GENERAL QUALITY ASSURANCE PROVISIONS

The General Quality Assurance Provisions listed below are an integral part of each nLIGHT purchase order which references any Specific (numbered) QAP. These General QAP's are in addition to all other clauses, provisions, instructions and terms and conditions.

IT IS THE SUPPLIER'S RESPONSIBILITY TO MAKE SURE CURRENT REVISIONS OF nLIGHT DRAWINGS AND COMPONENT SPECIFICATIONS ARE OBTAINED FROM THE nLIGHT BUYER BEFORE FULFILLING EACH PURCHASE ORDER. IT IS THE SUPPLIER'S RESPONSIBILITY TO MAKE SURE CURRENT REVISIONS OF ALL REFERENCED STANDARDS ARE USED, UNLESS nLIGHT SPECIFIES OTHERWISE IN THE PURCHASE ORDER, DRAWING OR COMPONENT SPECIFICATION FOR THE ITEM.

SHIPMENT OF MATERIAL IMPLIES COMPLETE COMPLIANCE WITH ALL PURCHASE ORDER REQUIREMENTS AND RELATED SPECIFICATIONS AND STANDARDS.

A. QUALITY MANAGEMENT SYSTEM:
The Supplier must have an established and maintained Quality Management System compliant to an Industry recognized Quality Standard, such as ISO 9001 or AS9100. The Supplier's Quality Management System must be available for nLIGHT review. Suppliers having certified or registered Quality Management Systems must notify nLIGHT immediately, if that certification or registration was not renewed or was revoked.

B. PURCHASE ORDER RECEIPT AND VERIFICATION:
The Supplier must verify all Purchase Orders issued by nLIGHT upon receipt. Any discrepancies in price, quantity, specifications, quality requirements, packaging, or delivery requirements must be communicated to and resolved with nLIGHT Purchasing, before taking action on the Purchase Order.

C. DELIVERY:
nLIGHT expects 100% on time delivery. Deliveries are considered on time, if the required product, as specified on the Purchase Order is received on the due date or up to 7 calendar days early. Required supporting documents, such as, packing lists, certificates of conformance, certificates of analysis, material safety data sheets, etc., must arrive with, or prior to receipt of the shipment.

D. CONFORMANCE TO REQUIREMENTS:
nLIGHT expects all material and components to arrive defect free. Product is expected to meet all Purchase Order requirements and referenced specifications and standards, unless a Waiver Request has been submitted by the Supplier and approved by nLIGHT's Buyer in writing, prior to shipment. (If the Supplier does not have a Waiver Request Form, nLIGHT can provide a template on request).

E. UNAUTHORIZED REPAIRS:
The Supplier must not repair products damaged or found to be faulty during fabrication, by any method including, but not limited to, welding, brazing, plugging, soldering or use of adhesives unless authorized by nLIGHT in writing, utilizing a Waiver Request Process.

F. NOTIFICATION OF CHANGE*:
The Supplier must maintain strict controls to assure that, after the purchased item(s) successfully passes any required qualification, no changes will be made that affect the form, fit or function (including reliability), without nLIGHT's prior written approval. In addition, the items must not be produced at a facility other than the Supplier's original facility which produced the acceptable items, without nLIGHT's prior written approval. The Supplier must provide First Article data after the implementation of the changes (see QAP P), including providing partial FAIR (First Article Inspection Report) on the changes driven by the nLIGHT drawing revision, affecting the form, fit or function. nLIGHT reserves the right to cancel the Purchase Order(s) if the changes are deemed unacceptable. Failure to notify nLIGHT of such changes may result in removal of the Supplier from nLIGHT's Approved Suppliers List.

G. OUTSOURCING/SUB-CONTRACTING MANUFACTURING PROCESSES
Outsourcing or sub-contracting of any manufacturing process must be approved by nLIGHT in advance. The Supplier must provide qualification data for any proposed sub-contractors.
If the outsourcing of any manufacturing process is approved by nLIGHT, the Supplier must maintain lot traceability and lot integrity (i.e. no partial outsourcing of a Supplier lot). The Supplier is responsible for flowing down the requirements of this QAP to their sub-contractor.

H. CONTROL OF SUB-TIER SUPPLY
The Supplier's procurement documents must describe appropriate methods to flow down requirements necessary to assure the Supplier's procured items conform to nLIGHT's drawing, component specification and Purchase Order requirements (including QAPs listed therein).
The Supplier must ensure that purchased supplies conform to Purchase Order requirements. The Supplier must request all sub-contractors or sub tier suppliers to provide corrective action(s) and/or replacements, as and when necessary.
The Supplier must retain on file at their facility, all chemical and mechanical test data for raw materials used on this Purchase Order.

I. DELIVERY OF DEFECTIVE ITEMS:
In the event the Supplier determines that material previously delivered to nLIGHT was defective, written notification to the nLIGHT's Buyer is required within thirty (30) calendar days.

J. IMPROPER SUBMITTAL OF PREVIOUSLY REJECTED PRODUCTS:
Product previously rejected by nLIGHT and reworked or repaired by the Supplier, must be identified in the shipping documents. Reference to nLIGHT's rejection documentation must be noted. Failure to identify previously rejected product may be cause for rejection and return of the material at the Supplier's expense.

K. FAILURE ANALYSIS
USED FOR NON-COMMERCIAL PRODUCT

L. PROPER SUBMITTAL OF DOCUMENTATION:
Adequate records of inspections, tests, and certifications must be maintained throughout the manufacturing process by means deemed suitable by the Supplier. This information must be maintained on file and must be supplied to nLIGHT upon request. nLIGHT may refuse to accept

product if the Supplier fails to submit any documentation specified in the Quality Assurance Provisions of the Purchase Order.

M. CALIBRATION SYSTEM:
The Supplier's calibration system for measuring and test equipment must be in compliance with the latest revision of ISO10012, or equivalent. The Supplier's calibration system must be approved by nLIGHT and is subject to review and approval at any time by nLIGHT. The Supplier retains full responsibility for ensuring that all products, lower-tier suppliers, supplies used, and/or services furnished hereunder, comply with all applicable calibration requirements.

N. IDENTIFICATION, PRESERVATION, AND PACKAGING:
All shipments to nLIGHT must be packaged to avoid damage and deterioration and must be shipped to the address specified on the PO unless otherwise noted. Packaging must be in accordance with good commercial practices unless otherwise specified on the Purchase Order. Items must not be intermingled unless otherwise specified. Each box or container must be labeled and have as a minimum the following information: (1) nLIGHT part number, (2) PO number, (3) PO Line Item, (4) Quantity, (5) Manufacturer's lot number (and Manufacturer's part number if applicable) and (6) Country of Origin. Product supplied to nLIGHT shall comply with nLIGHT standard QI-STD-0002.

O. SUPPLIER CORRECTIVE ACTION REQUEST:
A Supplier Corrective Action will be forwarded by nLIGHT to a Supplier when corrective action is required. Upon notification of the non-conformance, the Supplier must take immediate containment action(s) and complete the analysis of root cause(s) and propose corrective action(s) with anticipated completion dates within 14 calendar days. Failure to respond in a timely manner may result in the removal of the Supplier from nLIGHT's Approved Suppliers List. Upon notification of the non-conformance, shipments may be suspended until containment processes are established.

P. FIRST ARTICLE:
For the first article produced, the supplier must conduct, document and report inspections and tests that verify conformance to all requirements. The supplier's report shall include, as a minimum: 1) purchase order number; part number; revision level; part name; specimen serial number(s); the drawing and specification requirements, including tolerances; 2) the tool/method used to perform each inspection; 3) actual measured and accepted inspection/test results; 4) material certifications of chemical/physical analysis; 5) the actual accepted first article specimen(s) identified as "first article inspection sample" and traceable to the report's measured data; 6) when functional testing is required, a diagram of the test set-up, test equipment used, test equipment tolerances, calibration identifications with the last calibration date of the test equipment.
First Article Inspection Reports in accordance with AS9102 are preferred (nLIGHT can provide report forms on request). The first article inspection report is required from the supplier when any one of the following conditions exist or occur:

a) The Supplier has never provided this product or service before.
b) There has been a lapse in the Supplier's production of this item exceeding 24 months.
c) Following the incorporation of a form, fit, or function change for the item (see F).
d) A material, design, tooling and/or process change(s) affects the original qualification testing of the product.
e) Following damage and subsequent repair to tooling, fixtures, dies or equipment used in the manufacturing process which affects, or has the potential to affect, the specification parameters or attributes.
f) The supplier has made changes to their location of production.

g) A change has been made to a Supplier proprietary product that may affect the product purchased by nLIGHT or the performance of a higher assembly

It is acceptable to only do partial qualification testing related only to those characteristics affected by the change. This delta qualification must be approved in advance and in writing, by nLIGHT. Further qualification requirements are defined by Specific Quality Assurance Provisions referenced in the purchase order.

Q. CONFLICTS:
The document hierarchy; Purchase Order, product drawing, component specification, then secondary standards and specifications identified within, shall take precedence in the event of conflicts with the QAP requirements within this document. The QAPs are quality requirements in addition to the aforementioned core documents.

R. SAFETY DATA SHEETS:
Safety Data Sheets must be made available for materials that are identified in 29 CFR 1910.1200 and the Registry of Toxic Effects of Chemical Substances (published by NIOSH).

*indicates different wording to the non-commercial QAP

SPECIFIC QUALITY ASSURANCE PROVISIONS

The Specific Quality Assurance Provisions which may be required as part of each purchase order are detailed below. These provisions when called for by reference number on the purchase order are in addition to all other clauses, provisions, instructions and terms and conditions of purchase and are a part thereof by reference.

1. PROHIBITED MATERIALS
   A. The use of Ozone Depleting Chemicals (ODC's) in the processing of materials or products delivered on this order is not allowed. If the product requires the use of ODC's, this must be brought to the attention of the nLIGHT buyer prior to any such processing. The notification to nLIGHT must include the reason that alternative chemicals or processing cannot be substituted for ODC usage. Written authorization from nLIGHT is required prior to processing products for this order with ODC's. This requirement must be flowed down by the Supplier to any sub-tier supplier or processor utilized in the production of this order.
   B. The items supplied under this purchase order must contain no metallic mercury or mercury compounds and must be free from mercury contamination. During manufacturing, test or inspection, the items supplied must not come in contact with mercury or any of its compounds nor with any mercury containing devices employing only a single boundary of containment. Note: A single boundary of containment is one not backed by a second seal or barrier to prevent contamination in the event of an accidental rupture of the primary seal or barrier. In the event this requirement cannot be met contact the nLIGHT buyer. This requirement must be flowed down by the Supplier to any sub-tier supplier or processor utilized in the production of this order.

