



SUPPLIER QUALITY ASSURANCE MANUAL

Rev C



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1.0 SCOPE

This manual defines the quality standards and procedures associated with performing work against manufacturing or process related purchase orders for Kamatics Corporation. Specific requirements are stated on the purchase order, drawing, or Kamatics internal procedures.

1.1 Controlled Distribution

Kamatics requires each supplier to comply with the requirements set out in this manual and to accept full responsibility for the quality of materials and workmanship, and services supplied.

Information contained herein is the property of Kamatics Corporation and reproduction in part or in full is strictly forbidden.

1.2 Supplier Acceptance

Supplier acknowledgement of a Kamatics purchase order signifies the acceptance of terms and conditions contained within this manual at the revision level quoted on the purchase order.

2.0 RESPONSIBILITY

The Supplier Quality Manager is responsible for establishing and maintaining this manual.

3.0 APPLICABLE DOCUMENTS AND FORMS

- SOP 1/1035: Malpractice and Fraud & Falsification Prevention (AAM Compliance)
- SOP 4/2009: Interpretation of Heat Treat Specifications MIL-H-6875, AMS-H-6875 and AMS 2759 (Steel Alloys)
- SOP 4/8033: Visual inspection standards & rework of surface finish flaws
- SOP 10/2011: Supplier Certification Requirements
- SOP 10/1025 (Exhibit 1): Quality Assurance Sampling – General Requirements
- SOP 10/1029: Control of Nonconforming Product
- SOP 10/3019: Certified Supplier Requirements
- WI-10/3013-25: Spherical Ball Surface Inspection Standard
- FORM 10/1002-1: First Article Inspection Record
- FORM 10/1013-1: Inspection Method Sheet
- FORM 10/1013-1.1: Inspection Method Sheet – Supplier Source Inspection Version
- FORM 10/1015-1: Supplier Quality System Evaluation Survey
- FORM 10/1026-1: Corrective/Preventive Action Request
- K034: Nonconforming Material Report
- K310: Supplier Concession Request
- K417: Supplier Performance Rating
- AS9102: Aerospace First Article Inspection
- AS9100 Quality Management Systems – Requirements for Aviation, Space, and Defense Organizations
- AS9146 Foreign Object Damage (FOD) Prevention Program – Requirements for Aviation, Space, and Defense Organizations
- AS6174 Counterfeit Material: Assuring Acquisition of Authentic and Conforming Material

4.0 DEFINITIONS

- **Acceptance Authority Media (AAM):** Means defined by the organization to record the acceptance status relating to conformity, identification, monitoring, and measurement requirements of a product during its life cycle. This includes stamps, electronic and personal signatures, passwords, and badges as well as electronic and physical control of the previously mentioned items.
- **Approved Supplier List:** Formal list of suppliers approved to perform specific processes for Kamatics Corporation.
- **Certified Supplier:** Supplier who has been designated to conduct product verification and assume responsibility for final inspection and acceptance of Kamatics product within their facility.
- **Commercial Off the Shelf (COTS) Items:** Commercially available items intended by design to be purchased and used without modifications.
- **Concession:** Written approval granting authorization to release, or use a limited product already manufactured not in full compliance with the relevant specifications or requirements.

