PDR-OPS-004 QUALITY CONTROL STANDAR

Version 3.2 | Effective Date: January 15, 2024

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1. PURPOSE AND SCOPE

1. This Quality Control Standard ("Standard") establishes mandatory r

2. This Standard applies to all cryogenic components integrated into t

2. DEFINITIONS

1. "Cryogenic Components" means any mechanical, electrical, or elec

a) Temperature-hardened power cells

b) Cold-resistant actuators

c) Thermal isolation systems

d) Frost-resistant sensor arrays

e) Low-temperature lubricants and sealants

2. "Quality Control Inspector" means a Company employee certified in

3. "Critical Failure" means any defect that could compromise the comp

3. QUALITY CONTROL PROCEDURES

1. Incoming Component Inspection

a) All cryogenic components must undergo receiving inspection within

delivery

b) Visual inspection for physical damage or contamination

c) Verification of manufacturer certifications and batch documentation

d) Recording of serial numbers and lot codes in the Company's QMS

2. Pre-Installation Testing

a) Temperature cycling from ambient to -40 C (-40 F)

b) Minimum 4-hour cold soak test at operational temperature

c) Thermal imaging analysis during temperature transitions

d) Verification of electrical characteristics at minimum operating tempe

e) Mechanical stress testing under cryogenic conditions

3. Documentation Requirements

a) Complete test results logged in BlueCore(TM) QMS platform

b) Photographic documentation of any anomalies

c) Digital signature of authorized Quality Control Inspector

d) Retention of all test data for minimum of 5 years

4. ACCEPTANCE CRITERIA

1. General Requirements

a) Zero visible damage or degradation

b) Full compliance with manufacturer specifications

c) Successful completion of all pre-installation tests

d) No deviation from approved thermal profiles

2. Component-Specific Requirements

a) Power cells: <5% capacity reduction at -30 C

b) Actuators: <2% performance deviation across temperature range

c) Sensors: 99.9% accuracy maintenance in cold conditions

d) Seals: Zero brittleness or cracking at minimum temperature

5. NON-CONFORMANCE HANDLING

1. Any component failing to meet acceptance criteria shall be:

a) Immediately quarantined and labeled as non-conforming

b) Documented in the non-conformance tracking system

c) Evaluated for root cause analysis

d) Disposed of or returned to vendor as appropriate

2. Corrective Action Requirements

a) Investigation of failure mode

b) Supplier notification within 24 hours

c) Corrective action plan development

d) Verification of effectiveness before closing

6. QUALITY ASSURANCE RECORDS

1. Required Documentation

a) Inspection reports

b) Test results and data logs

c) Non-conformance reports

d) Corrective action records

e) Calibration certificates

f) Training records of Quality Control Inspectors

2. Record Retention

a) Electronic records maintained for 7 years

b) Critical component data retained for product lifetime

c) Backup systems maintained in secure cloud storage

7. REVISION AND CONTROL

1. This Standard shall be reviewed annually and updated as necessar

a) Changes in technology or manufacturing processes

b) New regulatory requirements

c) Lessons learned from field performance

d) Improvements in testing methodology

2. All revisions must be approved by:

a) Chief Technology Officer

b) Quality Assurance Director

c) Chief Robotics Officer

8. COMPLIANCE AND ENFORCEMENT

1. Compliance with this Standard is mandatory for all Company perso

2. Violations may result in disciplinary action up to and including termi

APPROVAL AND EXECUTION

APPROVED AND ADOPTED this 15th day of January, 2024.

POLARIS DYNAMICS ROBOTICS, INC.

By:

Marcus Chen

Chief Technology Officer

By:

Dr. James Barrett

Chief Robotics Officer