2. Restriction of Hazardous Substances (RoHS)
   A. USED FOR NON-COMMERCIAL PRODUCT
   B. Compliance with European Directive 2011/65/EU, amended by Directive 2015/863, is required for this Purchase Order.
   The hazardous substances are:
   - Cadmium (Cd) 0.01% by weight
   - Lead (Pb) 0.10% by weight
   - Mercury (Hg) 0.10% by weight
   - Hexavalent Chromium (Cr^{6+}) 0.10% by weight
   - Polybrominated Biphenyls (PBB) 0.10% by weight
   - Polybrominated Diphenyl Ethers (PBDE) 0.10% by weight
   - Bis(2-Ethylhexyl) phthalate (DEHP) 0.10% by weight
   - Benzyl butyl phthalate (BBP) 0.10% by weight
   - Dibutyl phthalate (DBP) 0.10% by weight
   - Diisobutyl phthalate (DIBP) 0.10% by weight

   The percentage weight of these hazardous substances is not measured as a percentage of the complete part or assembly, but of any homogenous material that can be mechanically separated from the part or assembly.

3. CONFLICT MINERALS
   The supplier is responsible for ensuring that none of the following material used in parts or assemblies supplied to nLIGHT, originate from the Democratic Republic of the Congo or an adjoining country (Angola, Burundi, Central African Republic, the Republic of the Congo, Rwanda, South Sudan, Tanzania, Uganda and Zambia):
   - gold,
   - columbite-tantalite or its derivatives (e.g. tantalum),
   - cassiterite or its derivatives (e.g. tin), or
   - wolframite or its derivatives (e.g. tungsten)

4. CRITICAL FOR SAFETY PART
   This part is considered by nLIGHT to be critical for the safe operation of nLIGHT product. As such, suppliers of Commercial Off The Shelf (COTS) parts must ensure all parts are new and genuine (see QAP 85A for more information) and suppliers of custom parts must obtain nLIGHT approval before making any change to the part or processes used to manufacture it or to rework it in a non-standard manner.

5. REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals)

   Compliance with European Directive 1907/2006 is required for this Purchase Order. Any material listed in the current version of the Candidate List of Substances of Very High Concern (SVHC) used in the article provided to nLIGHT, shall be reported as follows:

   - SVHC name
   - Weight of SVHC in the article
   - Weight of the article

   If no SVHC is contained in the article, this shall be reported to nLIGHT.

6. COMMERCIAL OFF THE SHELF (COTS) PARTS

   nLIGHT recognizes that it is unreasonable to expect manufacturers of COTS parts to comply with unique demands from every customer. However, the numbered QAPs in this purchase order are considered to be Industry-acceptable requirements and compliance is therefore expected.

   The inclusion of this QAP in nLIGHT's purchase order removes the requirement to comply with all lettered QAPs in this document, although compliance is preferred.

7. TSCA (Toxic Substances Control Act)

   Compliance with the Regulation of Persistent Bioaccumulative and Toxic Chemicals under TSCA section 6(h) is required for this Purchase Order. Any material as listed below shall be reported to nLIGHT:

   - Decabromodiphenyl ether (DecaBDE)
   - Phenol, isopropylated phosphate (3:1) (PIP (3:1))
   - 2,4,6-Tris(tert-butyl)phenol (2,4,6-TTBP)
   - Hexachlorobutadiene (HCBD)
   - Pentachlorothiophenol (PCTP)

8. RESERVED FOR FUTURE USE
9. RESERVED FOR FUTURE USE

10. QUALIFICATION

    Qualification testing per the drawing and/or component specification(s) is required for this Purchase Order. Qualification samples and the associated test data shall be identified and packaged separately from the production items.

11. USED FOR NON-COMMERCIAL PRODUCT
12. RESERVED FOR FUTURE USE
13. RESERVED FOR FUTURE USE
14. RESERVED FOR FUTURE USE

15. USED FOR NON-COMMERCIAL PRODUCT

16. COPY EXACTLY!

    This PO is required for an nLIGHT product which has Copy Exactly! (CE!) requirements flowed down from nLIGHT's customer. Therefore, these CE! requirements apply to this PO. In addition

to the requirements of QAP F, the supplier must notify nLIGHT of all changes, irrespective of whether they directly impact the part form, fit or function.

17. CERTIFICATES OF CONFORMANCE

A. A Certificate of Conformance must be provided with each shipment and for each lot of material contained within, stating compliance to all requirements specified in the Purchase Order (including all QAPs), drawings, component specifications and referenced standards, and specifically including the following:

- Manufacturer's name and address
- nLIGHT's name, address and PO number
- Item part number, revision and description
- Lot identification code (including plant code as applicable)
- Conformance inspection acceptance date
- Quantity of units in the shipment
- Statement certifying product conformance and traceability
- Statement certifying material authenticity
- Signature or stamp of appropriate representative and date of transaction

The Supplier must have records on file to substantiate product compliance to the Contract and will furnish copies of these records upon request of nLIGHT's or nLIGHT's customer representative(s).

When material is provided by nLIGHT the Supplier must furnish a signed certification stating that the items supplied are made from material furnished by nLIGHT. Certification shall be identifiable to the original nLIGHT Shipping documentation.

B. Material supplied on this contract must be accompanied by a Certificate of Analysis, which must include:

1. Original manufacturer's name and address
2. Purchase Order number
3. Item part number, revision and quantity
4. Drawings and/or specification number and revision
5. Serial numbers or date code or lot number (as applicable)
6. QA signature or stamp, and date
7. Statement of conformance to all requirements

The Certificate of Analysis must include actual discrete data (physical and chemical analysis report) taken from the material supplied. The actual quantity of each constituent measured must be listed and compared to the requirements of each constituent identified in the applicable specification. The Supplier must also retain the Certificate of Analysis and

physical or chemical analysis reports on file for the longer of five years after completion of the nLIGHT Purchase Order or as QAP 110 specifies, if called out in the purchase order.

18. USED FOR NON-COMMERCIAL PRODUCT

19. The Supplier must provide access to their facilities at all reasonable times by nLIGHT or its authorized Customer representatives and Regulatory Authorities. The Supplier must include and require its (sub-tier) suppliers to include, the substance of this QAP in its purchase documents, in support of this nLIGHT Purchase Order.

20. The Supplier must include and require its (sub-tier) suppliers to include, the substance of the first paragraph of QAP A, including the intent of this sentence, in its purchase documents, in support of this nLIGHT Purchase Order.

21. RESERVED FOR FUTURE USE
22. RESERVED FOR FUTURE USE
23. RESERVED FOR FUTURE USE
24. RESERVED FOR FUTURE USE
25. RESERVED FOR FUTURE USE
26. RESERVED FOR FUTURE USE

27. PACKAGING

    A. Parts must be provided in suitable inner packaging which will not:

        - Fail a visual cleanliness inspection
        - Readily generate, shed, attract or harbor particulates
        - Cause or leave residue or particulate on the part(s) being supplied
        - Produce a noticeably strong odor
        - Create an ESD hazard for nLIGHT products

    B. The shipping tag, bag, or container must be permanently and legibly marked in accordance with MIL-STD-130. The marking must include the following information:

        a. Part Description and nLIGHT Part Number

        b. Purchase Order Number and Line number (if applicable)

        c. Quantity shipped

        d. Serial Number or range of Serial Numbers (if applicable) – see also QAP 37

e. Date Code (YYWW for a fixed point in the Supplier's manufacturing process – start of process is preferred) or unique Lot Number – see also QAP 36

f. Manufacturer's Name

g. ESD Symbol if required

h. Country of Origin

C. The shipping tag, bag, or container must be permanently and legibly marked. The marking must include the following information:

a. Part Description and nLIGHT Part Number

b. Purchase Order Number and Line number (if applicable)

c. Quantity shipped

d. Serial Number or range of Serial Numbers (if applicable) – see also QAP 37

e. Date Code (YYWW for a fixed point in the Supplier's manufacturing process – start of process is preferred) or unique Lot Number – see also QAP 36

f. Manufacturer's Name

g. ESD Symbol if required

h. Country of Origin

D. ESD-sensitive devices must be packaged in ESD-shielded bags or containers (compliant with ANSI/ESD S541) with an appropriate ESD warning label in a prominent position.

E. Environmentally-sensitive material, parts shall be provided with inner packaging that is suitable for handling and storage in nLIGHT's factory. The inner packaging format shall be agreed by nLIGHT. Instructions regarding storage and handling of the parts shall be provided on the inner packaging.

F. The inner package and outside shipping package shall be from low outgassing and low particulate materials. A low residue cleanroom tape and a desiccant pack can be included in the inner package; Supplier must provide a Certificate of Analysis as part of the First Article Inspection approval process certifying that the inner package and outside shipping package are from low outgassing and low particulate materials. Certification from the original manufacturer is also acceptable. A Change to the packaging materials shall follow nLIGHT QAP F(NOTIFICATION OF CHANGE) and accordingly subject to nLIGHT APPROVAL with a Certificate of Analysis to certify the compliance to the low outgassing and low particulate requirement.

28. RESERVED FOR FUTURE USE

29. RESERVED FOR FUTURE USE

30. PART MARKING

A. The item must be legibly marked in accordance with MIL-STD-130 in a suitable area determined by the Supplier and approved by nLIGHT, with the applicable serial number using low outgassing ink, laser marking, etching or other mechanical means

B. The item must be legibly marked in accordance with MIL-STD-130 in the area specified by nLIGHT on the drawing or component specification, with the applicable serial number using low outgassing ink, laser marking, etching or other mechanical means

C. The marking on items supplied (i.e., part number, serial number, date code, etc.) must meet the marking permanency requirements of the applicable specification. For inks, the test methods of "Resistance to Solvents" namely, MIL–STD 202, Method 215; MIL–STD–750, Methods 1022; or MIL–STD–883 Method 2015.

D. The inside of the part should be marked with Vendor's number in a location specified by nLIGHT or determined by the supplier and approved by nLIGHT. In general, outside surfaces are either marked as such or marked with a higher cosmetic class than the inside of the part. All locations without Class A cosmetic requirements or not noted as exterior surface are acceptable for vendor marking. The vendor number can be requested from nLIGHT Supply Chain representative. An identification other than the vendor number can be used with nLIGHT approval.

E. The part shall be marked with nLIGHT Part Number and revision in a location specified by nLIGHT or determined by the supplier and approved by nLIGHT.

F. Marking on part must comply with UL969

31. RESERVED FOR FUTURE USE

32. RESERVED FOR FUTURE USE

33. RESERVED FOR FUTURE USE

34. RESERVED FOR FUTURE USE

35. SERIALIZATION

A. Each part, component or assembly supplied on this Purchase Order must be identified with a distinct serial number. Serial numbers must not be duplicated for one part, component or assembly number when manufactured in sequential lots. The Supplier is responsible for managing the creation, allocation and tracking of part numbers.

B. Each part, component or assembly supplied on this Purchase Order must be identified with a distinct serial number. Serial numbers must not be duplicated for one part, component or assembly number when manufactured in sequential lots. nLIGHT will provide the serial numbers to be used with each Purchase Order

C. Five character alpha-numeric serial number required. For example: 1AB2C

D. Six character alpha-numeric serial number required. For example: VABC23 where V is a vendor code agreed between vendor and nLIGHT. When the serial number is applied to a region less than 5 mm^2 size, alphabetic character "I","L","Z","B","Q","O","W","G" and "S" must not be used.

