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**Title**  
**Type Approval Requirements for Signalling Systems and Equipment**

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## About This Standard

This document defines requirements and procedures for the type approval of equipment and systems offered for use in signalling systems on the ARTC railway system.

Formal type approval is a prerequisite for ARTC acceptance and permission to use equipment and systems in ARTC's signalling systems. It is not the only requisite and type approval itself does not guarantee that the item will be used in any specific application.

Type approval is granted by ARTC General Manager ISP or nominated Signalling representative for type approvals.

Approval of construction methods, maintenance service levels, test plans, quality systems, operational processes and the like is covered by ARTC approval processes other than this type approval process which qualifies or prequalifies products for use in ARTC signalling systems.

# Document History

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# 1 General

## 1.1 Scope

This document defines requirements and procedures for the type approval of equipment and systems offered for use in signalling systems on the ARTC railway system.

Formal type approval is a prerequisite for ARTC acceptance and permission to use equipment and systems in ARTC's signalling systems. It is not the only requisite and type approval itself does not guarantee that the item will be used in any specific application.

Type approval is granted by ARTC General Manager or nominated Signalling representative for type approvals.

Approval of construction methods, maintenance service levels, test plans, quality systems, operational processes and the like is covered by ARTC approval processes other than this type approval process which qualifies or prequalifies products for use in ARTC signalling systems.

## 1.2 Requirement

Type approval of an item for a signalling system is required where

- malfunctioning of the equipment could reduce the required level of protection provided by the signalling system, or
- failure to function could result in significant levels of use of less inherently safe means of regulating train movements, or
- unreliable operation could be costly to ARTC's business, or
- inadequacy could reduce integrity or life span by reducing the required level of defence or tolerance, or increase the vulnerability of, protected elements of signalling items to degradation, damage, vandalism, interference, manipulation, collapse, overheating, flooding, corrosion, infestation and attack.

The type approval process is carried out to prove robust compliance of the item in meeting the specified performance requirements as well as the technical requirements. The greater the risk associated with non-compliance the greater the degree of proof required.

Type approval is the outcome of an assessment of the initial and ongoing safety, reliability and cost-effectiveness of an item over the whole of its life in its intended application, to ARTC's objectives. Should the assessment in relation to these factors change, type approval is liable to be withdrawn.

Items may range in complexity and safety requirements from, for example, cable troughing, to a terminal block, to a miniature relay, up to a telemetry and train describer system or a computer-based interlocking system.

Where an item comprises a number of component units, every such unit shall be submitted for type approval. Non-type-approved components may not be substituted for use subsequently, without first undergoing the same type approval process. Modifications to a type approved item will render void the type approval.

Type approval is required before the item is connected to the working signalling system.

The majority, but not all, of items used in signalling systems are required to have formal type approval.

Items do not require type approval if they

- do not affect the operation of the signalling system, or
- are separate structures for housing or mounting signalling equipment, except where these are integral to the required integrity or life span of signalling items, or
- are common, commercial products, certified to comply with a national or international standard (compliance with which can be ascertained by a normal user).

Final determination of whether any particular item requires type approval will be made by  
ARTC.

Whether items are deemed to require type approval or not, all signalling items provided to ARTC are required to meet specification requirements including stipulated quality assurance and acceptance testing requirements; procurement selection will also be based on comparative evaluation criteria e.g. technical merit, value for money, support.

The type approval process described herein is written with reference to systems, both vital and non-vital, as these have the most complex type approval requirements. Less complex items are subject to a reduced set of requirements, such as that shown in Appendix C.

### 1.3 Referenced Documents

This document refers to the following Australian Standards, International Standards and ARTC documents

AS4292	Railway Safety Management
IEC 61508	Functional safety: Safety-related systems
SCP 17	Computer Based Interlocking Requirements.

### 1.4 Definitions

This section of the document addresses the specific terms and definitions used within the document.

