Not applicable Temperature: Not Applicable
Certificate No.	15/ 00070(E4)
Issue Date	25 July 2019
Expiry Date	31 December 2023
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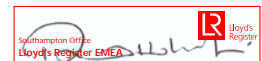
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Hold time: Not Applicable
 Temperature in reactor: > -2 degC
 Conductivity in reactor: >1050 µS/cm (0.9 psu at 3degC or 1.07 psu at -2 degC)
 Pressure System:< 6 bar
 Total Residual Oxidant (TRO): 6 mg Cl₂/L
 Maximum allowable dosages of Active Substances: TRO = 10 mg Cl₂/L
 Filter inlet pressure during flushing (FILTERSAFE): 1.6 Bar
 Filter inlet pressure during flushing (FILTREX): 1.5 Bar
 Filter Inlet pressure during flushing (HYDAC): 1.5 Bar
 Installation in Hazardous Areas: Yes

ERMA FIRST FIT Models	System Treated Rated Capacity (m ³ /hr)		Filter Model FILTERSAFE FS	Filter Model HYDAC RF14	Filter Model FILTREX FX	Electro- Chlorinati on Unit	Neutralizing medium Sodium bisulphite (38%w/w) L
	Min	Max					
BWTS FIT 75	20	90	BS-031H/V BS-050H/V	RF14-10	ACB-906-100	1xECF100	25
BWTS FIT 100	20	140	BS-031 H/V BS-050H/V	RF14-10	ACB-910-150	1xECF100	25
BWTS FIT 200	40	200	BS-061 H/V-T BS-070 H/V	RF14-15	ACB-935-200	1xECF250	25
BWTS FIT 300	60	300	BS-101H-10/V BS-101H/V-T BS-100H/V BS-100HV-T	RF14-20	ACB-945-200 ACB-935-200	1xECF250	200
BWTS FIT 400	80	515	BS-151 H/V BS-151-H/V-T BS-150 H/V BS-150 H/V-T	RF14-25 RF-20 △-Mesh	ACB-955-250	1xECF500	200

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BWTS FIT 600	120	600	BS-201 H/V BS-201 H/V-T BS-200 H/V BS-200 H/V-T	RF14-25	ACB-985-300	1xECF500	200
BWTS FIT 800	160	800	BS-300 H/V BS-300 H/V-T	RF-14-30 RF14-30 △-Mesh	ACB-999-350	1xECF750	200
BWTS FIT 1000	200	1200	BS-300 H/V-T BS-400 H/V	RF14-35 RF14-30 △-Mesh RF14-35 △ Mesh	ACB-999-350	1xECF100 0	200
BWTS FIT 1200	200	1250	BS-400 H/V BS-400 H/V-T	RF14-40 RF14-35 △-Mesh	2xACB-985-300 1xACB-9100-400	1xECF100 0	200
BWTS FIT 1500	160	1600	BS-400 H/V-T BS-603 H/V	RF14-45 RF14-40 △-Mesh	2xACB-985-300 1xACB-9100-400	2xECF750	200
BWTS FIT 2000	200	2300	BS-603 H/V-T BS-804 H/V BS-804 H/V-T	RF14-50 RF14-45 △-Mesh RF14-50 △-Mesh	2xACB-999-350 1xACB-9120-500	2xECF100 0	200
BWTS FIT 2500	200	2500	BS-804 H/V-T BS-1004 H/V BS-1004 H/V-T	RF14-50 RF14-50 △-Mesh	3xACB-999-350 1xACB-9200-600	2xECF100 0	200
BWTS FIT 3000	200	3740	BS-1004 H/V-T BS-1204H/V BS-1204 H/V-T BS-1206 H/V	RF14-60 RF14-60 △-Mesh	3xACB-999-350 1xACB-9200-600	3xECF100 0	200

SPECIFICATIONS

Filter 1(Primary)

Manufacturer Filtersafe Automatic Screen Filtration

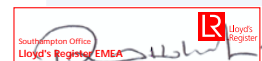
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3 Dolev St, Tefen Industrial Park, PO Box 2324959, Israel

Capacity range (per filter) 25 – 3740 m³/h
 Filter models BS-031(HorV), BS-050(HorV), BS-061(HorV)-T, BS-70(HorV),
 BS-100(HorV), BS-150(HorV), BS-200(HorV), BS-300(HorV),
 BS-400(HorV), BS-603(HorV), BS-804(HorV), BS-1004(HorV),
 BS-1004(HorV)-T, BS-1204(HorV), BS-1204(HorV)-T & BS-1206 H/V
 FILTERSAFE Models type name may be followed by additional letter eg E that indicates
 orientation and each model can be BS-#### E instead of BS-#### H/V