E. Serial number format is VVYYWW1234567R00XXXX where VV=vendor code, YY=year code, WW=week code, 1234567=nLIGHT Part Number, R00=nL Part Number rev, XXXX= unique serial number within week, part number and rev. Use highest assembly number on main label if more than one serialized component is present.

F. Barcode required

G. QR code required.
H. Each part, component or assembly supplied on this Purchase Order must be identified with a distinct serial number. Serial numbers must not be duplicated across different part numbers, components or assemblies and also from different manufacturing lots. The supplier is responsible for managing the creation, allocation and tracking of serial numbers.
I. Serial number format is YYVXXX where YY=year code, V=vendor code, XXX=unique serial number

36. LOT CONTROL NUMBERS

Products supplied under this Purchase Order must be identified by the Supplier's manufacturing lot, or batch number. This lot control number must be traceable to all the Supplier's critical manufacturing processes. All accompanying documents, such as packing list or certifications, must include the lot control number. Different lot numbers in the same shipment must be segregated and clearly identified.

37. DATE CODES

The supplier must identify the quantity of each date code in each lot and sub lot delivered in each shipment. This information shall be provided on the packing list. Each lot and sub lot shall be segregated in the shipment.

38. RESERVED FOR FUTURE USE

39. RESERVED FOR FUTURE USE

40. USED FOR NON-COMMERCIAL PRODUCT

41. RESERVED FOR FUTURE USE

42. RESERVED FOR FUTURE USE

43. RESERVED FOR FUTURE USE

44. POST-PLATING TEST STANDARDS

Sampling plan is to follow ASTM-B602 Table 4 except a Witness Sample Plan is allowed and approved. Sampling plan is applied to any of tests as below listed:

A. Plating Thickness Report to be provided.

B. Heat Test is provided per ASTM-B488 Section 9.5.2. , unless the drawing specifies the heat test requirement. Test result must be explicitly stated in a Certificate of Conformance (CofC) provided with each shipment

C. Tape Test is required per ISO2819-1980 or ASTM-B571 Section 11.

Apply tape test to the flat areas or the surfaces that specified on the drawing. No evidence of detachment of the coating by naked eyes. Don't apply tape to the sharp edges, cut-offs, threaded screw holes, rack mark areas unless it is required by the drawing.

Tape Test result must be explicitly stated in a Certificate of Conformance (CofC) provided with each shipment

D. The bonding surface shall be free of contamination, mechanical defects (e.g. dent, bump, scratch etc.), missing gold with underneath plating layer or substrate exposed, by inspection without magnification. If Die Shear Test is required, Die Shear Strength requirement is to follow MIL-STD-883E Method 2019.5

E. The bonding surface shall be free of contamination, mechanical defects (e.g. dent, bump, scratch etc.), missing gold with underneath plating layer or substrate exposed, by inspection without magnification. If Wire Pull Test is required, Bond Pull Test requirement is to follow MIL-STD-883E Method 2011.7

F. Scribe-Grid Test is required per ASTM-B571 Section 13
Test result must be explicitly stated in a Certificate of Conformance (CofC) provided with each shipment

G. Bend Test is required per ASTM-B571 Section 3
Test result must be explicitly stated in a Certificate of Conformance (CofC) provided with each shipment

H. Heat-Quench Test is required per ASTM-B571 Section 9
Test result must be explicitly stated in a Certificate of Conformance (CofC) provided with each shipment

45. SOLDERING STANDARDS

A. Solder connections must be in accordance with IPC/EIA J-STD-001 Class 1

B. Solder connections must be in accordance with IPC/EIA J-STD-001 Class 2

C. Solder connections must be in accordance with IPC/EIA J-STD-001 Class 3

46. SOLDER MATERIAL STANDARDS

A. Soldering material must comply with:

- Flux must be in accordance with IPC J-STD-004 with activity level L0 or L1. No-clean fluxes are prohibited unless specifically authorized by nLIGHT.
- Solder alloys must be in accordance with IPC J-STD-006. Fluxes contained in solder wire or preforms must comply with IPCJ-STD-004 and activity levels L0 and L1.
- Solder paste must be in accordance with IPC J-STD-005. Fluxes contained in the solder paste must comply with IPC J-STD-004 and activity levels L0 and L1.

B. Soldering material must comply with:

- Flux must be in accordance with IPC J-STD-004. No clean flux is allowed
- Solder alloys must be in accordance with IPC-J-STD-006. Fluxes contained in solder wire or preforms must comply with IPC J-STD-004
- Solder paste must be in accordance with IPC J-STD-005. Fluxes contained in the solder paste must comply with IPC J-STD-004

  Cleaning processes for assemblies using no-clean fluxes, must be pre-approved, in writing, by nLIGHT Engineering or Quality.

47. OPTICAL STANDARDS
    A. Fabrication of optical components must be in accordance with MIL-PRF-13830
    B. Fabrication of optical components must be in accordance with ISO 10110
    C. The item's optical elements coating durability must be in accordance with ISO 9211
    D. Optical products/lenses must contain no thorium or other source materials, as defined by AMCR 385-29, Title 10, Code of Federal Regulations, part 40 or any other radioactive materials
    E. Laser Threshold Damage Testing must be in accordance with ISO 11254

48. ELECTRICAL CABLE STANDARDS

    Components of cable assemblies (wire, connectors, heatshrink, etc.) must be certified by an appropriate Nationally Recognized Test Laboratory (NRTL) such as UL, CSA, ETL etc. Records of compliance must be available for inspection at nLIGHT's request.
    Cable assemblies must be manufactured in compliance with IPC/WHMA-A-620 Class 2.

49. COSMETIC STANDARD

    Product supplied to nLIGHT shall comply with nLIGHT standard QI-STD-0001.

50. CONTROL PLAN REQUIREMENTS

    The supplier must create a Control Plan for this part. The plan must detail the steps that are taken to ensure the accuracy and quality of the part, from incoming inspection to packaging for part shipment. The Control Plan must follow QS-9000 or similar format and include those parameters that are to be monitored and tracked for ensuring zero escaping defects and maximizing supplier yields. A template can be provided by nLIGHT upon request. The Control Plan must be submitted to nLIGHT Supplier Quality Engineering for review and approval.

51. CABLE ASSEMBLIES/FLEX CIRCUIT ADDITIONAL FAI REQUIREMENTS

    Cable Assemblies testing requirements to be presented as part of the First Article Inspection Report:
    - Connectors to be pulled tested (per connector manufacturer specification) prior to continuity testing
    - Flex test/twist to detect potential intermittent defects

- 100% continuity wiring check
- 100% hipot insulation resistance

52. EDGE QUALITY DEFINITIONS
    A. Remove Sharp Edges
    Edges defined by this level of finishing will be smoothed to the extent that the hands will not be cut, nor would electrical wires or mating parts.

    B. Remove all visible burrs
    No projections visible to the unaided eye are permitted beyond the normal plane of adjacent surfaces. This specification level also requires that edges shall not be sharp to the extent that they could cut hands, wiring cables, or mating parts.

    C. Remove all burrs visible at 4X magnification
    No projection visible at defined magnification are permitted beyond the normal plane of adjacent surfaces. This specification level also requires that edges shall not be sharp to the extent that they could cut hands, wiring cables, or mating parts. Tactile or other non-optical inspection approaches are not allowed in this level of deburring.

    D. Remove all burrs visible at 10X magnification
    No projection visible at defined magnification are permitted beyond the normal plane of adjacent surfaces. This specification level also requires that edges shall not be sharp to the extent that they could cut hands, wiring cables, or mating parts. Tactile or other non-optical inspection approaches are not allowed in this level of deburring.

    E. Break edges
    Edges shall be chamfered, blunted, or smoothed such as material falls above the chamfer of the indicated minimum dimensions. Small burrs may remain on edges of the chamfers, and some raised material may remain near edges. Any material left at edges shall not cause product dimensions to fall out of their drawing tolerances.

53. OPTICS CLEANING AND PACKAGING STANDARD

    Product supplied to nLIGHT shall comply with nLIGHT standard QI-PP-0003.

54. RESERVED FOR FUTURE USE
55. USED FOR NON-COMMERCIAL PRODUCT
56. USED FOR NON-COMMERCIAL PRODUCT
57. RESERVED FOR FUTURE USE
58. RESERVED FOR FUTURE USE
59. RESERVED FOR FUTURE USE
60. USED FOR NON-COMMERCIAL PRODUCT
61. RESERVED FOR FUTURE USE
62. RESERVED FOR FUTURE USE

63. RESERVED FOR FUTURE USE
64. RESERVED FOR FUTURE USE
65. ESD

    The Supplier must have an ESD Program in place that is compliant with ANSI/ESD S20.20

66. RESERVED FOR FUTURE USE
67. RESERVED FOR FUTURE USE
68. RESERVED FOR FUTURE USE
69. RESERVED FOR FUTURE USE
70. USED FOR NON-COMMERCIAL PRODUCT
71. RESERVED FOR FUTURE USE
72. RESERVED FOR FUTURE USE
73. RESERVED FOR FUTURE USE
74. RESERVED FOR FUTURE USE
75. USED FOR NON-COMMERCIAL PRODUCT

76. CONTROL OF SPECIAL PROCESSES – nLIGHT SPECIAL PROCESSES

    When Special Processes are identified on nLIGHT drawings and/or component specifications that are nLIGHT Special Processes, all Supplier and lower-tier supplier work performed to those required Special Processes, must be performed by nLIGHT approved sources. Names and contact details for nLIGHT Special Process suppliers will be provided by nLIGHT.

    Below is the list of nLIGHT Special Process Commodities. The Special Processes applied to this Purchase Order, must meet all requirements of all applicable drawings and component specifications.

nLIGHT SPECIAL PROCESSES
Printed Circuit Board Fabrication in accordance with IPC-A-600: Acceptability of Printed Boards (For printed, rigid, flexible and rigid flexible circuit boards)
Printed Circuit Board Assembly in accordance with IPC-A-610: Acceptability of Electronic Assemblies
Wire harness and cable assemblies in accordance with IPC/WHMA-A-620: Acceptability of Electronic Wire Harnesses and Cables
Gold Plating: nLIGHT approved suppliers must be used
Optical coating: nLIGHT approved suppliers must be used

77. PRINTED CIRCUIT BOARD ASSEMBLIES (PCBA)

PCBA suppliers shall ensure that their assembly processes are suitable for the components specified in the nLIGHT Bill of Material (BoM) and will not degrade the components' performance or reliability. Components not in the nLIGHT BoM (including equivalent parts from unapproved manufacturers) shall not be substituted without an nLIGHT approved waiver request. nLIGHT specifying the components/manufacturers in BoMs does not remove the PCBA supplier's responsibility of complying with all other QAPs called out in the PO, including, but not limited to QAPs 2, 3, 5, and 85.