- **Customer:** Kamatics Corporation
- **First Article Inspection Report (FAIR):** Detailed inspection report that provides objective evidence that all engineering design and specification requirements are properly understood, accounted for, verified, and documented.
- **Flight Safety Part:** Any part, assembly, or installation contains a critical characteristic whose failure, malfunction, or absence could cause loss or serious damage to the aircraft and/or injury or death to the occupants or ground support personnel.
- **Foreign Object Damage:** Damage caused by an item (substance, debris, or article) that is alien to the system, component, or assembly.
- **Foreign Object Debris:** A substance, debris, or article alien to the component, system, or assembly that could cause damage.
- **Frozen Plan:** A controlled process plan that defines and controls critical processes and references support documentation. Frozen plans will be reviewed by Kamatics prior to production.
- **Inspection Method Sheet (IMS):** Documentation that provides inspection requirements for each lot of product to assure conformity of each drawing characteristic and associated note. Documentation shall at minimum consist of the lot size, sample size inspected, inspection results (accept/reject), and inspection method. The IMS also provides a record that the required verifications were performed.
- **Nonconformance:** A process, condition, or feature, that does not conform to requirements.
- **Nonconforming Material Report (NMR):** A record used to document supplied product and services that exhibit nonconformity with a purchase order or drawing requirement, including disposition instructions.
- **Notice of Escape (NoE):** Written notification of a supplier identified nonconformance on product that has been delivered to the customer.
- **Process:** Operation performed in the manufacturing of a product. Types of processes include machining, grinding, metal finishing, heat treating, coating, welding, NDT, forging, casting, and assembly.
- **Quality Assurance Sampling:** Procedure that defines approved inspection requirements in lieu of 100 percent verification.
- **Standard Catalogue Items:** Part or material that conforms to an established industry or national authority specification.
- **Supplier Corrective Action Request (SCAR):** Record requesting formal root cause and corrective action from a supplier.
- **Sub-tier:** A company contracted by a Kamatics supplier who provides services the supplier is unable to or not approved to perform.
- **Supplier/Subcontractor:** A company that provides parts, components, processes or services.
- **Supplier Quality Performance Rating:** A score based on analysis of data metrics used to determine a supplier's performance to meet requirements.
- **Supplier Instructions:** Requirements and other information referenced on a purchase order.

5.0 GENERAL REQUIREMENTS: ALL SUPPLIERS AND SUBCONTRACTORS

5.1 Contents

Specific sections of this manual are applicable to all suppliers performing work to a Kamatics purchase order or their sub-tier. Sections of this manual are dependent on the services provided and are designated accordingly.

- Applicable to all suppliers or subcontractors (Sections 5.0 and 6.0)
- Machining and manufacturing sources of supplied product (Section 7.0)
- Raw material and hardware suppliers/distributors (Section 8.0)
- Process Suppliers (Heat Treat, NDT, Metal Finishing, Shot Peen, Welding, etc.) (Section 9.0)
- Certified Suppliers (Section 10.0)

5.2 Kamatics Purchase Order

The Kamatics purchase order is computer generated and provides standard information that includes, but is not limited to:

- Supplier name and address
- Purchase Order revision status
- Part number and current revision
- Product nomenclature
- Quantities ordered by line item
- Delivery due dates
- Manufacture or process requirements as specified on the associated drawing
- Mandatory quality assurance requirements and applicable clauses
- Reference to specific process instructions, or procedures
- Reference to the current issue of the Supplier Quality Assurance Manual
- “Terms and Conditions”

Kamatics shall provide complete and specific work instructions with purchase orders. Verbal instructions without formal documented notification are invalid.

5.3 Selection of Suppliers, Assessment and Placement of Orders

The control of all purchased material and services is the responsibility of the Kamatics purchasing department. Kamatics supplier quality has the following supporting responsibilities:

- Assessing/Auditing a supplier’s quality system and/or process capability
- Monitoring supplier quality performance
- Determining the acceptability of product, materials, and services
- Initiating corrective actions
- Supplier risk assessment

The initial Quality Assurance assessment of a supplier will be initiated by a request prior to use of the supplier.

The purpose of the assessment is to evaluate the supplier's ability to provide products or services, in accordance with the requirements specified in this document, as well as those specified on the purchase order, drawing and applicable technical specifications.

5.4 Kamatics Approved Suppliers

Kamatics approved suppliers are periodically evaluated for quality system compliance and scope of approval per Kamatics SOP 10/1009, Control of Direct Material Suppliers.

