Certificate No: LR2002483TA
Issue Date: 12/03/2020
Expiry Date: 11/03/2025

Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

Manufacturer	**TECHCROSS**
Address	433, Noksansaneopbuk-ro, Samsung-Dong,Gangnam-Gu, Gangseo-gu, Busan, 46758, Korea, Republic of
Place of Production	TECHCROSS 433, Noksansaneopbuk-ro, Samsung-Dong,Gangnam-Gu, Gangseo-gu, Busan, 46758, Korea, Republic of
Type	Ballast Water Treatment Systems And Water Treatment Plants
Description	Electrolysis type ballast water treatment system.
Trade Name	Electro-cleen™ Ballast Water Management System, ,A Type: ECS-300 to ECS-1000.,B Type: ECS-150 to ECS–1000., B1.1 Type: ECS-150 to ECS–10
Application	For treatment of ships' ballast water within environmental category ENV2 as defined in Lloyd's Register Test Specification No. 1: 2019.
Specified Standard	Lloyd's Register Rules and Regulation for the Classification of Ships Part 5 and Part 6 as applicable.
Ratings	See Appendix
Other Conditions	The intended installation location of the Techcross BWMS is to be suitable and in compliance with the requirements for said location. The integration of the

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Yong-Dae Kong

Senior Specialist to Lloyd's Register Asia
A member of the Lloyd's Register group

71 Fenchurch Street, London, EC3M 4BS,
United Kingdom

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Techcross BWMS into the ship's systems,including piping, mechanical/ electrical components and control engineering aspects are to be shown on the ship's plans and submitted for approval.Particular attention is to be paid to the following points:

- Different configurations of ECS unit(s), filter(s), and flow meter
- Location and installation of Chemical storage tank, Filling and handling of chemicals
- Ventilation and Firefighting arrangement
- Location of hydrogen gas detection sensors

Warning signs for 'Naked flames & heat sources' are to be provided in the vicinity of ballast tanks air vents during ballasting operation
In addition, the proposed installation of components within hazardous areas are to be supported with the adequate Ex-certification meeting the requirements for each specific area
Electro-cleen™ systems may be combined in parallel for higher treatment rated capacities as approved in Statutory Type Approval certificate. However, for any Electro-cleen™ systems where multiple ECS units are specified, evidence for equal flow distribution i.e. CFD analysis, etc. is to be provided for each ship specific approval
The quoted performance data for each discrete model is based on technical documentation submitted by the manufacturer. Any deviations require submitting to Lloyd's Register for approval
All components outside the scope of supply of Techcross Inc are to be of type complying with LR Rules and submitted for consideration prior to installation
Each installation is to be installed, surveyed and commissioned in accordance with all applicable statutory and LR 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 Asia of any modification or changes to the equipment in order to obtain a valid Certificate.

The Design Appraisal Document No. LR2002483TA and its supplementary Type Approval Terms and Conditions form part of this Certificate.

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