

XOS Supplier Quality Manual



**X-Ray Optical Systems, Inc
15 Tech Valley Drive
East Greenbush, NY 12061**

Message to Suppliers:

Quality materials, exacting standards, excellent workmanship and a commitment to Continuous Improvement are elements that distinguish XOS. The goals we have set for ourselves and our suppliers to achieve these elements are:

- **100% Quality Product**
- **100% On Time Delivery**
- **Zero Defect Culture with a Focus on Continuous Improvement**

XOS cannot achieve these goals without the support and expertise of our suppliers. Our suppliers are vital to our success. The purpose in presenting this manual is to assist suppliers in promoting Continuous Improvements in Quality, Delivery, and Cost (Q, D, and C.)

The XOS Quality Policy is:

“XOS will consistently exceed customer expectations through continuous improvement of product, quality, on-time delivery, customer service and the quality management system.”

Our quality policies extend to our suppliers. We are committed to build and maintain a profitable partnership with our suppliers that result in a timely and cost effective launch of products and materials that meet the defined performance standards, plant assembly needs, overall customer satisfaction, and governmental and regulatory agency requirements.

David Ellenberger

Supply Chain Manager

Supplier Acknowledgement January 2017

This supplier manual and the requirements herein will become part of and are incorporated into all contracts for the sale by supplier and purchase by XOS of goods and services; also known as the Purchase Order or Supply Agreement. All quotations shall encompass these requirements. In the event there are exceptions, they shall be clearly documented. The supplier management team is responsible for reviewing this manual. Directors or Managers, of the departments listed below, must sign in the space indicated.

The completed form is to be returned to the XOS Materials Department within two weeks from date of receipt.

We hereby agree to abide by the XOS Supplier Quality Manual and its requirements are hereby incorporated into all contracts with XOS for the sale of goods and services.

Company Name: _____

Address: _____

Department Authorized Signatures	Name	Signature	Date
Engineering Manger			
Executive (Officer)			
Quality Manager			
Operations Manager			

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1.0 Introduction

XOS is committed to continuously improving all aspects of our business, including the design, manufacturing and support of our products. This is to ensure continued customer satisfaction and long-term competitiveness and growth of XOS and its suppliers. In addition, continuous improvement will increase productivity, and reduce inspection and losses due to variation.

XOS utilizes a product quality planning process and requires its suppliers to demonstrate that parts meet purchase order requirements, or process capabilities, and develop and maintain process controls. For new part numbers and product/process changes, XOS works with suppliers to develop, approve and monitor processes using Design and Process FMEAs, Control Plans, Capability Studies, Gage R&R and other quality tools. The supplier's upper management shall provide the required resources, time and training to effectively use these tools.

2.0 Quality System Requirements Specific to XOS

Quality Systems Requirements specific to XOS are described in paragraphs 2.1 through 2.7.

2.1 Corrective Action

In the event of a quality issue related to a supplier's product, the supplier will be issued a Supplier Corrective Action Response (SCAR), which describes the part nonconformance.

The supplier shall submit a formal corrective action response, unless otherwise specified, to XOS Purchasing. SCAR format is preferred and the following are requirements for response:

- Initial Response (Acknowledgement of the issue and containment action taken) is required within 24 hrs., including Return Authorization.
- Formal corrective action plan is required within 30 calendar days. XOS may require more frequent updates to corrective actions for some issues.
- At a minimum, XOS requires the completion and return of the SCAR or Supplier Corrective Action format.
- XOS depending on the severity and magnitude of the issue reserves the right to require the completion of an 8D.

2.2 Change Management

Suppliers must notify XOS in advance of any intended product, material, or process changes and must receive XOS approval prior to implementation. Suppliers shall use the XOS Supplier Change Request Form (available <https://www.xos.com/cms-portals/xos.com/cms/documents/supplier-information/XOS-Supplier-Change-Request.pdf>) to notify XOS of planned changes. A change may be initiated by an XOS signed deviation (see section 2.3).

Note: Suppliers shall also make this a requirement of their supply chain.

2.3 Nonconforming Material/Request for Deviation

Non-Conforming Product is defined as deviation from drawings, specification, and purchase order requirements. On an exception basis, suppliers may submit a Supplier Deviation Request (available at <https://www.xos.com/cms-portals/xos.com/cms/documents/supplier-information/XOS-Supplier-Deviation-Request.pdf>) for XOS review and approval. Written approval is required prior to the shipment of any nonconforming products. A copy of the signed (approved) Supplier Deviation Request shall accompany the shipment. The use of this form should be minimized as much as possible and shall not be construed as acceptance of future lots that do not meet specification.

