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## **CHECKLIST FOR CAPACITORS MANUFACTURER AND LINE SURVEY**

**ESCC Basic Specification No. 2023000**

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**1 INTRODUCTION**

This checklist is intended for use during the initial survey of a Manufacturer's ability to produce high quality articles, his management organisation, production facilities, test facilities and technical know-how. When completed, this checklist should enable the party interested in procurement of the subject components to assess the ability of the Manufacturer concerned to successfully execute a contract for the supply of high reliability space hardware.

**2 SURVEY CHECKLIST****2.1 INTERVIEW ON ARRIVAL OF SURVEY TEAM**

- (a) Introductory Remarks by Team Leader (Explanation of purpose of survey, procedures to be followed, time limitations, etc.):-

--

- (b) Notes (Atmosphere during reception, willingness to co-operate, interest shown, comments on personnel, general remarks):-

--

**2.2 MANUFACTURER AND SURVEY TEAM INFORMATION**

- (a) Survey requested by:

--

Survey Team Leader:

--

Team Members:

--

- (b) Key personnel of Manufacturer interviewed:-

	Name	Function	Tlph. Ext
1			
2			
3			
4			
5			

- (c) Type of Company (Private company, limited company, etc.)

--

Affiliated with any other company? If so, which:

--

No. of employees:

- Total number:

- Production:

- Quality Assurance:

- Q.A. Inspection:

- Prod. Engineering:

- Design Engineering:

- Reliability Control:

- Other:

(d) Number of shifts:

(e) Plant area:

(f) General Production line:

1. Device types manufactured:

2. Will flow diagrams of steps to produce capacitors be available to Survey Team?

YES

☐

NO

☐

Are specifications, if any, referenced in the flow diagrams?

YES

☐

NO

☐

(g) Principal Government and industrial customers:

1.

2.

3.

4.

5.

- (h) The Manufacturer's Quality System is organised in accordance with:

Comments:

- (i) Manufacturer's Government Service Inspection:

DCAS Inspector, resident/non-resident

- (j) National Inspectorate:

- (k) Is the Manufacturer's capacitor production

(1) Continuous?

YES

☐

NO

☐

(2) Pilot production?

YES

☐

NO

☐

(3) Advanced R&D, limited?

YES

☐

NO

☐

- (l) The Manufacturer has adequate experience in the production of the following hi-rel parts:

## 2.3 MANAGEMENT ORGANISATION

- (a) What is general policy/attitude of the Management regarding quality/reliability programme?

- (b) Which level of Management participates actively in orientating policy towards space component production?

- (c) Which organisation, if any, reviews and monitors all work involved in space component production?

- (d) Is work related to space components (contracts) regarded as "normal business" or as belonging to the "unique order" category?

- (e) What is the general policy concerning proprietary rights?

- (f) Has the "Reliability" department the same authority from Management as the "Engineering" and "Production" departments? Does this mean direct responsibility for reliability of products in the line?

- (g) Has the Q.A. Manager direct authority for implementation of quality policy and actions related to the line?

- (h) Does a system exist for the regular supply of quality report summaries to Management?

Does this system lead to (corrective) actions being taken in respect of the production line?

- (i) Are key management staff notified of persistent out-of-control conditions?

- (j) What is length of service and experience of key management personnel (Q.A., Reliability, Production, Engineering Design)?

- (k) How would contract for space components be organised?

- (l) How can original requirements from Orderer (Space Agency or end-user) be assumed to be correctly translated into internal instructions?

- (m) How can information necessary to the Orderer (corrective actions, deviations, notification of inspections and/or problem areas) be assumed to be issued and channelled to the Orderer?



## 2.4 QUALITY ASSURANCE SYSTEM AND ORGANISATION

(a) To whom does Q.A Manager report?