5.5 Performance Monitoring

Supplier quality and delivery performance shall be monitored on a quarterly basis. A Supplier Performance Rating Report, Form K417, shall be submitted to core suppliers and suppliers with 10 or more PO receipts in a given quarter.

5.6 Supplier Responsibility

The supplier is responsible for:

- Notification prior to any change in product, process, procedure, or location that may affect Kamatics products. Kamatics and end user approval may be required.
- Staffing qualified personnel responsible for manufacturing and quality assurance.
- Providing information regarding organization structure with access to management upon Kamatics request.
- Timely notification of any changes or problems that could affect conformance or delivery.
- Adhering to the workmanship standards as defined in SOP 4/8033 (Visual inspection standards & rework of surface finish flaws)
- Implementing new, superseded, or revised standards (ASTM, ISO, AMS, etc.) within 180 days of release

5.6.1 Malpractice Prevention

Suppliers' and their sub-tiers shall meet all PO requirements pertaining to contract terms and regulatory requirements. The supply chain shall be vigilant in efforts to prevent malpractice, fraud and falsification as it can affect compliance and safety.

5.7 Supplier Facility Accessibility for Kamatics Surveillance

Purchase order driven "Terms and Conditions" grant Kamatics and their customers' right of access to the supplier's facility including, but not limited to:

- Quality and process audits
- Inspection of products
- Process and procedure review

Surveillance requirements must be properly flowed down to all sub-tiers involved in the manufacture or processing of Kamatics parts.

5.8 Records

Supplier records shall be maintained to provide evidence of conformity to purchase order requirements. Records shall include all manufacturing and quality documents.

Physical records shall be stored in a suitable environment and in a manner appropriate to facilitate retrieval and to preserve document condition and integrity.

Electronic records shall be protected from loss or damage via system backup programs.

Supplier quality records shall be maintained at minimum of 10 years unless otherwise specified.

6.0 SUPPLIER SYSTEMS REQUIREMENTS: ALL SUPPLIERS AND SUBCONTRACTORS

6.1 Quality System Requirements

The supplier shall maintain a documented quality system designed to ensure compliance with the requirements specified on the Kamatics purchase order. The quality system shall as a minimum ensure:

- Control of product quality
- Prevention and detection of nonconformances with the use of root cause and corrective actions as required
- Personnel performing quality related functions have sufficient training and the authority to identify, evaluate, and correct quality issues
- Personnel receive necessary training relative to tasks assigned
- All training is documented and retained

The supplier shall provide Kamatics Representatives:

- Safe access to facilities and equipment during onsite review of products or processes
- Copies of all documentation and records relevant to the product, process, and purchase order upon request by Kamatics or their customer

6.2 Receiving Inspection

Incoming materials and parts shall be subject to adequate inspection as necessary to assure conformity to contractual requirements prior to additional processing. The supplier shall maintain a documented system for the control of incoming product traceability.

6.3 Manufacturing Control

The supplier shall establish and maintain manufacturing controls with work instructions.

When purchase orders, drawings, or specifications state that product is subject to special controls the supplier shall incorporate these controls on internal manufacturing documentation.

The supplier must ensure that contracted work cannot be initiated until all applicable documents relating to the purchase order are received.

6.3.1 Frozen Plans

The supplier shall not change process plans approved by Kamatics without documented authorized approval by a Kamatics engineering or quality representative.

6.4 Inspection System

The supplier shall establish and maintain a documented inspection system for the control of products and services. The supplier's quality system shall have a process for the early detection of potential nonconformances.

The supplier is responsible for assuring that all materials, products, and processes, conform to the requirements on the Kamatics purchase order, drawing and specifications. Kamatics supplier quality can be requested to assist the supplier in assuring product conformity.

6.5 Document Control

The supplier shall maintain a system to record, acknowledge, and control the receipt of drawings, specifications, and instructions.

The suppliers' document control system shall ensure that the current revision of purchase orders, drawings, specifications, frozen, plans, technical requirements, and engineering changes are available during manufacturing and inspection. Records of documentation change requests shall be controlled for compliance.

