

# XOS Supplier Quality Manual



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



better analysis counts

<b>Revision</b>	<b>Change</b>	<b>Date</b>	<b>Sign-Off</b>
A	Initial Release	Jan. 2017	DE
B	Document Overhaul	Nov. 2023	DD
C	Quality Policy, Supplier Report Card Metrics	Mar. 2026	LB



## Contents

Message to Suppliers .....	3
1.0 Introduction.....	4
2.0 Quality System Requirements Specific to XOS .....	4
2.1 Corrective Action .....	4
2.2 Nonconforming Material / Request for Deviation.....	5
2.3 Cost Recovery .....	5
2.4 Maintaining Process Control .....	5
2.5 Inventory Management.....	5
2.6 Delivery .....	6
3.0 First Article Inspection (FAI) .....	6
3.1 FAI Submission Requirements.....	6
4.0 Strategic Supplier Attributes.....	7
5.0 Supplier Performance Evaluation .....	7
5.1 Supplier Report Card.....	7
5.1.1 Scorecard: Quality (20%).....	8
5.1.2 Scorecard: 8D - Corrective Action Response (20%).....	9
5.1.3 Scorecard: Delivery (25%).....	10
5.1.4 Scorecard: Cost Management (20%).....	11
5.1.5 Scorecard: Payment Terms (5%).....	11
5.1.6 Scorecard: Communication (10%).....	11
5.2 Supplier Development .....	12



## 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, C).

The XOS Quality Policy is:

**XOS is the Quality T.E.A.M.!**

**Together, Everyone Achieves More**

Our quality policies extend to our suppliers. We are committed to building and maintaining a profitable partnership with our suppliers that results 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.

Justin Thomas  
Quality Engineer

## 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 System Requirements specific to XOS are described in sections 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 Quality. SCAR format is preferred, and the following are requirements for response:

- Initial Response - Acknowledgement of the issue and containment action taken is required within 48 hours, 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.
- XOS requires the completion of an 8D for each SCAR.

## 2.2 Nonconforming Material / Request for Deviation

Nonconforming product is defined as deviation from drawings, specification and/or purchase order requirements without approval from XOS. Suppliers must notify XOS in advance of any intended product, material, or process changes and must receive XOS approval prior to implementation. On an exception basis, suppliers may submit a Supplier Deviation Request (available on XOS website) for XOS review and approval. Written approval is required prior to 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 (unless explicitly stated).

## 2.3 Cost Recovery

Suppliers may be responsible for all costs associated with XOS, or XOS's customers, receiving nonconforming material. This may include the cost of parts, rework, freight shipment(s) and scrap disposal.

## 2.4 Maintaining Process Control

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

- Measurement technique
- Acceptance criteria
- Reaction plans when the acceptance criteria are not met
- Packaging method to ensure minimization of damage to product prior to arrival at XOS facility

## 2.5 Inventory Management

Suppliers shall use an inventory management system to optimize inventory turn 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. For Kanban blanket orders, guidelines are defined within the Purchase Order.

## 2.6 Delivery

XOS Production System works in a Just-In-Time environment with a combination of scheduled, spot buy, scheduled blanket orders and annual Kanban release orders. Suppliers shall establish a system to support >90% 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 >90% 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 First Article Inspection (FAI)

### 3.1 FAI Submission Requirements

XOS requires a First Article Inspection (FAI) report for new parts or new revisions for existing material.

All submitted FAI report(s) at a minimum will include a complete Dimensional Analysis.

The Dimensional Analysis will include:

- i. The Specification
- ii. The Supplier Measurement
- iii. The Tool and Method that was utilized to obtain Supplier Measurement
- iv. Packaging method for when parts are to ship

First Article Inspection parts can be submitted with supplier's formats if not otherwise requested by XOS.

Completed FAI reports are to be e-mailed to [sqm@xos.com](mailto:sqm@xos.com). If the supplier is unable to use the workbook the supplier shall contact XOS Quality for direction.