	YES	NO
(b) Does the company reflect a positive attitude towards Quality Assurance? Comments:	<input type="checkbox"/>	<input type="checkbox"/>
(c) Has the Q.A. group sufficient authority in relation to its position within the company's organisation (see organigram)? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(d) Are areas of responsibility within the Q.A. group clearly defined? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(e) Are corrective actions to which Q.A. management is committed delegated to responsible staff or does Q.A. management have direct authority regarding the line? Which?	<input type="checkbox"/>	<input type="checkbox"/>
(f) Is there a periodic and comprehensive quality data reporting system which covers all operational phases? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(g) What is the relationship between Q.A. and Reliability?		
(h) Is a Q.A. manual or equivalent document supplied to all levels of appropriate supervisory personnel?	<input type="checkbox"/>	<input type="checkbox"/>
Is such document kept updated? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(i) Are written procedures available for identification and positive control of accepted/rejected materials? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(j) What is ratio Q.A. inspectors : personnel directly involved in production?		

- (k) Is inspection (acceptance sampling or sorting) performed by Q.A. personnel:

☐
☐

On receipt?

Sampling

☐

Sorting

☐

None

☐

During processing?

Sampling

☐

Sorting

☐

None

☐

During final testing?

Sampling

☐

Sorting

☐

None

☐

Comments

YES

NO

- (l) Are written procedures kept and used in areas for:

- Receiving inspection?

☐
☐

- In-process inspection?

☐
☐

- Fabrication processing?

☐
☐

- Final testing?

☐
☐

Comments

- (m) Does Q.A. maintain a system of written procedures for statistic controls (control chart, lot plot, etc.) in any of the following areas?

In-process inspection?

☐
☐

Fabrication processing?

☐
☐

Final inspection?

☐
☐

Comments

YES

NO

- (n) Is Q.A. responsible for determination of need for, and the conducting of, quality training?

☐
☐

Comments

- (o) Are training programmes provided for special process personnel?

☐
☐

Comments

(p) Do employees have to pass tests:

After training?

☐
☐

Periodically?

☐
☐

Comments

(q) Are production operators provided with visual aids and working instructions?

☐
☐

Comments

## 2.5

### CALIBRATION

	YES	NO
(a) Does Manufacturer maintain calibration facilities and standards?	<input type="checkbox"/>	<input type="checkbox"/>
Is this service purchased? If so, from whom?	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>		
(b) Do calibration personnel have written procedures for control and a time schedule for measurement frequency?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
<input type="text"/>		
(c) Is there an effective calibration record control system?	<input type="checkbox"/>	<input type="checkbox"/>
(d) Are calibration procedures adhered to and up-to-date?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
<input type="text"/>		
(e) Are decals used for equipment identification to show that units have been calibrated; when next calibration date is due and calibrator identification?	<input type="checkbox"/>	<input type="checkbox"/>
Are decals up-to-date?	<input type="checkbox"/>	<input type="checkbox"/>
(f) Are adjustments of calibrated equipment required to be sealed and tamper-proof?	<input type="checkbox"/>	<input type="checkbox"/>
(g) Who is in charge of initiating calibration steps?		
- User	<input type="checkbox"/>	<input type="checkbox"/>
- Calibration personnel	<input type="checkbox"/>	<input type="checkbox"/>
- Q.A.	<input type="checkbox"/>	<input type="checkbox"/>

	YES	NO
(h) Do calibration procedures provide for removal of any equipment not maintained or calibrated according to established schedules? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(i) Have calibrating personnel up-to-date certification records reflecting date, traceability to NBS and identification of calibrator?	<input type="checkbox"/>	<input type="checkbox"/>
(1) Mechanical Standard	<input type="checkbox"/>	<input type="checkbox"/>
(2) Electrical Standard	<input type="checkbox"/>	<input type="checkbox"/>
(j) Is modified and/or repaired equipment calibrated prior to release?	<input type="checkbox"/>	<input type="checkbox"/>