78. RESERVED FOR FUTURE USE
79. RESERVED FOR FUTURE USE

80. RESERVED FOR FUTURE USE
81. RESERVED FOR FUTURE USE
82. RESERVED FOR FUTURE USE
83. RESERVED FOR FUTURE USE
84. RESERVED FOR FUTURE USE

85. COUNTERFEIT PART PREVENTION

    A. In the Certificate of Conformance, the Supplier must represent and warrant that only new and authentic materials are used in the products delivered to nLIGHT and that the parts/product delivered contains no Counterfeit Parts and that acquisition documentation is available that accurately authenticates traceability of the parts.
    "Counterfeit Parts" are defined as any part, component, module, or assembly whose origin, material, source of manufacture, performance, or characteristics are misrepresented. This term includes, but is not limited to, (A) parts that have been marked or r-marked to disguise them or falsely represent the identity of the manufacturer, (B) defective parts and/or surplus material scrapped by the original manufacturer, (C) parts previously shipped, reclaimed and provided as "new", and (D) parts that are represented as passing Original Component Manufacturer (OCM) testing, verifying, screening and quality control requirements, when that is not the case.
    Parts or material are considered "new" if they are unused and the Seller provides full warranty for part/material performance, including reliability.
    B. Counterfeit Part Prevention requirements for Commercial Off The Shelf (COTS) parts or nLIGHT unique items that include COTS parts:
    Where the nLIGHT drawing, Component Specification, or Purchase Order specifies Original Component Manufacturer (OCM) part numbers, only these parts are to be used. These must either be purchased directly from the OCM or from an OCM-certified Distributor. Proof of this Distributor certification is to be provided to nLIGHT on request.
    Where the nLIGHT Drawing, Component Specification, or Purchase Order does not specify Original Component Manufacturer (OCM) part numbers, the Supplier can use any source that meets the nLIGHT documented requirements. However, the Supplier must still purchase these parts directly from an OCM or from an OCM-certified Distributor. Proof of this Distributor certification is to be provided to nLIGHT on request.

Purchase of parts/components from Independent (i.e. non OCM-certified) Distributors is not authorized unless first approved in writing by nLIGHT. The Supplier must present complete and compelling support for its request and include in its request all actions to ensure the parts/components thus procured are legitimate parts. nLIGHT's approval of the Supplier's request(s) does not relieve the Supplier's responsibility to comply with all Drawing, Component Specification, and Purchase Order requirements.
The Supplier must maintain a documented system (policy, procedure, or other documented approach) that provides for prior notification and nLIGHT approval before parts/components are procured from sources other than OCMs or through OCM-certified Distributors chain.
The Supplier must flow these Counterfeit Part requirements to all subcontractors and suppliers at any tier for the fulfillment of this Purchase Order.

C. Counterfeit Part Prevention requirements for unique parts:
Where the nLIGHT Drawing is for a unique part (i.e. not a commercial off the shelf part), the Supplier must provide material certification for the material used in the construction of the component, in addition to any required Certificate of Conformance for the part/component. No other material, part, or component other than that which is new and authentic is to be used, unless approved in advance in writing by nLIGHT. If any part used in the construction of the unique part supplied to nLIGHT is a COTS item, QAP 85B applies to that part, irrespective of whether the Purchase Order calls out QAP 85B or not.
The Supplier must flow these Counterfeit Part requirements to all subcontractors and suppliers at any tier for the fulfillment of this Purchase Order.

D. Counterfeit Part Prevention for bulk materials:
The Supplier must represent and warrant that only new and authentic bulk materials are delivered to nLIGHT and that acquisition documentation is available upon request that accurately authenticates traceability of the constituent materials. For bulk materials, "new" means the bulk material comes from an original batch, has been tested, meets all specifications and has not left the supplier's custody until shipped to nLIGHT. Any suspect bulk material that does not meet all these requirements cannot be used and nLIGHT must be notified within 7 days of any suspect material that has already been shipped. Purchase of constituent materials from Independent (i.e. not an Original Manufacturer or Certified) Distributor is not authorized unless first approved in writing by nLIGHT. This provision must be flowed down thru the supply chain to all tiers. Each tier can only purchase materials from an Original Manufacturer or their Authorized Distributor unless approved by the purchaser of the next-higher tier.

E. The Distributor must provide acquisition documentation with each shipment that accurately authenticates traceability of the parts back to the Original Manufacturer, including Originial Manufacturer's Certificate of Conformance.

86. RESERVED FOR FUTURE USE
87. RESERVED FOR FUTURE USE
88. RESERVED FOR FUTURE USE
89. RESERVED FOR FUTURE USE
90. USED FOR NON-COMMERCIAL PRODUCT
91. RESERVED FOR FUTURE USE

92. RESERVED FOR FUTURE USE

93. RESERVED FOR FUTURE USE

94. RESERVED FOR FUTURE USE

95. RESERVED FOR FUTURE USE

96. RESERVED FOR FUTURE USE

97. RESERVED FOR FUTURE USE

98. RESERVED FOR FUTURE USE

99. RESERVED FOR FUTURE USE

100. INSPECTION/TEST

A. The Supplier must provide data with each shipment in accordance with the following requirements. The Supplier is required to notify and receive written authorization from nLIGHT, if deviations from the following criteria are desired, i.e. sampling, etc.
   - The Supplier must perform and record the results of mechanical and/or electrical test in accordance with the final acceptance criteria as specified in the applicable component specification/drawing, unless otherwise specified in the purchase order.
   - When final acceptance is not defined in the controlling documents, the Supplier must perform and record results of the mechanical and/or electrical tests that are considered part of the Supplier's process.
   - Variable data must be utilized for 100% of the end item acceptance parameters within a component specification or drawing. Attribute data must only be utilized to identify the condition. Use of critical control characteristics as part of an approved SPC Control Plan may be substituted for the 100% variable/attributes data
   - Recorded data must be traceable to 100% of the devices inspected/tested. Traceablility must be controlled through part serialization, tagging, or identification of individual unit packaging unless otherwise specified in the purchase order or specification/drawing
   - 100% of the lot must be inspected/tested unless otherwise stated in the Purchase Order or component specification/drawing. When sampling is authorized, it shall be in accordance with ANSI/ASQ Z1.4 or MIL-STD- 105, with specific lot size, AQL, and sample size identified on each data sheet

B. This product requires acceptance testing. The Supplier must prepare a detailed Acceptance Test Procedure (ATP), encompassing all tests and test equipment required for in-process and/or final acceptance in sufficient detail to allow duplication of the test and results. The ATP shall provide: Equipment type, range, accuracy level, and calibration requirements (methods and frequency). ATP(s) requires nLIGHT's approval prior to the delivery of the first product or as required by the Purchase Order, drawing or component specification. The Supplier must certify all equipment used for acceptance testing of deliverable products on this Purchase Order, with concurrence by nLIGHT, prior to acceptance testing. Subsequent changes to the ATP(s) are subject to nLIGHT's approval prior to incorporation and use on deliverable product. Software or firmware used in test equipment shall be controlled.

C. Actual measurement data or indication of pass/fail inspection/test results must accompany each shipment. The Supplier's format is acceptable but must reference the Purchase Order number, Supplier's name and/or independent laboratory's name, item part number, serial

number and/or lot date code(s), and the date of the inspection/test. An authorized Supplier's representative must validate all submitted reports, by either an inspection stamp or a signature.

D. The Supplier must obtain nLIGHT's approval of detailed plans and procedures for accomplishing all acceptance test required by the drawings and component specifications. Approval must be obtained prior to the Seller presenting hardware for acceptance. nLIGHT reserve the right to witness a demonstration of the procedures and equipment. The detailed plans and procedures will contain as a minimum:
    - A list of all instrumentation, non-standard instrumentation calibration procedures, points of measurement and accuracy of measuring system.
    - Test conditions.
    - Test sequence.
    - Test Methods including a detailed step-by-step procedure of each test using instruments listed above.
    - Supporting data for critical parameters or special equipment, such as: error analysis, schematic diagrams and panel layouts, which are not necessarily part of the procedure, but are required to adequately evaluate the procedure, shall be submitted as supplemental information.
    - Sample data sheets.
    - Quantity of test samples.
        - 100% testing
        - Lot acceptance
    - Definition of lot
    - Determination of lot sample size
    - nLIGHT's approval must be obtained prior to Supplier's implementation of subsequent changes to the acceptance test plan.
    - nLIGHT approval of the test plan does not relieve the Supplier of the obligation of meeting all requirements as listed in nLIGHT's Purchase Order, drawings and/or component specifications.

E. The Supplier must retain objective written evidence of hardware conformance to Purchase Order requirements for each shipment. Note: All evidence is subject to review and/or audit by nLIGHT at the Supplier's facility or at nLIGHT.
The following must be retained if it is generated during the build of the part(s):
    - Any special selection test records
    - Conditioning (burn-in) test records
    - Lot acceptance test records
    - Sampling test records or any other test records used to determine item conformance
    - Reports/certifications of chemical and/or physical analysis/test records that assure conformance to applicable specifications.

Note: Records/reports/certifications of chemical and physical analyses/tests are to be fully traceable to the drawings, component specification, the Purchase Order, item serial numbers and/or lot numbers, and any specific shipment identification.
If the Supplier is a distributor of the item(s) in this Purchase Order, the Supplier must require the same documentation from the original manufacturer of the item(s). Additionally, the Supplier must secure from that manufacturer a right for nLIGHT to acquire or inspect all

pertinent data in that manufacturer's possession showing the items compliance to specifications.

The Supplier may obtain attributes data or variables data at their discretion unless variables data is specifically requested by nLIGHT. The Supplier's format is acceptable. At a minimum, attributes data must include the parameter inspected, the tolerance, and a summary of the inspection test results. The variables data must include the parameter inspected, the tolerance, and the measurement obtained for each item inspected.

Data sheets/test reports must bear evidence of acceptance by Seller's signature (or stamp) and date signed.

F. Actual measurement data or test results (for those specific parameters identified as requiring data reporting in nLIGHT's drawing or component specification), must accompany each shipment. The Supplier's format is acceptable but must reference the Purchase Order number, Supplier's name and/or independent laboratory's name, item part number, serial number and/or lot date code(s), and the date of the inspection/test. An authorized Supplier's representative must validate all submitted reports, by either an inspection stamp or a signature.

G. Any witness pieces (including plating coupons or other representative materials) required by nLIGHT drawing, PO or Component Specification must be retained for a time period consistent with the requirement of QAP 110 called out by the Purchase Order, or 5 years if QAP 110 is not called out in the Purchase Order. Witness pieces must be made available to nLIGHT on request.

H. Data from witness pieces (including plating coupons or other representative materials) processed at the same time as nLIGHT product, must be provided with the shipped product.

I. RESERVED FOR FUTURE USE

J. RESERVED FOR FUTURE USE

K. A copy of the Supplier's inspection measurements must accompany each shipment. The data must consist of individual measurements, not summary statistics such as the mean nor qualitative attributes such as pass/fail. The Supplier's format is acceptable but must reference the Purchase Order number, Supplier's name, item part number, serial number and/or lot date code(s), the date of the inspection, lot size and sample size.

