

OSHA COMPLIANCE REVIEW - AUTOMATED STORAGE SYSTEMS

Polar Dynamics Robotics, Inc.

Review Period: January 1, 2023 - December 31, 2023

Document Reference: OSHA-2024-PDR-001

1. EXECUTIVE SUMMARY

This OSHA compliance review evaluates Polar Dynamics Robotics, Inc.'s ("Company") automated storage systems, specifically focusing on the IceNav-enabled autonomous mobile robots (AMRs) deployed in cold storage environments. This assessment examines compliance with applicable OSHA standards, particularly 29 CFR 1910 (General Industry Standards) and relevant subsections pertaining to robotics and automated systems.

2. SCOPE OF REVIEW

1. Systems Evaluated:

- IceNav AMR Platform (Model Series PDR-2000)
- Automated Storage and Retrieval Systems (ASRS)
- Cold Environment Navigation Systems
- Human-Machine Interface Controls
- Emergency Stop Systems
- Safety Interlocking Mechanisms

2. Facilities Assessed:

- Primary Manufacturing Facility (Dover, Delaware)
- R&D Testing Center (Newark, Delaware)
- Customer Integration Lab (Boston, Massachusetts)

3. COMPLIANCE FINDINGS

1. Machine Guarding (29 CFR 1910.212)

- Compliant: All AMR units equipped with appropriate physical guards
- Compliant: Perimeter safety barriers installed in testing areas
- Action Item: Update guard specifications for new PDR-2000X model

2. Control of Hazardous Energy (29 CFR 1910.147)

- Compliant: Lockout/Tagout procedures documented and implemented
- Compliant: Energy isolation devices properly labeled
- Action Item: Enhance documentation for cold-environment maintenance procedures

3. Walking-Working Surfaces (29 CFR 1910.22)

- Compliant: Designated pedestrian walkways clearly marked
- Compliant: Anti-slip flooring in cold storage testing areas
- Action Item: Install additional visual warnings at robot-human interaction points

4. RISK ASSESSMENT

1. High-Priority Areas:

- Robot-human interaction zones in confined spaces
- Emergency stop system reliability in sub-zero conditions
- Thermal protection systems for maintenance personnel
- Communication system redundancy

2. Mitigation Measures:

- Implementation of zone-based speed controls
- Enhanced sensor systems for human detection
- Redundant emergency stop circuits
- Cold-environment PPE protocols

5. REGULATORY COMPLIANCE PROGRAM

1. Training Requirements:

- Operator safety training program established
- Maintenance personnel certification program
- Emergency response procedures training
- Annual refresher courses implemented

2. Documentation Systems:

- Digital maintenance logs maintained

- Incident reporting system operational
- Safety audit records archived
- Training certification tracking

6. RECOMMENDATIONS

1. Immediate Actions:

Update safety protocol documentation for PDR-2000X series

Enhance emergency stop system testing procedures

Implement additional operator training modules

Upgrade perimeter monitoring systems

2. Long-term Improvements:

Develop advanced human-detection algorithms

Enhance cold-environment safety protocols

Implement predictive maintenance systems

Expand safety monitoring capabilities

7. CERTIFICATION

The undersigned hereby certifies that this review was conducted in accordance with OSHA standards and industry best practices. All findings represent the professional opinion of the reviewing team based on available information as of the review date.

8. DISCLAIMERS

This review is based on conditions observed and information provided during the assessment period. Future changes in operations, equipment, or regulations may affect the validity of these findings. This document does not constitute legal advice or guarantee regulatory compliance.

9. EXECUTION

REVIEWED AND APPROVED:

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Lead Safety Compliance Officer

Polar Dynamics Robotics, Inc.

Date: January 11, 2024

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Director of Engineering

Polar Dynamics Robotics, Inc.

Date: January 11, 2024

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Chief Financial Officer

Polar Dynamics Robotics, Inc.

Date: January 11, 2024

10. REVISION HISTORY

Version 1.0 - Initial Review (January 11, 2024)

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Next Review Date: January 11, 2025