The system shall ensure that the location and issue of all documents in circulation are implemented in a controlled manner and that all obsolete revisions are withdrawn from use.

Kamatics supplied documents shall be monitored to prevent deterioration during use. Damaged or illegible drawings and documents shall be replaced by contacting the Kamatics purchasing department prior to use.

6.6 Handling, Storage, Packaging, Preservation and Delivery – General Requirements

The following requirements are in addition to any specific information dictated on the drawing or purchase order. In the event of conflict, specific requirements stated on the Kamatics purchase order shall take precedence over the drawing or the requirements of this manual.

6.6.1 Handling and Storage

All parts and components within the supplier's possession must be protected at all times against foreign object debris and damage, corrosion, and deterioration.

6.6.2 Packaging

All Kamatics products must be adequately packaged to avoid any damage. Special considerations must be given to chemically plated or coated parts that are susceptible to chipping and/or impact impressions. Outer packaging must be rigid enough to properly support the content weight.

Parts or components that are finished, highly surface textured, or have geometrical configurations susceptible to scratches, nicks, or dings, shall be packaged in such a manner to eliminate potential damage. Product that falls into these categories shall be individually isolated from potential impact using a combination of protective foam, bags, and other contact resistant materials as required.

Kamatics product supplied for further processing is typically packaged in suitable tubs, trays and containment that can be used for supplier return of parts. When packaging is determined to be unacceptable for transit, the supplier is responsible for taking the precautionary measures required to assure product arrives undamaged at Kamatics. In the event the supplier cannot adequately protect finished product for shipment, Kamatics purchasing must be contacted to coordinate the activity.

Packaging shall identify part number, lot number, and serial numbers as applicable.

6.6.3 Preservation

Supplied materials that are susceptible to corrosion (i.e., AISI 4340, 300M, C250) must be protected during all stages of manufacturing and during shipment. Temporary preservation used for protection against corrosion must not cause deterioration of the product or be incompatible. Preservation that cannot be readily removed from the parts shall not be used. Special consideration should be given when using heavy oils on parts with blind holes or recesses. A combination of light oil and V.C.I. (Vapor Corrosion Inhibitor) paper or “ZeRust” bags may be preferable to eliminate removal concerns during cleaning. Preservation concerns shall be communicated to Kamatics purchasing when material compatibility issues exist.

6.7 Supplier Process Control

Suppliers and their sub-tiers shall maintain written procedures and instructions for the following system requirements:

- Operating techniques
- Manufacturing/processing
- Operator qualifications
- Preservation
- Packaging and shipping
- Inspection and testing
- Lot control and traceability

The supplier shall also include the necessary information and/or instructions in their procurement documents to assure that all applicable requirements of the purchase order are implemented by their sub-tier sources.

Supplier procedures, written instructions and other supporting documentation shall be made available for review by the Kamatics supplier quality representative upon request.

Kamatics supplier quality shall approve supplier procedures, written instructions, NDT, Shot Peen and other process techniques prior to work release when stipulated on the purchase order.

6.7.1 Use of Markers on Metallic Parts

Due to the presence of chlorides and other chemicals, the use of standard felt ink markers such as standard Sharpies® cause surface corrosion when applied to metallic parts. For this reason, markers of this type shall not be used on metallic parts/components. The following brands of markers are approved for aerospace:

- Sharpie TEC®
- Markal®
- Dykem®
- Arro®
- JP Nissen®

6.8 Supplier Sub-tier Selection

All sub-tier suppliers must have third party process system accreditations or be approved by Kamatics.

6.8.1 Supplier Sub-tier Procurement

When Kamatics personnel are required at the supplier's sub-tier, the supplier's quality organization shall coordinate. The supplier shall require their sub-tier to provide access and assistance in accordance with 6.1 requirements.

