



## Confirmation of Product Type Approval

**Company Name:** DURAMAX MARINE LLC

**Address:** 17990 Great Lakes Parkway OH 44234 United States

**Product:** Bearing, Water Lubricated Bearings

**Model(s):** Duramax DuraBlue

**Endorsements:**

| <b>Certificate Type</b>         | <b>Certificate Number</b> | <b>Issue Date</b> | <b>Expiry Date</b> |
|---------------------------------|---------------------------|-------------------|--------------------|
| Product Design Assessment (PDA) | 22-2265755-PDA            | 01-JUL-2022       | 30-JUN-2027        |
| Manufacturing Assessment (MA)   | 21-4979970                | 13-OCT-2021       | 25-OCT-2026        |
| Product Quality Assurance (PQA) | NA                        | NA                | NA                 |

### **Tier**

3 - Type Approved, unit certification not required

### **Intended Service**

Marine and Offshore Applications

### **Description**

For use as rudder bushing, thrust washers, steering gear, stern tube bearing. Virtually no swelling in seawater, High strength-to-weight ratio, self-lubricating formulation for dry running, Proprietary fiber matrix extending wear life, very low thermal coefficient of expansion.

### **Ratings**

Rudder Stock, Pintles, Steering Gear Bushings, stern tubes:

Diameter: 25mm to 1070mm (1" to 42")

Thrust Washers and Wear Pads

Thickness: 1/8" to 3"

Temperature Range: -29 °C to +93 °C;

Maximum Nominal Bearing Pressure: 2176 psi (15 N/mm<sup>2</sup>)

Basic Design Criteria for the Propeller Support Bearings are Maximum Bearing Pressure (P) not to exceed 0.60 N/mm<sup>2</sup>, and for Bearing next to Propeller, the Length (L) not to be less than 2.0 times the required Tail Shaft Diameter as per the Rule Requirements.

### **Service Restrictions**

Unit Certification is not required for this product. If the manufacturer or purchaser request an ABS

Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.

Acceptance on facilities with Ice Class Notations will be carried out on a case by case basis.

### Comments

1. The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.

2. Bearings are to be installed in accordance with the manufacturer's recommendations and following points.

For rudder bearings:

- The bearing length is to be not greater than 1.2 times the bearing outer diameter. For length/diameter ratios greater than 1.2 will be specially considered upon submission of calculations showing acceptable clearances at both ends of the bearing.

- In general, clearances are to be not less than 1.5 mm on diameter. Request of clearances less than 1.5 mm will be specially considered with the submission of documented evidence, such as manufacturer's recommendation on acceptable clearance, expansion allowance and satisfactory service history with reduced clearances.

- The bearing length of the rudder pintle is to be not less than 1.0 times the bearing outer diameter.

- The bearing pressure is to be in accordance with 2022 MVR 3-2-14/Table 6.

For aft (the next to and supporting the propeller) stern tube bearings:

In general, the bearing length is to be not less than four (4) times the required tail-shaft diameter. However, such may be less than four times, but not less than two times the required tail shaft diameter, provided the bearing design is being substantiated by experimental tests to the satisfaction of ABS on a case by case basis.

### Notes, Drawings and Documentation

Drawing No. Correspondence, PDA Application 17-HS1637367-PDA, Revision: -, Pages: -

Drawing No. DuraBlue Self-lubricating bushings document

Drawing No. Type Approval DuraBlue Composite Rudder Bushing Test report

Drawing No. 571690, Detailed Independent Report

Drawing No. P-ENG-008, Rudder Bushing Test Plan and Procedure (Updated; Revision #001)

### Term of Validity

This Product Design Assessment (PDA) Certificate remains valid until 30/Jun/2027 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

**ABS Rules**

2022 ABS Rules for Building and Classing Marine Vessel Rules: 1-1-4/7.7, 1-1-A3, 1-1-A4, 3-2-14/15.3, 4-3-2/5.15.1

2022 ABS Rules for Conditions of Classification, Part 1 – Offshore Units and Structures: 1-1-4/9.7, 1-1-A2, 1-1-A3

2022 ABS Rules for Building and Classing Steel vessels for Service on Rivers and Intracoastal Waterways: 1-1-4/7.7, 1-1-A3, 1-1-A4, 4-2-1/11.1

2022 ABS Guide for Building and Classing Yachts: 4-1-1/3.3, 1-1-A3, 1-1-A4, 3-2-9/13, 3-2-9/15.1, 3-2-9/15.3, 4-3-1/13.1.2

2022 ABS Rules for Building and Classing High-Speed Craft: 1-1-4/11.9, 1-1-A2 and 1-1-A3, 3-2-8/13, 3-2-8/15.1, 3-2-8/15.3 and 4-3-1/13.1.2

**International Standards**

NA

**EU-MED Standards**

NA

**National Standards**

NA

**Government Standards**

NA

**Other Standards**

NA



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ABS has used due diligence in the preparation of this certificate, and it represents the information on the product in the ABS Records as of the date and time the certificate is printed.

If the Rules and/or standards used in the PDA evaluation are revised or if there is a design modification (whichever occurs first), a PDA revalidation may be necessary.

The continued validity of the MA is dependent on completion of satisfactory audits as required by the ABS Rules. The validity of both PDA and MA entitles the product to receive a **Confirmation of Product Type Approval**.

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or prior to the effective date of the ABS Rules and standards applied at the time of PDA issuance. ABS makes no representations regarding Type Approval of the Product for use on vessels, MODUs or facilities built after the date of the ABS Rules used for this evaluation.

Type Approval requires Drawing Assessment, Prototype Testing and assessment of the manufacturer's quality assurance and quality control arrangements. The manufacturer is responsible to maintain compliance with all specifications applicable to the product design assessment. Unless specifically indicated in the description of the product, certification under type approval does not waive requirements for witnessed inspection or additional survey for product use on a vessel, MODU or facility intended to

be ABS classed or that is presently in class with ABS.

Due to wide variety of specifications used in the products ABS has evaluated for Type Approval, it is part of our contract that; whether the standard is an ABS Rule or a non-ABS Rule, the Client has full responsibility for continued compliance with the standard.

Questions regarding the validity of ABS Rules or the need for supplemental testing or inspection of such products should, in all cases, be addressed to ABS.