101. RESERVED FOR FUTURE USE

102. RESERVED FOR FUTURE USE

103. RESERVED FOR FUTURE USE

104. RESERVED FOR FUTURE USE

105. nLIGHT SUPPLIED EQUIPMENT

The Supplier is responsible for the appropriate control, storage, handling, calibration and usage of all inspection and production tooling or equipment furnished or owned by nLIGHT (or any of nLIGHT's Customers) for use in performance of purchase order requirements. The Supplier must not modify, revise or rework such tooling or equipment without the written authorization of nLIGHT.

106. nLIGHT SUPPLIED MATERIAL

When material is furnished by nLIGHT, the Supplier's procedures must include, as a minimum:
(a) Examination upon receipt to detect damage in transit
(b) Inspection for proper item/material type and quantity
(c) Periodic inspection and precautions to assure adequate storage conditions and to safeguard against damage from handling and deterioration during storage
(d) Identification and protection from improper use or disposition

107. RESERVED FOR FUTURE USE

108. RESERVED FOR FUTURE USE

109. RESERVED FOR FUTURE USE

110. DOCUMENT RETENTION PERIOD

A. All records related to the manufacturing, testing and inspection of items supplied to nLIGHT must be maintained for a minimum of 3 years and made available upon request from nLIGHT's Buyer.
B. All records related to the manufacturing, testing and inspection of items supplied to nLIGHT must be maintained for a minimum of 5 years and made available upon request from nLIGHT's Buyer.
C. All records related to the manufacturing, testing and inspection of items supplied to nLIGHT must be maintained for a minimum of 7 years and made available upon request from nLIGHT's Buyer.
D. All records related to the manufacturing, testing and inspection of items supplied to nLIGHT must be maintained for a minimum of 10 years and made available upon request from nLIGHT's Buyer.

CHANGE HISTORY					
REV	DATE	ECO #	QAPs CHANGED	QAPs ADDED	QAPs DELETED
01	11/12/13	5968	>----------INITIAL RELEASE----------<		
02	5/2/14	6446	2B: clarified CofC requirements and relaxed requirements for COTS parts 27A: added detail to clarify requirement 100G: clarification of 'witness samples'	16, 27D, 100H	
03	6/25/14	6585		4	
04	3/10/15	7332	Revise 2B to require statement of exemption number if only compliant by exemption	48	

CHANGE HISTORY					
REV	DATE	ECO #	QAPs CHANGED	QAPs ADDED	QAPs DELETED
05	5/4/16	20358	Add 85D for bulk chemicals	85D	
06	12/5/16	33723		100K	
07	11/9/17	35602	More hazardous substances added to 2B per European Directive 2015/863	5	
08	4/2/2018	36259	35 Added Serialization formats. 30 moved from defense doc, added part marking on inside of part. 49 Add cosmetic standard reference. Translation done by Kathy L	30, 49	
09	4/20/18	36342	Add 30E	30E	
10	5/11/18	36441	Add 50. Control Plan Requirements	50	
11	6/11/18	ECO-036660	Add QAP 27 E-J. Modify QAP N, 27 B,C to add Country of Origin. Reword QAP R. Revise 35D to allow alpha-numeric SN.	27 E- 27J	
12	11/12/18	ECO-037499	Add QAP 51 and 52	51, 52	
13	12/18/18	ECO-037678	Add QAP 53. Modify QAP 35D to add forbidden number & characters per OCR requirement	53	
14	1/22/19	ECO-037838	Modify QAP 30 to add F	30F	
15	6/25/19	ECO-038629	Revise wording for N，2B, 30D. Add 35H, 85E. Remove 27 E-J	35H, 85E	27E-J
16	10/09/19	ECO-039100	Add character “S” to QAP 35D as prohibited letter; Add QAP 35I for fiber serialization;	35I	
17	10/24/19	ECO-039236	Add QAP 44 Post-Plating Test Standards	44	

CHANGE HISTORY					
REV	DATE	ECO #	QAPs CHANGED	QAPs ADDED	QAPs DELETED
18	2/26/20	ECO-039834	Bring more clarity to QAP 44C regarding what/if heat test is needed.	44C	
19	3/6/20	ECO-039901	Add QAP 27E Environment-sensitive materials packaging requirement	27E	
20	8/13/20	ECO-040748	QAP H clarified that QAPs are included in the flow downs from nLIGHT's suppliers to their suppliers. QAP 5 simplified. QAP 6 added to allow the inclusion of QAPS such as 2, 3, 5, 85 etc. on COTS items. QAP 77 added to better define PCBA suppliers' management of nLIGHT-specified BoMs	6, 77	
21	8/30/20	ECO-040961	Use low outgassing and low particulate packaging materials for element optics to prevent contamination from these materials	Add 27F	
22	01/15/21	ECO-041809	Add a requirement to provide statement of post plating peeling test in the CofC	44C	
23	2/20/2021	Admin Rev	Revise the footer, remove links from QAPs N, 49, 53		
24	7/16/21	ECO-042637	Revise QAP 30D		
25	7/23/21	ECO-042658	Add QAP 7 for TSCA	7	

CHANGE HISTORY					
REV	DATE	ECO #	QAPs CHANGED	QAPs ADDED	QAPs DELETED
26	8/6/2021	Admin Rev	Typo "not" error fixed 30 D. Part Marking		
27	10/22/2021	ECO-043170	Add several methods and align the method with the Standards	44	
28	12/7/2021	ECO-043432	Update to 2B, 3 and 7 that a QAP certificate in the shipment Certificate of Conformance is not required.	2B, 3, 7	
29	08/04/2022	DMS	Update to QAP F to add nLIGHT driven drawing change. Update to QAP P to extend 12 month manufacturing time lapse to 24 month according to AS9102. Correct SHA translation error for the sentence related to the manufacturing time lapse	F, P	
30	08/19/22	DMS	QAP 11 reserved for ITAR QAP	11	
31	05/25/2023	DMS	QAP85E to add OEM CofC	85E	

一般质量保证条款

下面列出的一般质量保证条款是每个恩耐采购订单的重要组成部分，采购订单将列出引用的具体 QAP 条款编号。除了这些一般质量保证条款以外，还有其它的条款、规定、指示和限制性规定。

供应商应确保在执行订单前从恩耐采购员处获得最新版本的恩耐图纸和规格参数。供应商应确保使用最新版本的参照标准，除非在采购订单、图纸或规格参数中指定其它方式。

物料发货意味着完全符合订单要求、规格参数和标准。

A. 质量管理系统
供应商必须有已经建立且得到适当维护的符合业界公认标准的质量管理体系，如ISO9001或S9100. 供应商的质量管理系统必须可被恩耐审查。如果供应商的质量管理体系认证证书没有被更新或被吊销，必须立即通知恩耐。

B. 采购订单接收和核实
供应商必须在接收订单时核实恩耐发出的所有订单。任何价格、数量、规格参数、质量要求、包装或发货要求方面的矛盾之处必须在执行订单前跟恩耐采购沟通并解决。

C. 交货
恩耐期望100%准时交货。 如果在订单上约定的日期或该日期前7天到货被视为准时交货。所需的支持文件，如装箱单、合格证书（COC）、分析证书(COA)、材料安全数据表(MSDS)等必须随货或先期到达。

D. 符合性要求
恩耐希望收到的所有材料和部件无缺陷。期望产品符合采购订单的所有要求和参照的规格参数和标准，除非在发货前供应商有发出豁免申请且得到恩耐采购员的书面签字。（如果供应商没有豁免申请表，恩耐可以提供模版）。

E. 未授权修理
在制造过程中，供应商一定不要通过任何方法，包括但不限于焊接、钎焊、插接或粘合剂的使用等方法，修复损坏或发现是有缺陷的产品，除非利用豁免流程申请并经恩耐书面授权。

F. 变更通知
产品成功通过认证后，供应商必须保持严格的控制，确保在无恩耐的事先书面批准时，不做任何影响产品外观，装配或功能（包含可靠性）的变更。此外，没有恩耐的事先书面批准，供应商不能在通过认证的工厂以外的工厂生产恩耐的产品。所有变更实施后，供应商必须提供首样检查报告（见QAP P），如果由nLIGHT图纸版本更改引起的产品外观，装配或功能变化，供应商需要提供相关的首件检查报告。。
如果变更被认为是不可接受的，恩耐保留取消订单的权利。未能通知这种变更可能会导致被从恩耐合格供应商名单中去除。

G. 外购/外包制造工艺
任何制造工艺的外购或外包必须事先得到恩耐的书面许可。供应商根据恩耐需求提供分包商的相关认证资料。如果制造工艺外部采购得到恩耐的许可，供应商必须保持生产批次的可追溯和独立完整性（如：一个采购批不可以有部分的外部采购，部分非外部采购）。供应商有责任将 此 QAP 要求传达到外包商.

H. 二级供应商的管控
供应商的采购文件必须描述适当的方法，以确保供应商的采购项目符合恩耐的图纸，部件规范和采购订单的要求（包括其中列出的QAP）。
供应商必须要求它的二级供应商提供的产品符合恩耐公司采购订单的要求。 供应商必须在有需要时要求其所有的外包商和二级供应商提供改善措施和/或换货处理。
供应商对于按采购订单提供的产品所用及的原材料的化学和机械测试数据，供应商必须在其公司内进行存档保留。

I. 缺陷产品的交付：
如果供应商确定之前交付给恩耐的材料是有缺陷的， 必须在30个自然日内提供书面通知给恩耐采购员。

J. 之前退货品的不适当递交：
之前被恩耐拒收并被供应商返修或维修的产品，必须在发货文件里标示。有关恩耐的拒收记录必须被注释。未能识别之前的退货品可能导致材料被拒收和退回，因此所产生费用由供应商承担。

K. 失效分析：
非贸易产品使用

L. 适当的记录递交：
供应商须用适当的方法维护其制造工艺中的检验，测试，认证记录； 这些信息必须被存档并可在恩耐有要求时提供。 若供应商无法提供采购订单的品质保证条款里面要求的记录， 恩耐有权拒绝收货。

M. 校验体制：
供应商的测量和测试设备的校验体制必须符合ISO10012《测量管理体系——测量过程和测量设备的要求》的最新版本或等同标准。供应商的校验体制必须得到恩耐的认可且可在任何时间接受恩耐检查。供应商全责保证所有产品，低阶供应商，所用部品， 和/或在此之下提供的服务符合所有适当的校验要求。

N. 标识，保存，和包装：
所出货到恩耐的物品的包装必须能防止损坏和变坏， 除非另有说明， 货物必须运送到订购单要求的地址。包装必须符合良好的行业规范除非采购订单中另有说明。产品不可混装除非另有说明。 每个盒子或箱子必须被标识并必须至少包含以下信息：（1）恩耐料号，（2）PO号码， （3）订单行项目（4）数量， （5）制造商的批次号码（如有制造商料号需同时附上）（6）原产国

提供给nLIGHT的产品必须符合nLIGHT公司包装标准 QI-STD-0002.

