

PDR-OPS-020 QUALITY ASSURANCE FOR THERMAL INSULATION COMPONENTS

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Version: 2.0

1. PURPOSE AND SCOPE

1. This Quality Assurance Protocol ("Protocol") establishes mandatory

2. This Protocol applies to all thermal insulation components incorporated

2. DEFINITIONS

1. "Thermal Insulation Components" means all materials, assemblies,
2. "Critical Temperature Range" means the operational temperature s
3. "Quality Control Inspector" means a Company employee certified in

3. COMPONENT SPECIFICATIONS

1. All Thermal Insulation Components must meet or exceed the follow
 - a) Thermal conductivity rating 0.023 W/(m K) at -40 C
 - b) Moisture vapor transmission rate 0.1 perm

- c) Compression resistance 25 psi at 10% deformation
 - d) Fire rating compliance with UL 94V-0
 - e) Chemical resistance to standard industrial cleaners and sanitizers
2. Components must maintain specified performance characteristics t

4. QUALITY CONTROL PROCEDURES

1. Incoming Inspection

- a) Each shipment of Thermal Insulation Components shall undergo re inspection within 24 hours of delivery
- b) Batch sampling according to ANSI/ASQ Z1.4-2003 Level II
- c) Visual inspection for physical damage, dimensional accuracy, and manufacturing defects

d) Documentation review of supplier test certificates and compliance declarations

2. Pre-Installation Testing

- a) Thermal conductivity verification using ASTM C518 method
- b) Moisture resistance testing per ASTM E96
- c) Dimensional stability assessment at Critical Temperature Range extremes
- d) Surface adhesion verification for bonded components

5. DOCUMENTATION REQUIREMENTS

- 1. The following documentation must be maintained for each batch of material:
 - a) Supplier certification documentation

- b) Incoming inspection reports
- c) Test results and validation certificates
- d) Non-conformance reports (if applicable)
- e) Traceability records including lot numbers and date codes

2. All documentation shall be retained for a minimum of seven (7) years

6. NON-CONFORMANCE HANDLING

1. Any Thermal Insulation Components failing to meet specified requirements

- a) Immediately segregated and clearly marked as non-conforming
- b) Documented in the quality management system
- c) Evaluated for root cause analysis
- d) Disposed of or returned to supplier as appropriate

2. Non-conformance trends shall be analyzed quarterly for supplier qu

7. TRAINING REQUIREMENTS

1. Quality Control Inspectors must complete:
 - a) Initial certification in thermal systems inspection
 - b) Annual refresher training
 - c) Specific product familiarization for new insulation technologies
 - d) Documentation and reporting systems training

8. AUDIT AND REVIEW

1. This Protocol shall be audited annually by the Quality Assurance D

2. Review criteria shall include:

- a) Compliance with documented procedures
- b) Effectiveness of quality control measures
- c) Documentation completeness and accuracy
- d) Training program effectiveness
- e) Supplier quality performance

9. AMENDMENTS AND UPDATES

1. This Protocol may be amended only by written authorization from the
2. All amendments shall be documented in the revision history and co

10. LEGAL COMPLIANCE

1. This Protocol is designed to comply with ISO 9001:2015, relevant A
2. Nothing in this Protocol shall be construed to supersede applicable

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

POLAR DYNAMICS ROBOTICS, INC.

By:

Dr. Marcus Chen

Chief Technology Officer

By:

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Chief Operating Officer