6.9 Control of Measuring and Test Equipment (M&TE)

The supplier shall ensure measuring and test equipment used for the acceptance of product are calibrated against standards traceable to the National Institute of Standards and Technology (N.I.S.T). If N.I.S.T. standards are not available, industry standards may be used with Kamatics approval.

The supplier calibration system shall be controlled to assure accuracy within the established calibration schedule. M&TE will be regularly verified in accordance with the following requirements but are not limited to:

- Frequency of calibration shall be controlled by an established procedure based on the type of equipment and usage
- Documentation shall be maintained with actual dates and results of calibration
- All M&TE shall indicate its current calibration status

The supplier shall establish a system which provides accountability, identification, and maintenance of tooling. Equipment used for inspection or testing shall require periodic inspection in accordance with the same calibration frequency requirements as specified in this section.

All M&TE, tools, jigs, fixtures, templates and mylar's on loan from Kamatics shall be properly received, identified and calibrated during use and possession at the supplier's facility.

M&TE or tooling provided to the supplier shall not be altered or modified without written approval from Kamatics. This includes tooling fabricated or procured by the supplier for Kamatics as part of the purchase order. Kamatics supplied M&TE and inspection aids received in defective condition, damaged at the supplier's facility, or with suspect accuracy malfunction shall be immediately quarantined for Kamatics disposition. All suspect materials or parts shall be re-inspected to drawing requirements using known calibrated M&TE prior to acceptance, and release for further processing or shipment.

M&TE provided with a purchase order shall be returned to Kamatics with the purchase order.

6.10 Control of Nonconforming Product

Suppliers shall establish and maintain procedures for the identification and segregation of nonconforming material.

Non-conformances identified by the supplier shall be controlled to prevent the delivery of nonconforming items to Kamatics. Reports of non-conformances shall be submitted to Kamatics for review prior to shipment.

Suppliers shall notify Kamatics within 24 hours of discovery of suspect nonconformance regardless of the product status or location. (WIP, shipped, inventory, etc.)

Nonconforming product that cannot be reworked or reprocessed may be submitted for consideration on a concession to Kamatics using form K310. (Supplier Concession Request)

Suppliers are not authorized to disposition a nonconformance that does not meet the requirements of the Kamatics drawing or specification. Nonconforming material must have documented review and disposition by Kamatics MRB.

6.11 Supplier Certification and Requirements

All materials and product submitted to Kamatics shall be furnished with a certification of compliance complying with SOP 10/2011 (Supplier Certification Requirements).

- The supplier's Quality Manager or authorized designee must sign and date the certificate of conformance. A listing of supplier authorized signatures and their job title shall be made available to Kamatics on request.

7.0 SPECIFIC REQUIREMENTS: MACHINING AND MANUFACTURING SUPPLIERS

7.1 Classification: Machining and Manufacturing Sources of Supplied Product

A machining or manufacturing source is defined as a supplier who performs:

- The manufacture of components and parts
- Specific machine generated processes (grinding, milling, honing, etc.)

7.1.1 Source Control

Regardless of a machining or manufacturing supplier having the capability to perform special processes such as heat-treatment, or plating, a Nadcap accredited source will be utilized unless otherwise specified via Kamatics purchase order and or drawing.

7.2 Standard Manufacturing Practice

Standard manufacturing of Kamatics parts shall not deviate from drawing specified requirements. Unless otherwise specified, only conventional metal removal processes can be used (turning, milling, grinding, etc.) following industry practices. Nonconventional machining methods (electrical discharge, electrochemical, chemical milling, ultrasonic, etc.) or surface enhancement processes (grit/vapor blast, glass bead, tumbling, chemical processing, plating/coating, etc.) are prohibited unless otherwise specified on the purchase order or drawing or by written authorization from Kamatics authority.

- All deburring operations are to be performed using virgin materials. If wire wheels are utilized for deburring, they must be constructed of stainless steel.

7.3 Inspection Control

The supplier shall plan and execute production under controlled conditions. Controlled conditions include evidence that all production and inspection or verification operations have been completed as planned, or as otherwise documented and authorized.

