PDR-2023-889 WEATHER SEALING TECHNICAL REPORT

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Polar Dynamics Robotics, Inc.

Technical Documentation Division

Date: December 15, 2023

Report ID: PDR-2023-889-WS

Classification: Confidential

1. EXECUTIVE SUMMARY

This technical report documents the comprehensive weather sealing s

and testing results for the BlueCore(TM) AMR Platform (Model BC-20
by Polar Dynamics Robotics, Inc. The testing was conducted betwee
2023, and December 1, 2023, at our primary R&D facility in Rocheste

2. SCOPE AND OBJECTIVES

1. To validate the weather sealing integrity of the BlueCore(TM) AMR

2. To certify compliance with IP65 protection standards for dust and m

3. To document the performance of proprietary cold-resistant gasket s

3. TECHNICAL SPECIFICATIONS

3.1 Sealing System Components

Primary chassis seal: Proprietary Arctic-Grade EPDM compound (PD

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Secondary containment: Reinforced polyurethane barriers

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Access panel seals: Double-lip silicone gaskets with thermal expansio

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Cable glands: IP68-rated marine-grade stainless steel

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Ventilation ports: Gore-Tex(R) membrane filters with hydrophobic coa

3.2 Material Properties

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Operating temperature range: -40 C to +25 C

Chemical resistance: Resistant to common industrial cleaners and sa

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UV stability: >5 years exposure rating

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Compression set: <15% at -40 C

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Shore A hardness: 65 5

4. TESTING METHODOLOGY

4.1 Environmental Chamber Testing

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Duration: 1000 hours continuous cycling

- Temperature range: -40 C to +25 C
- Humidity range: 20% to 95% RH
- Pressure differential: 50 mbar
- Cycle frequency: 6 hours per complete cycle

4.2 Ingress Protection Testing

- Dust chamber exposure: 8 hours at maximum concentration
- Water jet testing: 12.5L/min at 30kPa from all angles

Thermal shock testing: 100 cycles from -40 C to +25 C

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Vibration testing: 10-500Hz sweep at 2g acceleration

5. TEST RESULTS

5.1 Sealing Performance

Test Parameter	Requirement	Result	Status
Dust Ingress	No ingress	Pass	
Water Resistance	No harmful ingress	Pass	
Thermal Cycling	No seal degradation	Pass	

| Compression Set | <15% | 12.3% | |

5.2 Material Integrity

All sealing components maintained structural and functional integrity t
the testing period. No significant degradation or material property cha
observed.

6. COMPLIANCE VERIFICATION

The BlueCore(TM) AMR Platform meets or exceeds the following star

- IP65 Protection Rating (IEC 60529)
- UL 50E Environmental Requirements

NEMA 250 Type 4X

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ISO 9001:2015 Quality Management System Requirements

7. RECOMMENDATIONS

1. Implement quarterly seal inspection protocol during routine mainter

2. Replace primary seals every 2000 operating hours or annually, whi

3. Maintain documented torque specifications for sealed access pane

8. LIMITATIONS AND DISCLAIMERS

This report represents testing conducted under laboratory conditions.

performance may vary based on specific operating conditions and env

factors. This document is confidential and proprietary to Polar Dynam

Robotics, Inc.

9. AUTHENTICATION

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10. DOCUMENT CONTROL

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