2.4 Cost Recovery

Suppliers may be responsible for all costs associated with XOS, or XOS' customers, receiving non-conforming material. Costs may include, but are not limited to:

Administrative costs, Sorting of suspect material, Rework, Customer Charges, Premium Freight, Production Downtime, Third party containment, Scrap, First Article rejection, Overtime, Laboratory Testing, and Travel.

XOS uses Cost Recovery to recover costs incurred as a result of a supplier's nonconformance on issues occurring before products are shipped (in plant). If XOS production is shut-down, a charge of up to \$500 per day may be charged directly to the vendor.

All costs will be debited from the suppliers account with the issuance of a Credit Memo from the Supplier. The standard labor rate to cover the above activities is \$30 per hour and may be subject to an adjustment based on the current Consumer Price Index (CPI). Upon notification of the SCAR or intent to debit, suppliers must provide a Return Authorization to XOS materials. Suppliers will have 60 days to appeal the charges to XOS. If there is no response from the supplier, XOS will consider this acceptance of the charges.

2.5 Maintaining Process Control

The supplier shall maintain (or exceed) process capability or performance requirements as approved via XOS. To accomplish this, the supplier shall ensure that a Control Plan is effectively implemented, including, but not limited to, adherence to specified:

- Measurement technique
- Acceptance criteria
- Reaction plans when the acceptance criteria are not met

2.6 Material Certificates of Analysis

For products that have material characteristics, the supplier shall submit a Material Certification Analysis report with each shipment. The certification will have the part number, revision, quantity, purchase order number, specification numbers, signature and title of the authorized company representative and date. Actual tests performed to verify material analysis may include material hardness, purity, heat treating, chemical composition, tensile strength, carbon/de-carbon, wedge test, thread lap, etc., depending on the requirement(s).

2.7 Inventory Management

Suppliers shall use an inventory management system to optimize inventory turns over time, assure stock rotation and minimize inventory levels. For suppliers providing material to XOS on Kanban blanket orders, XOS forecasts, historical usage data, and consideration of manufacturing lead time should be used to ensure there is maintenance of inventories to support XOS production triggers.

2.8 Delivery

XOS Production System works in a Just – In – Time environment with combination of scheduled, spot buy, scheduled blanket orders, and annual Kanban release orders. Suppliers shall establish a system to support > 95% on-time shipments to meet production and service requirements. Suppliers shall communicate to the XOS buyer/planner of potential late delivery problems in advance of the due date. When > 95% on-time shipments are not maintained then the supplier shall implement and submit a corrective action plan (if requested by XOS) to improve delivery performance. Kanban release orders should be managed through mutually agreed and respected replenishment lead times defined by stocking arrangements which account for part manufacturing lead times.

3.0 Production Part Approval Process - (PPAP)

3.1 PPAP Submission Requirements

When specified, XOS requires compliance with a Production Part Approval Process (PPAP) for new parts or new orders for existing material.

All Submitted PPAP(s) at a minimum will include a complete 2 Piece Dimensional Layout.

- a. Dimensional Layout Will Include:
 - i. The Specification
 - ii. The Supplier Measurement
 - iii. The Tool and Method that was utilized to obtain Supplier Measurement.

Completed workbooks are to be e-mailed to sgm@xos.com. If the supplier is unable to use the workbook the supplier shall contact XOS procurement for direction.

PPAP and First Article parts are to be clearly identified on the outside of the shipping container.

3.2 PPAP Submission Levels and First Article submission

Suppliers can obtain a copy of the approved Part Submission Warrant prior to shipping production product to XOS if requested. First Article parts can be submitted with supplier's formats if not otherwise requested from XOS.

4.0 Strategic Supplier Attributes

XOS prefers to have working relationships with suppliers that have the desired attributes we want instilled within their organizations. XOS Comprehensive Supplier Evaluation Report and the quarterly Supplier Report Card are the tools used to select suppliers and measure their performance to the following attributes.

The strategic supplier attributes are:

1. The supplier should have a Zero-Defect culture with an emphasis on continual improvement.
2. The supplier must be able to work in a Just in Time environment and shall be able to absorb indemnification costs due to poor quality and late delivery.
3. The supplier shall have competitive pricing and provide cost reductions on an annual basis.
4. The supplier should be responsive and flexible to XOS delivery and cost requirements and have the ability to meet unexpected demand

5.0 Supplier Performance Evaluation

5.1 Supplier Report Card

The supplier report card is the framework for measuring supplier performance in Quality, Delivery, and Cost and is sent to select XOS suppliers on a quarterly basis. The Supplier Report Card calculates an overall score and performance level. Each element has a weighted percentage to indicate those elements that are ranked from highest to lowest. Suppliers that consistently achieve an overall level of "Excellent", or "Good" will have preference of being awarded new XOS business.