All internal inspections and Kamatics required documents (FAIR, IMS, etc.) shall be validated by AAM for proper identification of the supplier and the individual inspector responsible for product acceptance.

The use of AAM shall be documented and controlled by the supplier's QMS and restricted to the assigned inspector. The procedure shall maintain a record of issue, and withdrawal of personnel stamps and signatures (AAM).

7.3.1 Hardness Testing

Hardness testing shall be in accordance with Section 9.5.

7.3.2 Spherical Ball Inspection Standards

Spherical ball visual inspection criteria shall be in accordance with WI-10/1013-25.

7.4 First Article Inspection Report (FAIR)

The supplier shall provide a FAIR that accounts for the following:

- Part number and revision.
- Product accountability – Raw material, specifications, special processes, and test verifications.
- Characteristic accountability – including each drawing characteristics including notes.

Each drawing characteristic shall be recorded with actual values and reference the specific measuring device used to validate the characteristic. General notes, such as “complies” or “accepted” for dimensional characteristics are not acceptable. The supplier shall utilize the Kamatics provided form K866. Additional copies are available upon request from the Kamatics purchasing representative. AS9102 format is an acceptable substitute of form K866.

A new FAI is required under the following circumstances:

- New part manufacture
- Lapse in production (2 years or more)
- Significant change in manufacture equipment or processing methods
- Written request by Kamatics representative

A Partial (Delta) FAI is required under the following circumstances:

- Design change / revision change
- A change in method of manufacture (e.g., Tooling, Process, sequence of manufacture, change in sub-tier)

First article parts shall be identified as First Article by tagging or any other suitable means of identification. The first article part along with the completed FAIR, and associated certifications as specified in section 6.11 shall be included in the shipping documents.

7.5 Inspection Method Sheet (IMS)

Upon acceptance of a purchase order, the supplier is responsible for assuring that a Kamatics inspection method sheet (IMS) is available for documenting inspection results prior to release for shipment. (Reference Form 10/1013-1) The supplier is responsible for contacting Kamatics purchasing in the event the IMS has been omitted in the contract package.

A completed IMS is required for each purchase order line-item shipment. Unless otherwise specified, inspection criteria shall be in accordance with the current revision of the Kamatics Sampling Plan (SOP 10/1025, Exhibit 1).

7.5.1 Hidden Dimensions

The supplier shall identify and document in-process dimensions that cannot be verified due to subsequent operations.

7.6 External Thread Inspection Gaging Acceptability

A machining or machining source as defined in 7.1 - 7.1.1 that has been contracted to generate an external thread in accordance with a Kamatics drawing shall verify thread features in accordance with Table 1 gaging requirements (*See Appendix*).

7.7 Supplier Control of Sub-tier Special Processes

When the Kamatics purchase order requires the use of sub-tier special processes, the following shall apply:

- Sub-contracted process requirements shall be in accordance with 7.1.1.
- Supplier shall flow down all purchase order and drawing requirements to sub-tier
- Kamatics and its customers shall be granted right of access
- Sub-tier process certification requirements shall be in compliance with SOP 10/2011 (Supplier Certification Requirements) per section. 6.11

7.8 Serialized Parts

Kamatics parts that require serialization shall be identified on the purchase order or drawing. Serial number allocation responsibility shall be documented on the purchase order. The supplier shall maintain serialization logs for traceability purposes.

7.9 Product Release Documentation Requirements

The supplier's certificate of conformance and any Sub-tier certification shall be in compliance with SOP 10/2011 (Supplier Certification Requirements) per section 6.11.

Any concession must be referenced on the certificate of conformance and associated parts tagged to indicate that they are subject to concession disposition.

Suppliers shall maintain a record of sub-tier activity for Kamatics purchase order requirements. Sub-tier certifications and test reports must be included in the supplier documentation package.