A physical copy of a First Article Inspection report is to be included with the part when they are shipped. First Article Inspection parts are to be clearly identified on the outside of the shipping container.

## 4.0 Strategic Supplier Attributes

XOS would like 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 based on strategic supplier attributes.

### **The strategic supplier attributes are:**

1. The supplier should have a Zero-Defect culture with an emphasis on continuous 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 to provide cost reductions on an annual basis.
4. The supplier should be responsive/flexible to XOS delivery, 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, Cost, and Delivery. The Supplier Report Card calculates an overall score and performance level. Report Cards are sent to suppliers at XOS' discretion or upon request from the supplier. Each element has a percentage to indicate those elements that are ranked from highest to lowest. Suppliers that consistently achieve a grade of 70.0% and above will have preference of being awarded new and/or continued XOS business.

Suppliers that receive a rating of below 70.0% may be required to submit an action plan to show in detail what actions are going to be taken 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 Supplier Report Card is based on the metrics of Quality, 8D Corrective Action Response, Delivery, Cost Improvement, Payment Terms, and Communication.

### 5.1.1 Scorecard: Quality (20%)

XOS’s objective is for suppliers to provide parts that meet our quality requirements consistently and grow a supply relationship based on continuous improvement. For this reason, the quality score is divided into two aspects: Component Quality and Problem Elimination.

**Component Quality:** Delivered quality of production parts (meeting all product specifications).

Total Pieces Defective will be counted as follows:

**SCAR disposition:**

- Use as is – Product deemed as acceptable (does not count as defective)
- Return to Vendor – 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.

The Quality grade is determined based on the Defect Parts Per Million (DPPM) of all parts delivered within a 12 month rolling time frame.

DPPM is calculated using the following formula:

$$DPPM = 1,000,000 * \frac{Total\ Pieces\ Defective}{Total\ Pieces\ Delivered}$$

Final Quality Score is classified by the following:

Score	Criteria
5	DPPM less than 500
4	DPPM ranging from 501 to 2,500
3	DPPM ranging from 2,501 to 25,000
2	DPPM ranging from 25001 to 50,000
1	DPPM over 50,000

### 5.1.2 Scorecard: 8D - Corrective Action Response (20%)

**8D Response:** Incidence(s) or lack of 8D response(s) within 30 days of RMA receipt for rejected product or acknowledgement of defect (in the event rework is done by XOS) will cause lower scores.

Corrective Action Response Percentage (CARP) is based on the percentage of corrective actions received relative to the number of SCAR incidents reported.

Final 8D Score is classified by the following:

Score	Criteria
5	CARP of 90% and above
4	CARP ranging from 89% to 80%
3	CARP ranging from 79% to 40%
2	CARP ranging from 39% to 20%
1	CARP of less than 20%

**NOTE:** If no SCAR incidents have been reported, CARP will be marked as 100% and a score of 5 will be given for this metric.

### 5.1.3 Scorecard: Delivery (25%)

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

A delivery needs to have the correct quantities as specified on the purchase order or Kanban signal.

Not adhering to the requirements of this supplier quality manual, such as lack of packing list will also count as a delivery instance.

Suppliers have a delivery window that is determined by their classification based on shipping distance between the supplier's facility and XOS's East Greenbush facility. Classifications and delivery windows are as follows:

- **Local**
  - **On-Time Delivery Window: 5 business days total**
    - Includes 2 business days before the due date, the due date and 2 business days after the due date
- **Domestic**
  - **On-Time Delivery Window: 7 business days total**
    - Includes 3 business days before the due date, the due date and 3 business days after the due date
- **International**
  - **On-Time Delivery Window: 11 business days total**
    - Includes 5 business days before the due date, the due date and 5 business days after the due date

Any delivery that arrives outside of the delivery window defined by the supplier's classification will be marked as:

- ***Early*** – delivery arrived before the start of the delivery window
- ***Late*** – delivery arrived after the end of the delivery window

Scoring factors the On-Time Delivery Percentage (OTDP) of parts that were received. Final Delivery Score is classified as the following:

Score	Criteria
5	OTDP of 95% and above
4	OTDP ranging from 94% to 85%
3	OTDP ranging from 84% to 75%
2	OTDP ranging from 74% to 65%
1	OTDP of less than 65%

#### 5.1.4 Scorecard: Cost Management (20%)

Level of cost reduction achieved over a rolling (1) year period of time.