## 2.6 DRAWING AND CHANGE CONTROL

	YES	NO
(a) Has Manufacturer adequate written procedures for control of specification and contract changes? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(b) Does Manufacturer's system provide for documented change control guaranteeing availability of required drawing at relevant manufacturing or inspection step?	<input type="checkbox"/>	<input type="checkbox"/>
Do flow documents show current revisions? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(c) Are drawings furnished by ESTEC and contract changes adequately controlled? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(d) Does Q.A. review all drawings and changes therein prior to their becoming effective? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(e) Has Manufacturer established a procedure for notifying his Supplier of changes in drawings? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(f) are current specification revisions shown on prints of drawings?	<input type="checkbox"/>	<input type="checkbox"/>

## 2.7 RELIABILITY

	YES	NO
(a) Is structure of Reliability organisation clearly defined?	<input type="checkbox"/>	<input type="checkbox"/>
Has Reliability same authority in respect of the line as Production or Engineering management?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(b) Is there a direct feed-back of information between Reliability, Design Engineering and Q.A. groups to ensure timely notification of all relevant data?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(c) Does Reliability respond promptly and efficiently to unexpected and/or newly detected failure modes?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(d) Are line failures (types and causes) analysed and reported to those responsible for corrective actions?	<input type="checkbox"/>	<input type="checkbox"/>
(e) Are corrective actions resulting from failure analysis agreed with the Q.A. group involved or Reliability if parts or process changes must be made?		
Q.A. Group	<input type="checkbox"/>	<input type="checkbox"/>
Reliability	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(f) Has Reliability right to approve test specifications, data tabulation, parts or process changes?	<input type="checkbox"/>	<input type="checkbox"/>
(g) Is there a system for in-process failure analysis?	<input type="checkbox"/>	<input type="checkbox"/>
End-item failure?	<input type="checkbox"/>	<input type="checkbox"/>
Reporting?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(h) Are following items submitted to failure analysis as a matter of routine?		
Production line rejects	<input type="checkbox"/>	<input type="checkbox"/>
Lots with a high rejection rate	<input type="checkbox"/>	<input type="checkbox"/>

	YES	NO
Define:		
Items returned by Orderer	<input type="checkbox"/>	<input type="checkbox"/>
Items returned by Orderer with special request for failure analysis	<input type="checkbox"/>	<input type="checkbox"/>
(i) Has Manufacturer a failure analysis laboratory or an equivalent facility?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(j) Are failure analysis procedures:		
(1) Available?	<input type="checkbox"/>	<input type="checkbox"/>
(2) In use?	<input type="checkbox"/>	<input type="checkbox"/>
(3) Adequate?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(k) Is failure analysis equipment:		
(1) Available?	<input type="checkbox"/>	<input type="checkbox"/>
(2) In use?	<input type="checkbox"/>	<input type="checkbox"/>
(3) Adequate?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(l) Are there special personnel for failure analysis?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(m) Are failure analysis reports		
(1) Available?	<input type="checkbox"/>	<input type="checkbox"/>
(2) Adequate?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(n) Has Reliability a programme to ensure reliability of discrete device designs prior to release thereof?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(o) Has Reliability access to all pertinent development and production data of discrete devices for analysis purposes?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		

	YES	NO
<div></div>		
(p) Is reliability data available of discrete devices from the line(s) which the Manufacturer wishes to be approved? Comments	<input type="checkbox"/>	<input type="checkbox"/>
<div></div>		
(q) Has Manufacturer an evaluation laboratory for determination of product characteristics?	<input type="checkbox"/>	<input type="checkbox"/>
(r) If Manufacturer has an evaluation laboratory:		
Does it operate according to an established programme? or	<input type="checkbox"/>	<input type="checkbox"/>
According to special requests?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
<div></div>		
(s) Give examples of problems investigated by evaluation laboratory		
<div></div>		
(t) Are laboratory results available on request?	<input type="checkbox"/>	<input type="checkbox"/>
(u) Are data sheets based on these results?	<input type="checkbox"/>	<input type="checkbox"/>

