

**POTVRDA O TIPNOM ODOBRENJU SUSTAVA ZA OBRADU  
BALASTNIH VODA**  
*TYPE APPROVAL CERTIFICATE OF BALLAST WATER MANAGEMENT SYSTEM*



**REPUBLIKA HRVATSKA**

**REPUBLIC OF CROATIA**

Izdana u ime Vlade REPUBLIKE HRVATSKE od HRVATSKOG REGISTRA BRODOVA

*Issued under the authority of the Government of the REPUBLIC OF CROATIA by the CROATIAN REGISTER OF SHIPPING*

Br. / No.

02-003238/025263

Potvrđuje se da je ovaj sustav za obradu balastnih voda pregledan i ispitan u skladu sa zahtjevima specifikacija sadržanih u Kodeksu za odobrenje sustava za obradu balastnih voda (Rezolucija MEPC.300(72)). Ova Potvrda vrijedi samo za ovaj sustav za obradu balastnih voda.

*This is to certify that the ballast water management system listed below has been examined and tested in accordance with the requirements of the specifications contained in the Code for Approval of Ballast Water Management Systems (Resolution MEPC.300(72)). This certificate is valid only for the ballast water management system referred to below.*

**Naziv sustava za obradu balastnih voda:**

*Name of ballast water management system:*

**ELECTRO-CLEEN™ SYSTEM BWMS**

**Sustav za obradu balastnih voda proizveden od:**

*Ballast water management system manufactured by:*

**TECHCROSS**

433 Noksansaneopbuk-ro, Gangseo-gu

BUSAN 46758; REPUBLIC OF KOREA

**Oznaka tipa i modela, uključujući:**

*Under type and model designation and incorporating:*

(Ex-)ECS-150B 1.1 –(Ex-)ECS-12000B 1.1 – sustav za obradu balastnih voda koji koristi elektroklorinaciju, te sredstvo za neutralizaciju kod pražnjenja balasta.

*(Ex-)ECS-150B 1.1 –(Ex-)ECS-12000B 1.1 –ballast water treatment system using electro-chlorination at ballast water uptake and neutralization at ballast water discharge.*

Vidi Tablicu 1 - Popis odobrenih BWTS

*See Table 1 - List of certified BWTS*

**Prema nacrtu opreme/sklopnom nacrtu br.:** TC 1908-005; TC 1908-006

*To equipment / assembly drawing No.:*

**datum**

*date*

Rev.2.0

**Ostala oprema proizvedena od:**

*Other equipment manufactured by:*

**Jedinica za napajanje/ Power distribution equipment**

Proizvođač/Manufacturer: TECHCROSS

Tip/Type: PDE-12A 1.1; PDE-A4 1.1; PDE-A4 1.0; PDE-24A 1.1K

Napajanje/Power supply: AC 440V, 3 ph, 60Hz

**Ispravljač/ Power rectifier unit**

Proizvođač/Manufacturer: TECHCROSS

Tip/Type: PRU 1.1-A; PRU 1.1-T; Ex-PRU 1.1

Struja/Current: 24V/1100 A

Rashladna slatka voda/ Cooling fresh water:

Najveći radni tlak/Maximum working pressure: 5 bar

Najveća radna temperatura/Maximum working temperature: 36°C

**Osjetnik TRO/TRO sensor unit**

Proizvođač/Manufacturer: TECHCROSS

Tip/Type: TSU 1.1; TSU-S; TSU-S 1.1; Ex-TSU 1.1

Područje/Range: 0 do/to 10 mg/L

Najveći radni tlak/Maximum working pressure: 10 bar

**Jedinica za neutralizaciju/Auto neutralization unit**

Proizvođač/Manufacturer: TECHCROSS  
Tip/Type: ANU-S; ANU-5T 1.1; ANU-10T 1.1

Sredstvo za neutralizaciju/Neutralizing medium:  
Vodena otopina natrijevog tiosulfata/Aqueous solution of sodium thiosulfate (45-55% w/w)  
Najveći radni tlak/Maximum working pressure: 10 bar

**Elektro-klorinacijska jedinica/Electro-chlorination unit**

Proizvođač/Manufacturer: TECHCROSS  
Tip/Type: ECU-150B 1.1; ECU-300B 1.1; ECU-450B 1.1; ECU-600B 1.1; ECU-1000B 1.1  
Ex-ECU-150B 1.1; Ex-ECU-300B 1.1; Ex-ECU-450B 1.1; Ex-ECU-600B 1.1; Ex-ECU-1000B 1.1

Najmanja i najveća radna temperatura/Minimum and maximum operating temperature: nije primjenjivo/not applicable

Najveći radni tlak/Maximum working pressure: 5 bar

Najmanji radni salinitet/Minimum operating salinity: nije primjenjivo/not applicable

Prema nacrtu opreme/sklopnom nacrtu br.: TC 1908-007  
To equipment / assembly drawing No.:

datum Rev.2.0; Rev.2.1  
date

Nazivni kapacitet obrade: 150 - 12000 m<sup>3</sup>/h  
Treatment rated capacity:

Ova Potvrda o tipnom odobrenju izdana je na osnovu odobrenja od Republike Koreje, Potvrda br.: 2021-1 do 2021-10  
This Type Approval Certificate is issued based on approval by Republic of Korea, Certificate No.: 2021-1 to 2021-10

Kopija ove Potvrde o tipnom odobrenju mora se nalaziti na brodu opremljenom ovim sustavom za obradu balastnih voda, za pregled na brodu. Ako je Potvrda o tipnom odobrenju izdana na osnovu odobrenja od druge Uprave, potrebno je navesti tu Potvrdu o tipnom odobrenju.  
A copy of this Type Approval Certificate shall be carried onboard a ship fitted with this ballast water management system, for inspection onboard the ship. If the Type Approval Certificate is issued based on approval by another Administration, reference to that Type Approval Certificate shall be made.