Mesh size 40 micron
 Maximum design pressure 10 bar
 Maximum operating pressure 6 bar
 Max. working temperature 50°C

Filter 2(Alternative 1)

Manufacturer Filtrex S.r.l
 Via Rubattino, 94/B, 20134 Milan, Italy

Capacity range (per filter) 25-3000 m³/h
 (max 5% increase in flowrate does not affect the operation and performance
 of the filter)

Filter models ACB-906-100, ACB-910-150, ACB-935-200, ACB-945-200, ACB-955-250,
 ACB-985-300, ACB-999-350, ACB-9100-400, ACB-9120-500 & ACB-9200-
 600

Mesh size 40 micron
 Maximum design pressure 10 bar
 Maximum operating pressure 6 bar

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Filter 3 (Alternative 2)

Manufacturer: HYDAC Process Technology GmbH Neunkirchen, Saarland, Germany

Capacity 52-3000m³ per hour
 130-3500M³ per hour (△-Mesh)
 Model numbers: RF14-10, RF14-15, RF14-20, RF14-25, RF14-30, RF14-35, RF14-40
 RF14-45, RF14-50, RF14-60
 Mesh size 40 micron
 Max. working temp.: 55°C
 Design pressure: 6 bar

Filter manufacturer have the right to amend these filter models at any time based on new Design Appraisal Document

ERMA FIRST panel could include functions of Filter if it is project specific requirement

Electrolyser

Manufacturer ERMA FIRST ESK Engineering Solutions SA (Greece)
 Type ECF100; ECF100Ex; ECF250; ECF250Ex; ECF500; ECF500Ex; ECF750;
 ECF750Ex; ECF1000; ECF1000Ex

Min. and max. operating temperature 3 °C (-2 °C) and 55°C respectively
 Max. design pressure 6 bar
 Minimum operating salinity 0.9 PSU (1,07PSU); 1050 µS/cm
 pH range 7.2 - 8.3

Target Concentration of TRO: 6 mg Cl₂/Litre

Maximum allowable discharge concentrations of Active Substances: < 0.1 mg Cl₂/Litre

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Neutralising agent Aqueous solution of Sodium Bisulphite (38%w/w)
(38%w/w; CAS: 7631-90-5;7681-57-4)

Power Supply Panel

Manufacturer KraftPowercon
Type Rectifier for Marine environment (Flex Kraft Marine)
Supply voltage 3 x 380–480 V ± 10%, 50–60 Hz
Protection class 44
Max. Ambient Temp. 55
Operating Temp 0-55°C
Max. Cooling water Temp. 45°C
Rated Output Voltage 200VDC @ >420 VAC
Rate Output Current up to 2500A per stack @ 30VDC
Max. Output Power 10 kW per module @ rated voltage
Max. no. of modules 30
Environmental Category ENV2 as defined in LR Test Specification No. 1 (2002)

Electrical Panels ERMA FIRST Control Panel ENV2

OTHER CONDITIONS

This Certificate does not address Flag State/Statutory requirements regarding the efficacy of the process. Please refer to the relevant IMO Type Approval(s) for this manufacturer.

The intended location of the ERMA FIRST FIT model on board any ship is to be suitable and in compliance with the Class Rule requirements for such a location and where an explosive atmosphere may be present, the installation is to be of a type providing protection against ignition of the gases. Its connection into the ship's system, including the electrical system, is to be shown on the ship's plans which are to be submitted for approval.

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Manufacturer's instructions and certification details showing appropriate compliance are to be followed.

Hydrogen is a by-product of the ERMA FIRST FIT treatment process. The risk of hydrogen accumulation and formation of potential explosive atmosphere including venting arrangements for ship specific installation is to be considered. Ship specific installation is to be considered using ERMA FIRST theoretical hydrogen calculation model. Adequate safety measures are to be provided if deemed necessary by the designer or installer such as:

- a. Tank entry and confined space entry procedures are to be developed or adhered with if in place.
- b. Adequate venting arrangement is to be considered for enclosed areas.

The use of non-metallic / plastic materials within the ERMA FIRST FIT system in particular the Electrolytic Chlorination Unit is to be in accordance with Part 5 Chapter 12 Section 5 of Lloyd's Register Rules and Regulations for the Classification of Ships.

Installation survey and commissioning is to be conducted for each installation on board ships in accordance with IMO Res. MEPC.174 (58) or Res. MEPC 279(70) Section 8 and Lloyd's Register specific survey requirements.

This Certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register EMEA of any modification or changes to the equipment in order to obtain a valid certificate.

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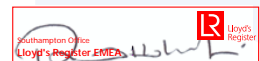


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The Design Appraisal Document No. 15/00070(E4) and its supplementary Type Approval Terms and Conditions form part of this Certificate.

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