Suppliers that receive a rating of "Needs Improvement" or "Unacceptable" rating may be required to submit an action plan to show in detail what actions are going to be taken to by the supplier to improve in the next quarter. Also, these vendors may be marked as to not be given new business until improvements are implemented that satisfy the XOS requirements.

The 2016 Supplier Report Card is based on Quality (50%), Delivery (30%), and Cost management (20%) component measures.

Scorecard: Quality XOS objective is for suppliers to provide parts that meet our quality requirements consistently and that we grow a supply relationship based on continuous improvement. For this reason, the quality score has two components, component quality and problem elimination:

Component Quality (75% of quality metric score): Delivered quality of production parts.

$$\text{PPM} = 1,000,000 (x) \frac{\text{Total Pieces Defective}}{\text{Total Pieces Received}}$$

Total pieces defective will be counted as follows:

SCAR(s) disposition:

- Use As Is – Product deemed as acceptable (does not count as defective)
- RTV – Entire lot or affected parts which XOS identifies will be counted unless the supplier notifies XOS within 7 working days the number of defective parts found in their 100% inspection of the product returned.
- Sort – If supplier sorts, (or arranges for a third party to sort/repair at XOS), the defective pieces found.
- Rework – Estimate of defective product based on incoming inspection. If the rework is completed by XOS, suppliers will be informed of defects through the SCAR.

PPM Defective:

Points	Rating %	PPM Defective
5	60	< 500
4	50	500 – 2500
3	40	2501 – 12000
2	30	12001 – 25000
1	20	25001– 50000
0	10	> 50000

SCAR Response: Incidence(s) of lack of SCAR response(s) within 30 days of RMA receipt for rejected product will cause lower scores.

Points	Response Rating %
5	90
4	80
3	70
2	60
1	50
0	Less than 50

Quality scores below 2 or incidence(s) of inadequate or incomplete action plan response to one or more quarters for a “needs improvement” or “unacceptable” report card score will cause suppliers to be moved to Unacceptable category, regardless of overall XOS score average. .

Scorecard: Delivery Ability to deliver what we order, at the right time, in the right way.

A delivery is considered on-time if it is received by the required due date with the correct quantities, as specified on the purchase order or Kanban signal. If XOS has to expedite Kanban parts from a supplier to prevent a possible line down situation, the delivery is considered late. Not adhering to the requirements of this supplier quality manual such as lack of packing list, improperly labeled boxes and missing material certifications will also count as a delivery instance.

Points	Rating %	On Time Delivery
5	100	95%
4	90	89% - 94%
3	80	80% - 88%
2	70	70% - 79%
1	60	60% - 69%
0	50	<60%

Scorecard: Cost Improvement: Level of cost reduction achieved over a rolling (1) year period of time. Suppliers providing payment via P-Card or preferred terms will have one additional point with a 5-point maximum.

$$\text{Cost Reduction} = 1 - \frac{\text{Total (3 month) actual supplier invoiced price}}{\text{Total (3 month) frozen Standard Cost from prior year}}$$

Points	Rating %	Total Cost Reduction
5	100	≥ to 5%
4		1% - 4%
3		Maintaining Cost
0		Price increase

5.2 Supplier Development

If suppliers are rated “Unacceptable” or “Needs Improvement”, XOS will implement supplier development activities to work together with our supply base to continuously improve quality, delivery, and cost.

Supplier development/improvement activities shall include:

Supplier Quality Performance Rating	Supplier Development Activity
Supplier rating "Excellent" or "Good" Isolated Supplier Non- Conformances	<ul style="list-style-type: none"> • No formal development required beyond review of SCAR corrective actions
Supplier rating “Fair” Periodic/Recurring Supplier Non-Conformances	<ul style="list-style-type: none"> • Review of SCAR corrective actions • As needed supplier conference calls with activity summary issue tracking • Consideration for on-site supplier process audit on “problem” part(s)
Supplier rating “Needs Improvement” Periodic/Recurring Supplier Non-Conformances All “Unacceptable” Delivery and Cost Scores	<ul style="list-style-type: none"> • Review of SCAR corrective actions • Regular supplier conference calls with activity summary issue tracking • High consideration for on-site supplier process audit on “problem” part(s) • Potential candidate for Supplier Top Focus
Supplier rating “Unacceptable” Periodic/Recurring Supplier Non-Conformances All “Unacceptable” and “Needs Improvement” quality scores	<ul style="list-style-type: none"> • Review of SCAR corrective actions • Regular supplier conference calls with activity summary issue tracking • High consideration for on-site supplier process audit on “problem” part(s) • High consideration as candidate for Supplier Top Focus • Formal Corrective Action plan required • Consideration for resourcing, if issues are recurring