## 2.8 CONTROL OF PROCUREMENT SOURCES

	YES	NO
(a) Has Manufacturer adequate written procedures for purchase control of materials, components and services? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(b) Has Manufacturer an effective vendor rating system? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(c) Does rating system provide for effectiveness of written corrective actions received from Suppliers? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(d) Do purchase documents require delivery of test reports if such reports are specified in the relevant ESA contract? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(e) Is there a means of channelling information when specification changes require modification of current purchase orders? Is "Receiving Inspection" notified of changes in purchase orders? Comments	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

## 2.9 CONTROL OF INCOMING MATERIALS (PERFORMED IN SITU)

	YES	NO
(a) Are Manufacturer's written standard inspection procedures adequate for control of incoming materials and services received? Do inspectors know how and when to apply these procedures? Comments	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
(b) Are materials received in a controlled area from which removal prior to inspection is impossible? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(c) Are materials properly handled and protected during the receiving process? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(d) Does Receiving Inspection use drawings and purchase orders? If so, do these documents show Quality Control review? Comments	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>



	YES	NO
(e) Are test reports from Suppliers being reviewed? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(f) Are accepted materials adequately identified? Do documents show evidence of acceptance? Comments	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
(g) Are rejected materials adequately identified and segregated? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(h) Which materials are subject to limited shelf life limitations? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(i) Are shelf life and cure date materials properly identified and controlled? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(j) Do records indicate traceability of units, lots and sublots to applicable documents (specification, revision letter - if any - and inspection record)? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(k) Are materials stored in a controlled area under the responsibility of an authorised Custodian? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(l) Are suitable inspections and tests, including physical and chemical tests, performed on raw materials? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(m) Are such tests performed: In-house?	<input type="checkbox"/>	<input type="checkbox"/>
At other locations?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(n) Are storage containers, racks, bins, etc. adequate for type of material stored? Comments	<input type="checkbox"/>	<input type="checkbox"/>

	YES	NO
(o) Is lot traceability maintained? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(p) Is "first in/first out" method applied?	<input type="checkbox"/>	<input type="checkbox"/>

## 2.10 IN-PROCESS INSPECTIONS AND TESTS

	YES	NO
(a) To whom does In-process Q.A. Inspection report? Comments		
(b) Are inspection and/or operation travellers used sequential to performance and control of all operations and processes? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(c) Do travellers refer to inspection procedures? Do inspectors know how and when to use them? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(d) Do travellers refer to controlled specifications? Do specifications show current revision status? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(e) Does Q.A. have written in-process procedures to control acceptance of products? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(f) Does the manufacturer test for early failures as part of in-process controls? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(g) Does the manufacturer maintain and document standard screening tests as part of their own in-process controls?	<input type="checkbox"/>	<input type="checkbox"/>
(h) Does the manufacturer review the in-process control tests results against the screening tests requirements defined in the relevant Generic Specification?	<input type="checkbox"/>	<input type="checkbox"/>
(i) Is type and quantity of available inspection equipment adequate for type of work being accomplished? Comments	<input type="checkbox"/>	<input type="checkbox"/>