O. 供应商改善措施要求：

恩耐会在改善措施被要求时发送供应商改善措施通知给供应商。根据不合格状况通知， 供应商必须采取立即的围堵措 施和完成根本原因分析，并在14个自然日内提交有预期完成日期的改善措施计划。 未能及时处理可能会导致此供应商从恩耐认可供应商清单中被移除。根据不合格状况的通知， 出货可能会暂停直到围堵措施被实施。

P. 首件

当首件被生产出来时，供应商必须实施，记录和报告检验和测试以验证符合所有的要求。 供应商的报告应至少包含： 1）订购单；料号；版本号；材料名称；样品序列号； 图纸和规范要求，包含公差； 2）检验的工具和方法； 3）实际量测和验收的检验/测试结果； 4）材料化学/物理分析证明； 5）实际验收的首件样品必须被标示为“首件检查样品”并且可追溯到报告的量测数据； 6）当功能测试被要求，测试设立的示意图，使用的设备， 测试设备公差，带有最近一次校验日期的测试设备校准证明。

首件检查报告首选依照AS9102（若有要求，恩耐可提供报告模板）。以下任何一种情况存在或发生时，供应商须提供首件检查报告：

a) 供应商之前从未提供此产品或服务。
b) 供应商生产间隔超过24个月。
c)产品的外观，装配或功能变更。
d) 材料，设计， 设备工具和/或工艺变更影响到原始的产品认证测试。
e) 影响或潜在影响制造工艺的工具，治具，模具或设备损坏和维修后
f) 供应商变更了其生产场所。
g) 供应商特有产品变更可能影响恩耐购买的产品或一个更上级的组装性能

仅仅针对变更影响的规格参数部分做认证测试是可接受的。认证必须事先得到恩耐的书面批准。进一步的认证要求定义在采购订单的品质保证条款里。

Q. 冲突：

文件等级： 订购单， 产品图纸，零件规格书， 然后是二级标准和其内包含的规格规范。当前述文件与QAP冲突时， 前述文件优先于此文件里的QAP要求。 QAP是前面提到的核心文件之外的品质要求。

R. 材料安全数据表

针对29 CFR 1910.1200和有毒化学物质档案（NIOSH出版）涉及的材料必须提供材料安全数据表。

特殊品质保证条款

特殊品质保证条款或许会被要求作为每个采购订单的一部分，详细如下。当这些条款在采购订单中通过编号被要求时，此要求将作为采购订单中其它条款、规定、指引和限制性规定的一部分供参考。

1. 禁用物料

A. 此采购订单中的材料或产品加工工艺不允许用到臭氧消耗化学品（ODC's）. 如果产品要求 用ODC's， 在执行任何这样的工艺之前必须通知恩耐采购。提供给恩耐的通知书必须包含可替代化学品或工艺无法代替ODC使用的原因。在用到ODC的产品加工前必须得到恩耐的书面批准。供应商必须将此要求传递给订单生产中涉及的二阶供应商或加工者。

B. 订购单里供应的物品必须不包含金属汞或汞化合物且无汞污染。 在制造，测试或检验过程中，供应的物品必须不能接触到汞或任何汞的化合物，也不能使用只有一次防护装置的容器盛放。注意： 一次防护装置容器是指没有防止意外发生时可以提供二次保护的密封或屏障的容器。如果不能达到此要求，联系恩耐采购。供应商必须将此要求传递给订单生产中涉及的二级供应商或加工者。

2. 有害物质管制（RoHS）

A. 非贸易产品使用

B. 此订购单要求遵从欧洲官方规定RoHS 2011/65/EU及修订指令2015/863。

有害物质有：

- 镉 (Cd) 0.01% 重量
- 铅 (Pb) 0.10% 重量
- 汞 (Hg) 0.10% 重量
- 六价铬 (Cr^{6+}) 0.10% 重量
- 多溴联苯 (PBB) 0.10% 重量
- 多溴联苯醚 (PBDE) 0.10% 重量
- 邻苯二甲酸二（2-乙基己基）酯(DEHP) 0.10%重量
- 邻苯二甲酸甲苯基丁酯（BBP）_ 0.10%重量
- 邻苯二甲酸二丁基酯（DBP） 0.10%重量
- 邻苯二甲酸二异丁酯（DIBP） 0.10%重量

这些有害物质的重量百分比不是通过完整的部件或装配的百分比衡量的，而是通过可从部件或装配上机械分离的单一材料来量测。

3. 矿产抵制

供应商有责任保证提供给恩耐的产品或装配中所用的以下物料不是来源自刚果民主共和国或邻近国家（安哥拉，布隆迪，中非共和国，刚果共和国，卢旺达，南苏丹，坦桑尼亚，乌干达和赞比亚）：

- 黄金
- 铌钽铁矿或其衍生物 (如钽),
- 锡矿石或其衍生物 (如锡), 或
- 钨锰铁矿或其衍生物 (如钨)

4. 安全方面的关键零件

该零件被nLIGHT公司认定为对于公司的产品的安全运作有着关键作用的部件。因而，如果该零件是现货零件，供应商必须保证零件是新的和真实的（参照QAP 85A条款）；如果零件是定制产品，供应商在对于产品或工艺过程有任何变化时必须获得nLIGHT公司的批准，这包含正常生产或返工过程。

5. 欧盟法规REACH《化学品的注册、评估、授权和限制》

此订购单要求遵从欧洲REACH指令1907/2006. 如该订单物品包含高度关注物质清单(SVHC-Substances of Very High Concern)中的任何材料，需要提供如下：

- 高度关注限制物质的名称
- 物品中SVHC的重量
- 物品的重量

如该订单物品不含有高度关注限制物质（SVHC），也需要告知恩耐。

6. 商用现货（COTS）零件

恩耐认识到，期望COTS部件制造商要满足每个客户的需求是不合理的，但是本采购单编号的QAP被视为行业可接收的要求，应遵守。

将本QAP包含在恩耐的采购单中，取消了遵守本文件中所有字母QAP的要求，但最好符合要求。

7. 美国有毒物质控制法

此订购单要求遵从美国美国有毒物质控制法，如该订单物品包含6(h)部分有关具有持久的生物累积性和毒性的化学品，需要报告nLIGHT. 相关化学品如下：

- 十溴二苯基醚 Decabromodiphenyl ether (DecaBDE)
- 異丙基化磷酸三苯酯 Phenol, isopropylated phosphate (3:1) (PIP (3:1))
- 2,4,6-三叔丁基苯酚 2,4,6-Tris(tert-butyl)phenol (2,4,6-TTBP)
- 六氯丁二烯 Hexachlorobutadiene (HCBD)
- 五氯苯硫酚 Pentachlorothiophenol (PCTP)

8. 预留后续使用
9. 预留后续使用

10. 合格验证

对此订购单，必须参照图纸和/或部件规格进行合格性测试。验证样品和相关测试数据应该与生产品区分标识和包装。

11. 非贸易产品使用
12. 预留后续使用
13. 预留后续使用
14. 预留后续使用

15. 非贸易产品使用

16. 精确复制

此订单采购的恩耐产品，其要求是精确复制于恩耐客户的要求。所以这些精确复制的要适用于此订单。除了QAP A的要求，所有变更无论是否直接影响到部件的结构，组装或功能，供应商必须知会恩耐。

17. 合格证书

A. 合格证书必须随每批出货提供，且对每一批包含的材料说明符合采购订单（包含所有的QAPs），图纸，零件规格书和参考标准中规定的所有要求， 特别包含以下：

- 制造商的名称和地址
- 恩耐的名称，地址和 PO 号码
- 料号，版本和描述
- 批次标示码 (若适用包含工厂码)
- 验收检查日期
- 出货数量
- 证明产品的一致性和可追溯性声明
- 证明材料真实性声明
- 适当的代表的签名或盖章和处理日期

供应商保存记录以证明产品符合合同要求且可在恩耐或恩耐客户代表要求时提供这些记录的副本。

当材料是由恩耐提供时，供应商必须提供一个签名的证书以证明供货的产品是由恩耐提供的材料制造的。证明应可识别出恩耐初始出货记录。

B. 此合同上提供的的材料须附有分析证明书， 须包含：

1. 原始供应商的名称和地址
2. 采购订单号码
3. 料号，版本和数量
4. 图纸和/或规格书号码和版本
5. 序列号 或 日期代码或批号（如适用）
6. QA 签名或盖章, 及日期
7. 遵从所有要求的声明

分析证明书必须包含来自供应材料的实际数据（物理和化学分析报告）。每个组分实际含量的测量必须列出，且与适用的规格书标示的每个组分要求做比较。供应商亦须存档保留分析证明书和物理或化学分析报告5年以上或参照QAP110的定义，若订单有注释。

18. 非贸易产品使用

19. 供应商必须在任何合理的时间为恩耐或恩耐的授权客户代表和监管当局提供对它们的设施的访问

20. 供应商及其低阶供应商须在他们的采购文件中包含此QAP的主旨。

21. 预留后续使用
22. 预留后续使用

23. 预留后续使用
24. 预留后续使用
25. 预留后续使用
26. 预留后续使用

27. 包装

A. 部件必须有合适的内包装，不可：肉眼清洁检查不合格

- 易产生，脱落，吸附或藏匿微粒物质
- 在运输过程中导致有残留物或微粒物质在产品上
- 产生明显强烈的气味
- 对恩耐产品造成ESD危害

B. 出货标签， 包装袋，或包装箱必须依照MIL-STD-130被永久的和易辨识地标示。 标示必 须包含以下信息：

a. 零件描述和恩耐料号
b. 采购订单号码和采购订单条目编号(若适用)， 如 A订单第X条
c. 发货数量
d. 序列号或序列号范围 (如适用) – 参照 QAP 37
e. 日期 (使用XX年XX周来确定供应商的制造时间，最好有开始制造时间)或唯一的批号 – 参照QAP 36
f. 制造商的名称
g. 如有要求，ESD标志
h. 原产国

g. ESD 标签，若有要求

C. 出货标签， 包装袋，或包装箱必须被永久的和易辨识地标示。标示必须包含以下信息：

a. 部件描述和恩耐料号
b. 采购订单号码和采购订单条目编号(若适用)， 如 A订单第X条
c. 出货数量
d. 序列号或序列号范围 (如适用) – 参照 QAP 37
e. 日期 (使用XX年XX周来确定供应商的制造时间，最好有开始制造时间) 或唯一的批号 – 参照QAP 36
f. 制造商的名称
g. ESD 标签，若有要求
h. 原产国

D. ESD敏感元件必须用ESD 防护袋或容器包装（遵从ANSI/ESD S541），并在显著位置黏贴 ESD 警告标签

E. 对于放置环境有要求的物品需提供适合nLIGHT工厂的运输和储存的内部包装。 内部包装方式须得到nLIGHT同意。 相关的储存和运输条件须在内部包装上标注。

F. F、 内包装和外包装应由低释气和低颗粒材料制成。低残留洁净室胶带和干燥剂包装可包含在内包装中；供应商必须提供分析证书，作为首件检验批准流程的一部分，证明内包装和外包装由低释气和低颗粒材料制成。也可接受原始制造商的认证。包装材料的变更应遵循nLIGHT QAP F（变更通知），并相应地通过nLIGHT批准，并提供分析证书，以证明符合低释气和低颗粒要求。