8.0 SPECIFIC REQUIREMENTS: RAW MATERIAL AND HARDWARE SUPPLIERS/DISTRIBUTORS

8.1 Classification of Suppliers:

- A *raw material supplier* is a provider of both metallic and nonmetallic materials in the form of bar, sheet, plate, tube, composites, or liquid form obtained either from its original source of manufacture or from a distributor.

- A *formed raw material supplier* is a:
 - Forge that produces forgings or stampings from basic raw bar stock
 - Foundry that produces castings, or cast bar form basic raw material
 - Mill that produces ingots, rolled, forged, or extruded sections
- A *standard hardware supplier* is a provider of commercial off the shelf (COTS) or standard catalogue items (SCI). Standard hardware may consist of products such as washers, nuts, or bolts.
- A *distributor of proprietary products* is an accredited selling agent for a manufacturer of products whose design and manufacture are exclusively owned under a trademark or patent.

8.2 Raw Material Control

Kamatics product defined by the drawing as being Flight Safety, Vital Part, Critical, or Class 1 shall be explicitly denoted on the purchase order. Raw material obtained for Flight Safety, Critical or Class 1 parts shall be procured from a Kamatics or Kamatics customer approved source.

Raw materials purchased for a Kamatics purchase order must only be produced from mills in the United States or a qualified country as defined by DFARS unless otherwise specified.

Raw materials produced outside of the United States, or a qualified country may be accepted when authorized by Kamatics in writing.

8.2.1 Formed Raw Material Control

Forging or casting suppliers are allowed to procure raw material through their own sources provided that sufficient controls are in place to assure compliance with requirements. Kamatics reserves the right to request the use of Kamatics or their customers approved material sources if the supplier does not meet specified requirements.

Surplus product delivered to a machining facility may be required via purchase order terms to be held in inventory at the supplier's facility pending additional requirements.

8.3 Traceability

Raw material suppliers and distributors are responsible for ensuring that raw material and standard parts are traceable to the original source of manufacture including mill certificate (s) and any other related test data to provide traceability and an unbroken chain of custody.

Standard hardware delivered to Kamatics shall be furnished with a copy of the supplier certificate of conformance. Upon request, Kamatics shall have access to all documentation relating to original sources of manufacture and reserve the right to audit those sources.

All supplier certification requirements shall be in accordance with SOP 10/2011.

Any concession application accepted by Kamatics shall be referenced on the certificate of conformance.

8.4 Shelf Life

Suppliers of non-metallic raw materials must indicate any applicable shelf life and expiration date limitations on their certificate of conformance, in addition to on containment and/or packages.

Suppliers of seals and other rubber items shall ensure goods supplied are less than 12 months from the cure date on dispatch except where authorized in writing by the Kamatics quality department.

All items shall be supplied in adequate commercial packaging to prevent damage or deterioration of product.

8.5 Quality Assurance Requirements for Initial Deliveries

The initial purchase order or line item for forgings, castings, or stampings, shall be subject to First Article inspection in accordance with 7.4.

8.6 Process Control

Regardless of a raw or formed raw material supplier having the capability to perform special processes such as heat-treatment, or plating, a Nadcap accredited source will be utilized unless otherwise specified via Kamatics purchase order and or drawing.

Suppliers shall flow-down Kamatics processing requirements on their purchase orders to sub-tiers.

Nonconforming product may be reprocessed to drawing requirements without Kamatics authorization with the exception of frozen plan designated requirements. Nonconforming product due to processes that could affect material metallurgical properties (heat treating, nitriding, etc.) must obtain written authorization from Kamatics Design Engineering via concession application prior to any reprocessing attempt. Rework process plans must clearly demonstrate the capability to comply with drawing and specification requirements.

9.0 SPECIFIC REQUIREMENTS: PROCESS SUPPLIERS

9.1 Classification: Process Facility

A process facility is defined as a supplier who performs heat treatment, non-destructive testing, metal finishing, plating, shot/glass peening, or other processes that may alter or affect the metallurgical condition of the material.