	YES	NO
(j) Are documentation and instruments used by inspectors subject to calibration control?	<input type="checkbox"/>	<input type="checkbox"/>
Is calibration evident and up-to-date?	<input type="checkbox"/>	<input type="checkbox"/>
Comments	<div></div>	
(k) Is there a specific material review procedure?	<input type="checkbox"/>	<input type="checkbox"/>
Comments	<div></div>	
(l) Do in-process Q.A. inspectors summarise quality experience on the basis of specific process stages?	<input type="checkbox"/>	<input type="checkbox"/>
Do they issue quality reports on a regular basis?	<input type="checkbox"/>	<input type="checkbox"/>
Do reports result in assistance and/or action?	<input type="checkbox"/>	<input type="checkbox"/>
Comments	<div></div>	
(m) Are requests for corrective action issued in writing?	<input type="checkbox"/>	<input type="checkbox"/>
Are such requests answered?	<input type="checkbox"/>	<input type="checkbox"/>
Does corrective action ensue?	<input type="checkbox"/>	<input type="checkbox"/>
Comments	<div></div>	
(n) Does Q.A. maintain any statistic controls (X&R, etc.) in the in-process area?	<input type="checkbox"/>	<input type="checkbox"/>
Are these controls up-to-date and at individual process stations?	<input type="checkbox"/>	<input type="checkbox"/>
Comments	<div></div>	
(o) Is lot identification maintained throughout processing?	<input type="checkbox"/>	<input type="checkbox"/>
Comments	<div></div>	
(p) Are there documents describing in-process manufacturing procedures and controls?	<input type="checkbox"/>	<input type="checkbox"/>
Comments	<div></div>	
(q) Are there documents describing in-process inspections?	<input type="checkbox"/>	<input type="checkbox"/>
Do inspectors know how and when to use them?	<input type="checkbox"/>	<input type="checkbox"/>
Comments	<div></div>	
(r) Are there specific standards for handling, cleanliness and care of materials, parts and equipment?	<input type="checkbox"/>	<input type="checkbox"/>
Comments	<div></div>	

	YES	NO
(s) Are calibrations evidenced and up-to-date?	<input type="checkbox"/>	<input type="checkbox"/>
(t) Has Q.A. authority to stop production flow in case of out-of-control conditions?	<input type="checkbox"/>	<input type="checkbox"/>
Is a written material review procedure in use?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(u) Are records maintained of training and competence of operators for welding, soldering, radiography, radiflo and plating?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(v) Are certified operators identifiable by means of a card or badge on their clothing?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		

## 2.11 SURVEY OF MANUFACTURING LINE

This review shall be performed in 2 phases:-

1. Identification of the various steps listed in the flow chart to define the corresponding operations and collect all relevant information.
2. Actual line survey (indicate if inspection was performed).

If different technologies are applied, the inspection results shall be supplied on separate sheets.

### 2.11.1 Leads

- (a) Which lead material and plating is used?

- (b) Which body material and plating is used?

- (c) Lead/body type of junction.

- (d) How are parameters controlled?

- (e) How is quality controlled?

### 2.11.2 Capacitor Element

- (a) Which technology is used?

- (b) Description

- (c) Materials used

- (d) Which assembly method is used?

- (e) How is process controlled?

- (f) How is position of elements defined?

(g) How is quality of assembly controlled?

(h) Which criteria are applied to radiographic inspection?

(i) Additional items (if necessary).

### 2.11.3 Capacitor Enclosure

	YES	NO
(a) By which means is the device protected?		
- Lacquer	<input type="checkbox"/>	<input type="checkbox"/>
- Sealing in a hermetic enclosure	<input type="checkbox"/>	<input type="checkbox"/>
- Pressure moulding	<input type="checkbox"/>	<input type="checkbox"/>
- Coating	<input type="checkbox"/>	<input type="checkbox"/>
- Sleeving	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
<input type="text"/>		
(b) Is capacitor element heated before protection is applied?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
<input type="text"/>		
(c) How is protection applied?		
By hand	<input type="checkbox"/>	<input type="checkbox"/>
Automatically	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
<input type="text"/>		
(d) If several layers, how are they made?		
<input type="text"/>		
(e) List parameters of resin controlled during application		
<input type="text"/>		
(f) Are controls deemed to be adequate?	<input type="checkbox"/>	<input type="checkbox"/>
(g) Which curing and inspection procedures are applied to:		
- Intermediate coatings?		
<input type="text"/>		

- Final coatings?

(h) Which solvent is recommended for analysis of devices?

(i) Are records available to check actual curing conditions?