28. 预留后续使用
29. 预留后续使用

30. 产品标识
    A. 标识按照MIL-STD-130要求清晰的放在合适的部位并通过nLIGHT批准， 标识含有的管控号使用低放气或出气染色镀层材料，激光标识，蚀刻或其它物理方法。
    B. 标识按照MIL-STD-130在nLIGHT图纸或产品要求指定的地方清晰的标志出来，标识含有的管控号使用低放气或出气染色镀层材料，激光标识，蚀刻或其它物理方法。
    C. 标识在提供的产品上（如，产品号，管控号，日期号等）必须符合相关的永久标识要求。 对于染色镀层标识，检验是否其抗溶剂，使用MIL-STD 202, Method215， MIL-STD-750,Method 1022 或 MIL-STD-883 Method 2015.
    D. 产品部件里面需标识有供应商号码，具体的地方需nLIGHT提供或由nLIGHT批准。供应商号码可以向nLIGHT供应链部门获取。也可以使用供应商号码之外的数字，但需要通过nLIGHT的批准。基本上，用于外部产品部件的标识需要按照图纸上的明确规定或者比内部产品部件表面的标识从外观标准上更严格。供应商的标识可以标注在没有Class A外观要求的地方或者没有图纸明确是外表面的地方。
    E. 部件需标注部件号码和版本号，在双方同意的部位。
    F. 标识需符合UL969标准

32. 预留后续使用
33. 预留后续使用
34. 预留后续使用

35. 序列号管控
    A. 订购单中供应的每个产品，部件或组件必须用有区别的序列号做识别。 在相继批次生产的同一个产品、部件或组件的序列号不可以重复。供应商有责任将这些号码的产生，分配和追溯进行管理。
    B. 订购单中供应的每个产品，部件或组件必须用有区别的序列号做识别。 在相继批次生产的同一个产品、部件或组件的序列号不可以重复。恩耐提供每个订单要用到的序列号。
    C. 五个字母和数字组合的管控号，如： 1AB2C
    D. 六个字母数字组合的序列号。例如：VABC23，其中 V 是供应商和 Nlight 之间商定的供应商代码. 当序列号应用面积小于 5 平方毫米时，以下字母不能被使用：“I”，“L”，“Z”，“B”，“Q”，“O”，”W”，“G” 及 “S”。
    E. 管控号形式是VVYYWW1234567R00XXXX,其中 VV=供应商号， YY=年份号， WW=星期号，1234567=nLIGHT产品号， R00=nLIGHT产品的版本号， XXXX=管控号（代表该产品在其版本号下在某个星期出现的唯一的号码） 如果是组装产品带有多个具有管控号的部件，

其主要的标识 使用最高阶的组装产品号 。

F. 条形码使用

G. QR码使用

H. 订购单中供应的每个产品，部件或组件必须用有区别的序列号做识别。 在相继批次生产的及不同产品或部件或组件的序列号不可以重复。供应商有责任将这些序列号的产生，分配和追溯进行管理。

I. 管控号形式是YYVXXX, 其中YY=年份号，V是供应商和Nlight之间商定的供应商代码，XXX=管控号（唯一号码）

36. 批次号管控

此订购单下供应的产品必须标示供应商的制造批次号（ batch）或子批次号（lot）。批次号必须可追溯到供应商所有关键制造工序。所有伴随的文件，如包装清单或证书都必须包含批次号。 同一出货批次里面的不同批次号码必须被区分开并可被清晰地识别。

37. 日期代码

供应商必须能识别在每次出货递交的每个批次和子批次里面的每个日期代码的数量。此信息应该要提供在包装清单里。一批货物里面的每个批次或子批次应该被区分隔离。

38. 预留后续使用

39. 预留后续使用

40. 非贸易产品使用

41. 预留后续使用

42. 预留后续使用

43. 预留后续使用

44. 金属件镀膜后的测试标准

测试样品计划按照ASTM-B602 表4， 除非工艺随附样品得到批准。样品计划用于以下的测试项目：

A. 提供镀层厚度报告

B. 按照ASTM-B488 的9.5.2条提供温度试验。如果图纸有温度试验规定，按照图纸提供。试验结果在供货文件中提供

C. 按照ISO2819-1980或ASTM-B571的11条胶带粘贴试验。 将有粘性的一面粘在需测试的平坦的镀层面或者图纸指定的面，尖锐的边缘，口子，螺纹孔，镀膜挂口处无需测试。肉眼观察是否有镀层脱落剥离。试验的结果在供货文件中提供。

D. 将用于焊接的一面在目视检查中没有任何污染，机械缺陷（如，凹陷，突起，划痕等）或已暴露底料/下一层镀层的缺金。 如果要求有Die Shear实验，Die shear能承受力按照标准MIL-STD-883E方式2019.5

E. 将用于焊接的一面在目视检查中没有任何污染，机械缺陷（如，凹陷，突起，划痕等）或已暴露底料/下一层镀层的缺金。 如果要求有Wire Pull 实验， Pull Test 的要求按照标准MIL-STD-883E方式2011.7.

F. 按照ASTM-B571的13条进行划格试验，试验的结果在供货文件中提供

G. 按照ASTM-B571的3条进行弯曲试验，试验的结果在供货文件中提供

H. 按照ASTM-B571的9条进行淬火试验，试验的结果在供货文件中提供

45. 焊接标准
    A. 焊接必须参照IPC/EIA J-STD-001 Class 1
    B. 焊接必须参照IPC/EIA J-STD-001 Class 2
    C. 焊接必须参照IPC/EIA J-STD-001 Class 3

46. 焊接材料标准
    A. 焊接材料必须遵从：
        - 助焊剂符合IPC J-STD-004 活动等级L0或L1。 免清洗助焊剂是被禁止的，除非恩耐特别授权。
        - 焊料合金必须符合IPC J-STD-006. 包含在焊线内或预成品焊料内的助焊剂必须遵从IPCJ-STD-004，且活动等级是L0和L1。
        - 焊膏必须符合IPC J-STD-005。 包含在焊膏中的助焊剂必须遵从IPC J-STD-004，且活动等级是L0和L1。
    B. 焊接材料必须遵从：
        - 助焊剂必须符合IPC J-STD-004。 允许免清洗助焊剂
        - 焊料合金必须符合IPC J-STD-006。包含在焊线内或预成品内的助焊剂必须遵从IPCJ-STD-004
        - 焊膏必须符合IPC J-STD-005，包含在焊线内或预成品内的助焊剂必须遵从 IPCJ-STD-
        - 使用了免清洗助焊剂的组件的清洗程序必须预先得到恩耐工程或品质的书面同意。

47. 光学件标准
    A. 光学元件的制造必须符合MIL-PRF-13830
    B. 光学元件的制造 必须符合ISO 10110
    C. 产品的光学镀层持久性必须符合ISO 9211
    D. 光学产品/透镜必须不含钍或AMCR385-29， 标题10，联邦管理法规， 40部分定义的其它来源材料如或其它放射性材料
    E. 激光阈值损伤测试必须符合ISO11254

48. 电缆生产标准
    电缆组装部件（电线，连接器，热沉等）必须由合适的国家认可的测试中心/测试实验室(NRTL)通过，通过的实验记录必须保留以供恩耐公司审查。
    电缆组装生产必须遵守IPC/WHMA-A-620 Class 2标准。

49. 产品外观要求
    提供给nLIGHT的产品需符合nLIGHT的外观标准 QI-STD-0001.

50. 质量控制计划要求
    供应商必须为提供的产品创建一个质量控制计划。该计划必须详细说明为确保产品的准确性和质量而采取的步骤，从进货检验到部件装运包装。控制计划必须遵循QS-9000或类似的要求，并包括需要监控和跟踪的工艺参数，以确保零逃逸缺陷和最大化供应商优品产量。

nLIGHT可以根据要求提供控制计划模板。控制计划必须提交给nLIGHT供应商质量工程师审查和批准。

51. 电缆组件/ FLEX电路附加首件检验报告要求

电缆组件测试将作为首件检验报告的一部分提出：

- 在连续性测试之前，要对连接器进行拉伸测试（按连接器制造商规范）
- 弯曲测试/扭曲测试以检测潜在的间歇性缺陷
- 100%连续性接线检查
- 100%耐压和绝缘测试

52. 边缘质量定义

A.去除锋利的边缘

通过这种精加工水平定义的边缘将平滑到不会切割手的程度，也不会切割电线或它的配合部件。

B.**去除所有可**见的毛刺

在相邻表面的法线平面之外，不允许肉眼可见的毛刺及其投影。该规格等级也要求边缘不得尖锐到可以切割手，接线电缆或配合部件的程度。

C.**去除4倍放大率下可**见的所有毛刺

在相邻表面的法线平面之外，不允许在定义的放大率下可见的毛刺及其投影。该规格等级还要求边缘不得尖锐到可以切割手，接线电缆或其配合部件的程度。在此级别的去毛刺中不允许使用接触型或其他非光学检查方法。

D.**去除10倍放大倍率下可**见的所有毛刺

在相邻表面的法线平面之外，不允许在定义的放大率下可见的毛刺及其投影。该规格等级还要求边缘不得尖锐到可以切割手，接线电缆或1i配合部件的程度。在此级别的去毛刺中不允许使用接触型或其他非光学检查方法。

E.加工边缘

边缘应倒角，钝化或平滑，例如材料落在指定的最小尺寸的倒角上方。小**毛刺可能残留在倒角的**边缘上，并且一些凸起的材料可能保留在边缘附近。边缘留下的任何材料都不应导致产品尺寸超出其图纸公差。

53. 光学件清洁和包装要求

提供给nLIGHT的产品需符合nLIGHT的清洁和包装标准 QI-PP-0003.