This metric is determined based on Purchase Price Variance (PPV). Final Cost Management scoring is classified as the following:

Score	Criteria
5	PPV of -2.5% and below
4	PPV ranging from -0.5% to -2.4%
3	PPV ranging from 0.5% to -0.4%
2	PPV ranging from 0.6% to 1.5%
1	PPV over 1.5%

#### 5.1.5 Scorecard: Payment Terms (5%)

Alignment with payment terms based on XOS business model.

This metric is determined based on XOS's preferred terms of payment. Final Payment Terms scoring is classified as the following:

Score	Criteria
5	Net-90 or greater
4	Net-75, P-Card, Master Card, or AMEX
3	Net-60
2	Net-30/45
1	Pre-Pay, Immediate

#### 5.1.6 Scorecard: Communication (10%)

Supplier responsiveness in the procurement process and in addressing quality issues.

This metric is determined based on an average of the response ratings from the Procurement and Quality Departments.

The Procurement Response Rating is based on a supplier's responsiveness in the purchasing process and their ability to proactively update XOS regarding any impending issues that may affect their ability to meet the expected delivery dates.

The Quality Response Rating is based on the average of initial response times to quality issues within the current year. It takes the sum of business days between XOS's initial outreach and the supplier's initial response for each SCAR and divides it by the total number of SCARs. Quality Response Rating is as follows:

Rating	Criteria
5	Avg. response time of 1 business day or less
4	Avg. response time over 1 business day and less than or equal to 3 business days
3	Avg. response time over 3 business days and less than or equal to 4 business days
2	Avg. response time over 4 business days and less than or equal to 5 business days
1	Avg. response time over 5 business days

The overall Communication grade, which takes the average rating from Procurement and Quality is scored as follows:

Rating	Criteria
5	Avg. overall rating of 5
4	Avg. overall rating between 4.9 and 4.0
3	Avg. overall rating between 3.9 and 3.0
2	Avg. overall rating between 2.9 and 2.0
1	Avg. overall rating between 1.9 and 1.0

## 5.2 Supplier Development

If suppliers have a final grade of 69.9% and below, 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 Final Grade of 90.0% and above Isolated Supplier Nonconformances	<ul style="list-style-type: none"> <li>No formal development required beyond review of SCAR corrective actions</li> </ul>
Supplier Final Grade between 70.0% and 89.9% Periodic/Recurring Supplier Nonconformances	<ul style="list-style-type: none"> <li>Review of SCAR corrective actions</li> <li>As needed supplier conference calls with activity summary issue tracking</li> </ul>

	<ul style="list-style-type: none"> <li>• Consideration for on-site supplier process audit on “problem” part(s)</li> </ul>
<p>Supplier Final Grade between 60.0% and 69.9%</p> <p>Periodic/Recurring Supplier Nonconformances</p> <p>All “Unacceptable” Delivery and Cost Scores</p>	<ul style="list-style-type: none"> <li>• Review SCAR corrective actions</li> <li>• Regular supplier conference calls with activity summary issue tracking</li> <li>• High consideration for on-site supplier process audit on “problem” part(s)</li> <li>• Potential candidate for Supplier Top Focus</li> </ul>
<p>Supplier Final Grade below 60.0%</p> <p>Periodic/Recurring Supplier Nonconformances</p> <p>All “Unacceptable” and “Needs Improvement” quality scores</p>	<ul style="list-style-type: none"> <li>• Review of SCAR corrective actions</li> <li>• Regular supplier conference calls with activity summary issue tracking</li> <li>• High consideration as candidate for Supplier Top Focus</li> <li>• Formal Corrective Action plan required</li> <li>• Consideration for resourcing if issues are recurring</li> </ul>