(j) How does Manufacturer control sealing dimensions during processing?

(k) How does Manufacturer control dimensions during inspection?

(l) Is such inspection scheduled? And which aspects are inspected?

(m) Who performs the inspection(s)?

(n) Are visual aids and criteria provided for inspection purposes?

(o) Are visual aids and criteria applied to the production line?

(p) Are visual aids and criteria adequate?

#### 2.11.4 Final Test Area and Screening Facility

	YES	NO
(a) Are they separate operations?	<input type="checkbox"/>	<input type="checkbox"/>
(b) Are final production tests (see ESCC specification) performed by personnel under Q.A. monitoring?	<input type="checkbox"/>	<input type="checkbox"/>
Or are they performed by Q.A. personnel?	<input type="checkbox"/>	<input type="checkbox"/>
Comments	<input type="text"/>	
(c) Does the final test have written inspection and test procedures for product classes on the line?	<input type="checkbox"/>	<input type="checkbox"/>

	YES	NO
Do inspectors know when and how to use them? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(d) Do inspectors use assigned stamps to indicate inspection status on materials and accompanying documents? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(e) Are requests for corrective action made in writing? Are such requests answered? Comments	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
(f) Are rejected devices identified and segregated in a controlled area? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(g) Are records of accepted and rejected material maintained? Are these records identifiable with such materials? Comments	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
(h) Are device failures analysed? Are device failure analyses summarised and reported by final Q.A.? Comments	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
(i) Is a summary inspection and test report sent regularly to quality management (lot acceptance, percentage of defects, types of failure)? Comments	<input type="checkbox"/>	<input type="checkbox"/>
(j) Is a testing laboratory or equivalent facility available for quality assurance purposes?	<input type="checkbox"/>	<input type="checkbox"/>



	YES	NO
Which of the following tests are performed in the laboratory or facility?		
(1) Electrical tests	<input type="checkbox"/>	<input type="checkbox"/>
(2) Mechanical tests	<input type="checkbox"/>	<input type="checkbox"/>
(3) Chemical tests	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(k) Are statistical controls of device parameter distribution maintained?	<input type="checkbox"/>	<input type="checkbox"/>
Are they reported to Q.A. or Reliability?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(l) Is an environmental test facility maintained in-house?	<input type="checkbox"/>	<input type="checkbox"/>
If not, state where:		
Are the following tests performed at this facility?		
(1) Temperature (high, low, cycle)	<input type="checkbox"/>	<input type="checkbox"/>
(2) Shock (mechanical, thermal)	<input type="checkbox"/>	<input type="checkbox"/>
(3) Acceleration	<input type="checkbox"/>	<input type="checkbox"/>
(4) Vibration (fixed, variable, random noise)	<input type="checkbox"/>	<input type="checkbox"/>
(5) Moisture resistance	<input type="checkbox"/>	<input type="checkbox"/>
(6) Altitude	<input type="checkbox"/>	<input type="checkbox"/>
(7) Radiographic	<input type="checkbox"/>	<input type="checkbox"/>
(8) Hermeticity tests		
(a) Fine leak, if applicable	<input type="checkbox"/>	<input type="checkbox"/>
(b) Gross leak or penetrant dye	<input type="checkbox"/>	<input type="checkbox"/>
(9) Lead fatigue	<input type="checkbox"/>	<input type="checkbox"/>
(10) Life tests - operating	<input type="checkbox"/>	<input type="checkbox"/>
Comments		

	YES	NO
(m) Is available equipment used:		
- For production?	<input type="checkbox"/>	<input type="checkbox"/>
- In R&D?	<input type="checkbox"/>	<input type="checkbox"/>
- For Quality Control on a sample basis?	<input type="checkbox"/>	<input type="checkbox"/>
- For screening?	<input type="checkbox"/>	<input type="checkbox"/>
(n) Are charts provided for the monitoring of environmental test equipment?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(o) Is test equipment adequate for fulfilment of specification requirements?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(p) Is final external visual inspection performed on 100% of the devices?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(q) Are devices stored in a limited access area?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(r) Are devices adequately identified to Customer requirements?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(s) Are there provisions for lot identification?	<input type="checkbox"/>	<input type="checkbox"/>
Comments		
(t) How many burn-in positions are available:		
- At room ambient temperature?		
- At specified ambient temperature?		
- At specified case temperature (cooled hot plate)?		