6.0 Glossary of Commonly Used Acronyms (for reference only)

C=0	Zero Defective Sampling Plan
DBS	Danaher Business System
FMEA	Failure Mode & Effects Analysis
JIT	Just In Time
KPC	Key Product Characteristic
KCC	Key Control Characteristic
Kanban	Signal or trigger to replenish product quantity
PCP	Process Control Plan
PPAP	Production Part Approval Process
PPM	Parts Per Million
PSP	Problem Solving Process
RFD	Request for Deviation
SCR	Supplier Change Request
SCAR	Supplier Corrective Action Report
TPM	Total Productive Maintenance

7.0 Packaging and Shipping Requirements

7.1 Packaging Requirements

Packaging plans, if required, are included in the Supplier Feasibility review process in new product development, and are approved during the Part Approval (PPAP) process. Suppliers shall comply with the approved packaging methods, unless specifically approved for deviation by XOS. It is the responsibility of the supplier to provide reasonable and adequate protection of the parts provided to XOS during transit.

7.2 Shipping Instructions

7.2.1 Small Package Shipments

Ship packages by preferred carrier with size limitations having a total shipment weight of **150 pounds** or less to the address indicated on the XOS purchase order. Individual boxes shall weigh less than 25 pounds, or as approved by XOS to insure proper billing of freight charges, choose collect (authorized ground accounts).

7.2.2 Shipments

When XOS is responsible for freight charges, the supplier *must* use carriers listed on the XOS Domestic Supplier Routing Guide available from XOS upon request.

Please contact your XOS Purchasing representative with any questions.

- Consolidate all shipments that are to be shipped to one location on the same day. Create a master Bill of Lading that references multiple purchase orders.
- A packing list is mandatory and must be attached to one of the cartons in the shipment. The packing list must include XOS part number(s), lot number(s), and purchase order number(s). Carton's that contain packing lists must be marked on the outside.
- Each carton must show consignee address, name, part number, quantity, and purchase order number, or, for quality defect returns (RMA), the XOS DMR number.
- Shipments on pallets must be clearly marked with the piece count on each pallet.

7.2.3 Shipments by Air or Ground Expedite and Bill of Lading

XOS must authorize all collect air shipments or expedited shipments. Air carrier and account information and authorization number can be obtained from the Purchasing XOS representative. Authorization must be referenced on bill of lading.

A bill of lading (two copies) with the following information must be provided to the carrier at time of pick-up:

Consignee's Name
All Purchase order numbers
Description of merchandise and NMFC number

Ship to address:

If shipped collect Bill to:

XOS

Attn: Accounting Department

15 Tech Valley Drive

East Greenbush, NY 12061

Appendix A XOS - Nonconforming Material Report

(available at https://www.xos.com/cms-portals/xos_com/cms/documents/supplier-information/XOS-NCR.pdf)

Appendix B XOS - Supplier Corrective Action Response (SCAR)

(available at https://www.xos.com/cms-portals/xos_com/cms/documents/supplier-information/SCAR-Form.pdf)

Appendix C XOS - 8D – Problem Solving Corrective Action Report

(available at https://www.xos.com/cms-portals/xos_com/cms/documents/supplier-information/XOS-8D-Form.pdf)

Appendix D XOS - Supplier Change Request

(available at https://www.xos.com/cms-portals/xos_com/cms/documents/supplier-information/XOS-Supplier-Change-Request.pdf)

Appendix E XOS - Supplier Deviation Request

(available at https://www.xos.com/cms-portals/xos_com/cms/documents/supplier-information/XOS-Supplier-Deviation-Request.pdf)

Appendix F XOS - Comprehensive Supplier Evaluation Report (CSER)

(available to communicate your supply capabilities to XOS at https://www.xos.com/cms-portals/xos_com/cms/documents/supplier-information/XOS-CSER.pdf)

Appendix G XOS - Domestic Supplier Routing Guide

(available from XOS Purchasing)