Mjesto pečata  
Official stamp

Potpis  
Signed  
Marinko Popović, dipl.ing.  
Uprava  
Administration of  
Republika Hrvatska  
Republic of Croatia

Izdana  
Issued this  
Valjana do  
Valid until this  
07.  
07<sup>th</sup>  
07.  
07<sup>th</sup>  
dana  
day of  
dana  
day of  
svibnja 2021.  
May 2021  
svibnja 2025.  
May 2025

**Tablica 1/ Table 1**

Model	TRC (m <sup>3</sup> / h)	Electro-chamber unit (ECU)	Power distribution equipment	Rectifier	Auto neutralization unit
ECS-150B 1.1	150	ECU-150B 1.1	PDE-12A 1.1	PRU 1.1 x1	ANU-S or ANU-5T 1.1
ECS-300B 1.1	300	ECU-300B 1.1	PDE-12A 1.1	PRU 1.1 x2	ANU-S or ANU-5T 1.1
ECS-450B 1.1	450	ECU-450B 1.1	PDE-12A 1.1	PRU 1.1 x3	ANU-S or ANU-5T 1.1
ECS-600B 1.1	600	ECU-600B 1.1	PDE-12A 1.1	PRU 1.1 x4	ANU-S or ANU-5T 1.1
ECS-1000B 1.1	1000	ECU-1000B 1.1	PDE-12A 1.1	PRU 1.1 x8	ANU-5T 1.1
Ex-ECS-150B 1.1	150	Ex-ECU-150B 1.1	PDE-12A 1.1	Ex-PRU 1.1 x1	ANU-S or ANU-5T 1.1
Ex-ECS-300B 1.1	300	Ex-ECU-300B 1.1	PDE-12A 1.1	Ex-PRU 1.1 x2	ANU-S or ANU-5T 1.1
Ex-ECS-450B 1.1	450	Ex-ECU-450B 1.1	PDE-12A 1.1	Ex-PRU 1.1 x3	ANU-S or ANU-5T 1.1
Ex-ECS-600B 1.1	600	Ex-ECU-600B 1.1	PDE-12A 1.1	Ex-PRU 1.1 x4	ANU-S or ANU-5T 1.1
Ex-ECS-1000B 1.1	1000	Ex-ECU-1000B 1.1	PDE-12A 1.1	Ex-PRU 1.1 x8	ANU-5T 1.1

Jedinica za elektrolizu (ECU) mora raditi u granicama nazivnog kapaciteta obrade (TRC) uređaja (BWMS).  
*The electrolysis unit (ECU) shall be operated within the TRC of the BWMS.*

Sustav (ECS) se može ugraditi za paralelni rad radi većeg kapaciteta obrade (TRC).  
*ECS can be combined in parallel for higher TRC.*

**Granični radni uvjeti su opisani u ovom dokumentu (temperatura/salinitet):**

*Limiting operating conditions imposed are described in this document (temperature/salinity):*

Temperatura dobave balastne vode/*Ballast water feed temperature:*  $\geq -2^{\circ}\text{C}$

Najmanji salinitet balastne vode pri dobavi/*Minimum ballast water feed salinity:* 1,0 PSU

Miješanje balasta i morske vode iz skladišnog tanka se mora primijeniti u slučaju kad balastna voda ima salinitet ispod 1 PSU.  
*Mixing ballasting operation (from sea water holding tank) shall be applied if the water has a salinity below 1 PSU.*

**Vrijeme zadržavanja/*Hold time:***

Najmanje vrijeme zadržavanja između balastiranja i pražnjenja balasta iznosi 4 sata za bočatu i morsku vodu.

Najmanje vrijeme zadržavanja iznosi 23 sata za slatku vodu saliniteta manjeg od 1 PSU.

*Minimum holding time between uptake and discharge of 4 hours is required for brackish and marine water.*

*Minimum holding time of 23 hours is required for fresh water with salinity below 1 PSU.*

**Ostala ograničenja uključuju sljedeće:**

*Other restrictions imposed include the following:*

Sredstvo za neutralizaciju/*Neutralizing medium:*

Vodena otopina natrijevog tiosulfata/*Aqueous solution of sodium thiosulfate (45-55% w/w)*

Ukupni ostatni oksidans/*Total residual oxidant:*  $<0,1 \text{ mg/l}$

**Ova oprema je projektirana za rad u sljedećim uvjetima:\***

*This equipment has been designed for operation in the following conditions:\**

Najveći radni tlak/*Maximum working pressure:* 5 bar

Temperatura okoline/*Ambient temperature:*  $0^{\circ}\text{C}$  do/to  $55^{\circ}\text{C}$

\* Unesi projektna ograničenja sustava  
 Insert system design limitations