	YES	NO
(u) Does burn-in require soldering of leads? Comments	<input type="checkbox"/>	<input type="checkbox"/>
<div></div>		
(v) What precautions are taken to maintain solderability of leads after burn-in?		
<div></div>		
(w) How does Manufacturer ensure that failed devices are separated from processed lots of:		
- ESCC Level B		
<div></div>		
- ESCC Level C		
<div></div>		
(x) Has Manufacturer all test equipment necessary to perform all qualification tests:		
- In-house?	<input type="checkbox"/>	<input type="checkbox"/>
- In nearby facility?	<input type="checkbox"/>	<input type="checkbox"/>
Specify equipment and its location:		
<div></div>		
- In remote location	<input type="checkbox"/>	<input type="checkbox"/>
Specify equipment and its location:		
<div></div>		

## 2.12 PRESERVATION, PACKING AND SHIPPING

	YES	NO
(a) Are there adequate written procedures for control of shipping? Comments	<input type="checkbox"/>	<input type="checkbox"/>
<div></div>		
(b) Are materials designated for shipment properly identified, handled and protected? Comments	<input type="checkbox"/>	<input type="checkbox"/>
<div></div>		
(c) Do copies of Customer's purchase order and evidence of inspection acceptance accompany materials from end of final test up to the time of shipment? Comments	<input type="checkbox"/>	<input type="checkbox"/>
<div></div>		

	YES	NO
(d) Do Q.A. personnel perform audits of all outgoing lots? Comments	<input type="checkbox"/>	<input type="checkbox"/>
<div></div>		
(e) Do shipping documents reflect inspection status or evidence of inspection, identification and similar shipping requirements? Comments	<input type="checkbox"/>	<input type="checkbox"/>
<div></div>		
(f) Does Manufacturer verify conformity of devices and invoices with purchase order? Comments	<input type="checkbox"/>	<input type="checkbox"/>
<div></div>		
(g) Does Manufacturer implement special packaging methods for hi-rel devices?	<input type="checkbox"/>	<input type="checkbox"/>
If so, which of following methods is used?		
- Individual packages	<input type="checkbox"/>	<input type="checkbox"/>
- Mechanical protection	<input type="checkbox"/>	<input type="checkbox"/>
- Environmental protection	<input type="checkbox"/>	<input type="checkbox"/>
- Special warning labels	<input type="checkbox"/>	<input type="checkbox"/>
(h) Is shipping method designed to allow official inspection by Customs without actual removal of protective material? Comments	<input type="checkbox"/>	<input type="checkbox"/>
<div></div>		
(i) Do instructions prohibit the use of substandard packaging methods for shipment of hi-rel devices?	<input type="checkbox"/>	<input type="checkbox"/>

## 2.13 SUMMARY OF INSPECTION RESULTS

Indicate inspection results per manufacturing and testing area, whereby:

V = Adequate.

O =Insufficient or non-adequate.

- =Not checked or not applicable.

	1	2	3	4	5	6	7
Environmental conditions:							
Cleanliness							
Temperature control							
Humidity control							
Occupancy							
Procedures available:							
Travellers							
Calibration							
Segregation of rejects							
Inspection evidence							
Area No.							
1 =							
2 =							
3 =							
4 =							
5 =							
6 =							
7 =							

2.14 GENERAL OBSERVATIONS (NOT TO EXCEED 2 PAGES)

[Click here to enter text.](#)