



U. S. Department of Homeland Security
United States Coast Guard
Certificate of Approval

Coast Guard Approval Number: 162.060/54/0

Expires: 14 December 2028

BALLAST WATER MANAGEMENT SYSTEM
Electrolysis

Techcross, Inc.
433 Noksansaneopbuk-ro
Gangseo-gu, Busan KOREA, REPUBLIC OF

Name of BWMS: ECS-HYCHLOR 2.0

Capacities: 250 and 6000 m3/h

This is to certify that the above listed BWMS, with the listed treatment capacities, have been satisfactorily examined and tested by Independent Lab Lloyd's Register in accordance with the requirements contained in 46 CFR 162.060. The system shall be installed and operated in accordance with the ECS-HYCHLOR 2.0 Operation, Maintenance, and Safety Manual, Rev. 1.6, dated December 11, 2023.

Installation Limitations: See Appendix

Operational Limitations:

Salinity: Not applicable

Feed Salinity: ≥ 8 PSU

Temperature: Not applicable

Ambient Temperature: 0-55°C

Electrolyte Feed Temperature: $\geq 3^{\circ}\text{C}$

Hold Time: ≥ 23 hours

Total Residual Oxidant (TRO): Ballasting: 9.5 mg/L as Cl₂

De-Ballasting: ≤ 0.1 mg/L as Cl₂

The BWMS must be marked in accordance with 46 CFR 162.060-22. A copy of this Type Approval Certificate shall be carried on board a vessel fitted with the BWMS at all times.

Vessel owners/operators are expected to consult with the manufacturer to ensure the BWMS's operational limitations and treatment flow rates are acceptable for the waters frequented by their vessels.

*** End ***

THIS IS TO CERTIFY THAT the above named manufacturer has submitted to the undersigned satisfactory evidence that the item specified herein complies with the applicable laws and regulations as outlined on the reverse side of this Certificate, and approval is hereby given. This approval shall be in effect until the expiration date hereon unless sooner canceled or suspended by proper authority.



GIVEN UNDER MY HAND THIS 14th DAY OF
DECEMBER 2023, AT WASHINGTON D.C.



Acting Chief, Engineering Division
BY DIRECTION OF THE COMMANDANT

TERMS: The approval of the item described on the face of the Certificate has been based upon the submittal of satisfactory evidence that the item complies with the applicable provisions of the navigation and shipping laws and the applicable regulations in Title 33 and/or Title 46 of the Code of Federal Regulations. The approval is subject to any conditions noted on this Certificate and in the applicable laws and regulations governing the use of the item on vessels subject to Coast Guard inspection or on other vessels and boats.

Consideration will be given to an extension of this approval provided application is made 3 months prior to the expiration date of this Certificate.

The approval holder is responsible for making sure that the required inspections or tests of materials or devices covered by this approval are carried out during production as prescribed in the applicable regulations.

The approval of the item covered by this certificate is valid only so long as the item is manufactured in conformance with the details of the approved drawings, specifications, or other data referred to. No modification in the approved design, construction, or materials is to be adopted until the modification has been presented for consideration by the Commandant and confirmation received that the proposed alteration is acceptable.

NOTICE: Where a manufacturer of safety-at-sea equipment is offering for sale to the maritime industry, directly or indirectly, equipment represented to be approved, which fails to conform with either the design details or material specifications, or both, as approved by the Coast Guard, immediate action may be taken to invoke the various penalties and sanctions provided by law including prosecution under 46 U.S.C. 3318, which provides:

"A person that knowingly manufactures, sells, offers for sale, or possesses with intent to sell, any equipment subject to this part (*Part B. of Subtitle II of Title 46 U.S.C.*) and the equipment is so defective as to be insufficient to accomplish the purpose for which it is intended, shall be fined not more than \$10,000, imprisoned for not more than 5 years or both."

INSTALLATION LIMITATIONS

In addition to meeting 46 CFR 162.060, which approves the operation of this BWMS in U.S. waters, this type approval certificate also allows for the installation and operation of this BWMS on the following vessels and/or shipboard locations:

BWMS Model	U.S. Flag Installation	Hazardous Location Installation (U.S. Flag) ^{1,3}	Hazardous Location Installation (Foreign Flag) ^{2,3}
ECS-Hychlor-2.0	X		
ECS-Hychlor-2.0- Ex	X	X	X

- 1) Models have been verified to meet the requirements of 46 CFR 111.105
- 2) Subject to approval of the foreign administration
- 3) The hypochlorite generation unit (HGU), feeder pump, degas module unit (DMU), main control cabinet (MCC), main power cabinet (MPC), power rectifier module (PRM), main control panel (MCP), neutralization injection unit (NIU), conductivity sensor unit (CSU), gas detection sensor (GDS), gas sensor (GS), level sensor (LS) and inverter of feeder pump (IFP) must remain outside of hazardous locations.

Note: "X" indicates approval for installation.

*** END ***

(1 of 1)