54. 预留后续使用

55. 非贸易产品使用

56. 非贸易产品使用

57. 预留后续使用

58. 预留后续使用

59. 预留后续使用

60. 非贸易产品使用

61. 预留后续使用
62. 预留后续使用
63. 预留后续使用
64. 预留后续使用

65. ESD
供应商必须有一个符合ANSI/ESD S20.20的ESD程序

66. 预留后续使用
67. 预留后续使用
68. 预留后续使用
69. 预留后续使用

70. 非贸易产品使用

71. 预留后续使用
72. 预留后续使用
73. 预留后续使用
74. 预留后续使用
75. 非贸易产品使用

76. 特殊工艺管控-恩耐特殊工艺
恩耐图纸和/或零件规格书标示的特殊工艺即是恩耐特殊工艺，所有的供应商和低阶供应商执行这些要求的特殊工艺的作业，必须使用恩耐批准的供应商执行。恩耐特殊工艺供应商的名称和联络详细资料将由恩耐提供。

恩耐特殊工序
印刷电路板制造参照 IPC-A-600： 印刷电路板的可接受性（线路板，硬板，软板和刚柔线路板）
印刷电路板组装参照 IPC-A-610：电子器件装配的可接受性
铠装线和电缆组装参照 IPC/WHMA-A-620：电子铠装线和电缆的可接受性
镀金： 必须是恩耐认可的供应商
光学镀膜： 必须是恩耐认可的供应商

77. 印刷电路板组件（PCBA）
PCBA供应商应确保其装配工艺适用于材料清单（BOM）中规定的部件， 且不会降低部件的性能或可靠性。未经恩耐批准的豁免请求， 不得替换不在恩耐BOM中部件（包括未经批准制造商的等效部件）。恩耐在BOM中指定组件 / 制造商并不免除PCBA供应商遵守采购订单中要求的所有其它QAP的责任， 包括但不限于QAP2， 3， 5和85

78. 预留后续使用
79. 预留后续使用

80. 预留后续使用
81. 预留后续使用
82. 预留后续使用
83. 预留后续使用
84. 预留后续使用

85. 假冒零件预防

A. 在合格证书里，供应商必须标示并保证仅仅是新的且真实的材料用在了交货给恩耐的产品里，且交货的零件/产品没有包含假冒零件，准确的真实的零件可追溯的采购记录是可得到的。

“假冒零件”是指原产地，材料，制造商，性能或规格参数不符合的任何部件，零件，模组或组件。这一条款包含但不限于，（A）假冒或不实的标示零件制造商，（B）不良零件和/或被原制造商报废的多余材料，和（C）之前出过货的回收或翻新零件当做“新品”提供，和（D）被描述成通过原零件制造商（OCM）测试，验证，筛选和品质管控要求，而事实并非如此的零件。

如果零件或材料未被使用且卖方提供完整的零件/材料性能包含可靠性保证，则被当做“新品”。

B. 现货部件COTS零件或恩耐特有产品包含COTS零件的假冒零件预防要求：

当恩耐图纸，零件规格书，或订购单上指定原始零件制造商（OCM）料号时，只有这些料号的部件可以被使用。这些部件必须直接从OCM或OCM授权的代理商处采购。一经要求，代理商须提供代理证书给恩耐。

恩耐图纸，零件规格书或订购单没有指定原零件制造商料号，供应商可使用任何满足恩耐文件要求的来源。然而，供应商仍然必须直接从OCM或OCM授权的代理商处采购这些零件。一经要求，代理商须提供代理证书给恩耐。

从非OCM授权批发商处采购材料是不被允许的除非一开始就得到恩耐的书面同意。供应商必须提供完全的和有说服力的支持以确保购买到的部件/零件是合法的零件。恩耐对供应商要求的许可并不能减少供应商遵从所有图纸，零件规格书和订购单要求的责任。

供应商必须维护一个文件化的系统（方针，程序，或其他文件化的方式），在零件从非OCM或OCM授权供应链的来源采购前,通知和得到恩耐的许可。

供应商必须将这些假冒材料要求传递到所有履行此订购单的外包商和在任何阶层的供应商。

C. 特有零件的假冒零件预防要求

恩耐图纸指出的特有零件（非COTS零件），除了任何要求的零件合格证书，供应商必须针对用在此零件构造里的材料，提供材料证明书。任何使用的材料，部件，或零件必须是新的和真实的，除非事先得到恩耐的书面许可。如果任何用在提供给恩耐的特有产品构造的零件是COTS产品，无论订购单是否涉及QAP 85B， QAP 85B都适用于此零件。

供应商必须将这些假冒材料要求传递到所有履行此订购单的外包商和在任何阶层的供应商。

D. 散装材料的防伪件预防：

供应商必须声明并保证，只有新的和真实的材料交付给恩耐，采集的资料可根据要求准确地鉴别材料的可追溯性。对于散装材料，“新”是指原料来自于原批，已经过测试，符合所有的标准，也没有离开过供应商的保管直到运到恩耐。供应商不能使用任何不能满足所有要求的可疑的材料，已经发货的可疑材料，供应商必须在7天内通知恩耐。

没有得到恩耐的书面批准，组合件的采购不能来之于经销商（即不是原始制造商，也不是注册的分销商），这条规定必须通过供应链传递到所有的层次。每一层的采购只能从原厂或其授权的经销商购买原材料，除非购买者在下一个更高的层次上。

G. 代理商需提供的每批产品必须提供准确的真实的可追踪到原生产商的采购文件，包括提供原生产商的质量保证书。

86. 预留后续使用
87. 预留后续使用
88. 预留后续使用
89. 预留后续使用

90. 非贸易产品使用

91. 预留后续使用
92. 预留后续使用
93. 预留后续使用
94. 预留后续使用
95. 预留后续使用
96. 预留后续使用
97. 预留后续使用
98. 预留后续使用
99. 预留后续使用

100. 检验/测试

A. 供应商必须按照以下要求提供每次出货的资料。若想偏离以下标准如抽样等，供应商须通知和接受来自恩耐的书面授权。

- 供应商须按照适当的零件规格书/图纸定义的最终验收标准执行和记录机械和/或电性测试的结果，除非订购单另有所指。
- 当最终验收标准没有定义在控制文件中，供应商必须将其当做供应商制程的一部分执行和记录机械和/或电性测试结果。
- 零件规格书或图纸里面最终产品的所有参数接收标准必须是量测结果。判断性数据（如合格/不合格）仅被用作识别状态。关键参数的SPC管控计划可以替代100%产品量测。
- 记录的资料必须100%可追溯到检验/测试的设备。
- 可追溯性必须可通过零件序列化，标记，或单个包装的身份证明被管控，除非订购单或规格书/图纸另有所指
- 每次材料必须100%被检验/测试除非订购单或零件规格书/图纸另有所指。 当抽样被授权，则必须遵从ANSI/ASQZ1.4或MIL-STD-105，在每个data sheet里定义具体的批次数量，AQL和样本大小。

B. 此产品要求验收测试。供应商必须准备一个具体的验收测试程序（ATP），包含充分具体的用于过程和/或最终验收的所有的测试和必须的测试设备，且可使测试和结果被复制。

ATP应提供： 设备型号，范围，精确度，和校验要求（方法和频率）。ATP须在首个产品递交前得到恩耐的认可或按照订购单，图纸或零件规格书的要求。供应商必须验证所有用于此订购单可交付产品的验收测试的设备， 且须在验收测试之前得到恩耐的同

意。随后ATP的变更须在导入和用在可递交产品上以前提交恩耐批准。 用于测试设备的软件或硬件都应被管控。

C. 实际的量测数据和pass/fail检验/测试结果的标示必须伴随每次出货。 供应商的格式是可接受的但是必须包含订购单号码，供应商的名称和/或第三方实验室的名称，料号，序列号和/或批次日期代码，和检验/测试的日期。所有递交的报告 必须经过一个授权的供应商代表验证并盖检查章或签名。

D. 用于完成图纸和零件规格书要求的所有验收测试的具体计划和程序，供应商必须得到恩耐的认可。必须在卖方判定接受之前得到认可。恩耐保留验证程序和设备的演示的权利。具体的计划和程序将至少包含以下：

- 所有测量仪器，非标准测量仪器校验程序，测量点和测量系统精准度
- 测试条件
- 测试顺序
- 用以上列出的仪器的测试，其测试方法包含一个详细的逐步过程的程序
- 关键参数或特殊设备的支持资料， 如：误差分析，原理示意图和面板布局，其不是程序的必要组成，但是被要求能充分评估此程序，应作为增补信息提交
- 样品数据报告
- 样品数量.
  - 100% 测试
  - 批次接受
- 批次的定义
- 批次抽样数的确定
- 验收测试计划变更， 供应商须在执行前得到恩耐的批准
- 测试计划被恩耐批准并不能解除供应商满足恩耐订购单，图纸和/或零件规格书列出的所有要求的义务。

E. 针对 每批出货，供应商必须保留客观书面的有关硬件符合订购单要求的证据。注意：所有的证据可受恩耐在供应商端或恩耐端的检查和/或稽核。
以下必须被保留如果在生产产品期间有发生：

- 任何特殊的筛选测试记录
- 条件测试（老化）记录
- 批次验收测试记录
- 抽样测试记录或任何其他用来判定产品符合性的测试记录
- 确保符合相应规格要求的化学和/或物理分析/测试记录的报告/证书

注意：化学的和物理分析/测试的记录、报告或证书必须完全地可追溯到图纸，零件规格书，订购单，产品序列号和/或批号，和发货记录。
如果供应商是代理商， 供应商必须要求该产品的原制造厂商提供相同的记录。另外，供应商必须保证从制造商处获得恩耐直接从制造商处获得或检查所有制造商相应资料的权利，以证明产品符合规格书。
供应商可以按照他们的意愿获得属性数据或变量数据 ，除非变量数据特别 被恩耐要求。供应商的格式是可接受的。但至少，属性数据必须包含检验的参数，公差，和检验测试结果的概要。 变量数据必须包含检验的参数，公差和每个检验产品的测量数据。
数据表/测试报告必须有表示验收的证据，如签名（或盖章）和签核日期。

F. 实际量测数据和测试结果（对于那些恩耐图纸或零件规格书要求提供的数据的具体参

数），必须伴随每批出货提交。供应商的格式是可接受的但是必须包含订购单号码，供应商的名称和/或第三方实验室的名称，产品料号，序列号和/或批次日期代码，和检验/测试的日期。所有提交的报告必须经由授权的供应商代表验证并盖检验章或签名。

G. 任何恩耐图纸，订单或零件规格书要求的验证样品(包括镀膜小样品或其它验证样品)必须按照订购单提到的QAP110的要求保留，如果订购单没有提及QAP110的话则保留5年。一经要求，验证样品必须可提供给恩耐。

H. 验证样品（包括镀膜小样品或其它验证样品）必须随同nLIGHT产品一起进行生产，其测试数据将随nLIGHT产品一起交货。

I. 保留后续使用

J. 保留后续使用

K. 供应商实际量测数据必须伴随每次出货。数据必须是实测数据，而不是统计总结，如平均值，或通过/不通过；供应商的格式是可接受的但是必须包含订购单号码，，料号，序列号和/或批次日期代码，和检验/测试的日期，检验数量及样品数量。

101. 保留后续使用

102. 保留后续使用

103. 留后续使用

104. 保留后续使用

105. 恩耐提供的设备

供应商有责任适当地管控，存储，搬运，校验和使用所有的由恩耐（或任何恩耐的客户）提供或拥有的用于执行订购单要求的检验和生产工具或设备。未得到恩耐书面授权，供应商不可调整，修改或重新制作该工具或设备。

106. 恩耐提供的材料

当材料由恩耐提供，供应商的程序必须至少包含：

（a）收料检查以确认是否在运输途中被损坏

（b）检验产品/材料的型号和数量的正确性

（c）定期检验和预防以保证合适的储存条件和避免搬运过程造成损坏或储存期间变坏

（d）标示和保护措施防止不适当的使用或处置

107. 保留后续使用

108. 保留后续使用

109. 保留后续使用

110. 文件保存期限

A. 所有提交给恩耐的产品制造，测试和检验记录必须至少保存3年，并在恩耐采购要求时可提供。

B. 所有提交给恩耐的产品制造，测试和检验记录必须至少保存5年，并在恩耐采购要求时可提供。

C. 所有提交给恩耐的产品制造，测试和检验记录必须至少保存7年，并在恩耐采购要求时可提供。
D. 所有提交给恩耐的产品制造，测试和检验记录必须至少保存10年，并在恩耐采购要求时可提供。