9.2 Technical Control

Process facilities shall maintain procedures and written instructions to assure compliance with industry, national, and/or customer specifications as specified on the Kamatics purchase order.

9.3 Process Personnel Qualification

Personnel shall exhibit proficiency in the processes performed in accordance with industry standards, or applicable specifications referenced on the Kamatics purchase order. All suppliers and sub-tiers shall maintain personnel records for objective evidence of continued compliance.

9.4 Heat Treat Suppliers

Heat treat suppliers shall process parts and materials in accordance with Kamatics SOP 4/2009 when industry standard specifications are referenced on the Kamatics drawing. Adherence to this procedure shall be in addition to the applicable heat treat specification.

Unless otherwise specified, all suppliers and sub-tiers shall hardness test and certify in accordance with Kamatics SOP 4/2009 sampling plan. Hardness testing shall be performed in accordance with ASTM E.18.

9.5 Hardness Testing

Unless otherwise specified on the drawing, the location of a hardness impression shall be in a non-critical area. Critical areas include spherical ball OD, rod end faces, etc.

In the absence of part specific instructions, the scale for hardness testing shall be selected with the objective of causing no damage to the part. This may require testing on a lighter scale than specified on the drawing or purchase order.

Parts such as rod ends, spherical balls, components with close dimensional tolerances, highly finished surfaces, or when a controlled atmosphere is required are considered complete parts and a superficial hardness impression shall be used in lieu of Rockwell C scale hardness testing.

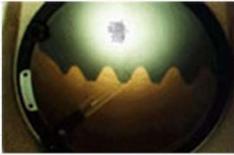
10.0 Kamatics Certified Suppliers

10.1 Certified Suppliers

Suppliers who have been approved and certified by Kamatics to the requirements of Kamatics SOP 10/3019 (Certified Supplier Requirements) shall assume the responsibility for final inspection and the acceptance of product on behalf of Kamatics.

APPENDIX

TABLE 1 - External Threads Inspection Methods

<u>Kamatrics</u> <u>Thread Gaging for Acceptability (External)</u>		
	Table 1 ASME B1.3-2007	Table 1 ASME B1.3-2007
	Method 1	Method 2
Major Diameter	14 Plain Micrometer 	5 Indicating Gage 
	← OR →	
Pitch Diameter	7 Pitch Micrometer cone vee (with approximate pitch contact) 	4.5.2 Single Element Tri-Roll 
	← OR →	
Functional Diameter	1.1 Go Gage 	4.3.2 Go Rolls at 180 deg (Multi Element) 
	← OR →	
Minor Diameter	Maximum limit not required when product passes a Go gage on UN, UNR, M Optical Comparator UNJ or MJ	Maximum limit not required when product passes a Go gage on UN, UNR, M Optical Comparator UNJ or MJ
Root Radius	8 Optical Comparator 	8 Optical Comparator 

Revision	Date	Description of Changes
N/C	May 11, 2011	New
A	October 7, 2014	Section 4.6: First sentence updated. Section 6.4: First Article updated. Section 6.6: added. Table 1 added to Appendix. FAI form added to Appendix. Added Revision History.
B	January 24, 2017	Section 2.0: FAIR definition revised. Section 4.2: Second paragraph added. Section 5.7.1: Added ban of the use markers on metallic components. Section 5.10: Added statement that plated parts can be stripped and replated one time without Kamatics approval. Section 6.2: Added statement regarding deburring. Section 6.3.1: Added hardness testing. Section 6.3.2: Added spherical ball visual inspection criteria. Sections 4.4, 4.6, 5.2, 5.7.1, 5.8, 5.9, 5.10, 6.1, 6.1.1, 6.2, 6.5, 6.5.1, 7.2, 8.2, 8.4, 9.4.1: slight wording changes
C	October 6, 2023	Complete Rewrite