#### **ARTC**

The Australian Rail Track Corporation

#### **ARTC Representative**

The person or organisation nominated by ARTC and authorised to carry out the type approval process and grant type approvals.

#### **Supplier**



Person or organisation submitting the item to ARTC for type approval. This may be the manufacturer or their agent, or a contractor proposing to use the item in contract signalling works.

### **Item**

In the context of this document, 'item' is a generic term referring to any separately identifiable and functional quantity of equipment. An item may comprise a single unit, multiple interconnected units operating as one functional group, or a complex, geographically distributed functional system. It includes the associated standard electrical circuits and software for interlocking, control, indication and operation of the equipment.

### **Type Approval**

A formal statement regarding the fitness of a particular item, for use in a defined application under stated conditions.

### **Signalling Type Approval**

Formal statement that a particular item is acceptable for use, for a nominated purpose, in conjunction with ARTC's signalling system.

It does not override a particular specification or contract requirement.

### **Conditional Type Approval**

Formal statement that a particular item is acceptable for use for a nominated purpose in conjunction with ARTC's signalling system, subject to specific limitations or conditions.

### **Provisional Type Approval**

Formal statement that a particular item has been assessed as being acceptable for use for a nominated purpose, in conjunction with ARTC's signalling system, with final type approval being subject to the item having passed a nominated period of satisfactory service with ARTC.

### **Type Approval Process**

The process of examination and evaluation to determine the fitness of a particular item, for a given application, culminating in the issuing of a formal type approval.

### **Vital Signalling Equipment**

Equipment which is directly involved in providing the safety of the signalling system.

### **Non-vital Signalling Equipment**

Equipment involved with peripheral control and indication of vital signalling equipment, but not directly related to the safety of the signalling system.

### **Single Unit Item**

An item of equipment, performing a single simple function, supplied as a unit ready to operate in its intended function, and generally used as a component in a signalling installation. It generally involves a low degree of technical complexity.

## **System**

An arrangement of equipment, consisting of a number of discrete or separable components which operate together to carry out a complex function.

## **Signalling Systems/Signalling Equipment**

The terms “signalling systems” and “signalling equipment” refer to the “signalling and telecommunications” systems and related equipment covered by AS4292 Part 4, including train control systems and equipment at the human interfaces.

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## 2 The Type Approval Process 2.1 Ready For Use Items

This type approval process applies to any item of signalling related equipment offered for use, which is an existing, ready-for-use item, and not one being designed or developed especially for ARTC.

### 2.2 Submission For Type Approval

The Supplier wishing to obtain type approval for a new item submits a request in writing to ARTC GM ISP or nominated Signalling representative for type approvals.

ARTC, at its discretion, may accept or decline the submission or terminate the type approval process at any stage, with or without explanation.

The submission should provide all technical data necessary to fully evaluate the item for type approval. Where practical, one or more samples of each of the units included in the type approval request should also be forwarded for evaluation. The Supplier shall not provide misleading information or conceal information that is relevant to the determination for type approval. Typical technical information required is shown in Appendix B; detailed requirements for CBI systems are specified in SCP 17 “Computer Based Interlocking Requirements”.

Sufficient time should be allowed for the data to be analysed and the necessary testing to be carried out. The time will vary with the complexity and nature of the item involved.

The Supplier will be required to pay an agreed cost for the type approval process.

### 2.3 Evaluation

If the submission is accepted, ARTC GM ISP or nominated Signalling representative will arrange for the evaluation of the material provided, and for any tests necessary to measure the quality and performance of the item.

The evaluation may range in scope from a simple analysis of design and performance data, to the detailed technical and safety evaluation required for a computer-based interlocking system, and to trial installations.

The evaluation should establish compliance and acceptable performance in relation to:

- a) Established standards and or contract specifications
- b) Performance history
- c) Form and Fit
- d) Functionality
- e) Safety

- f) Reliability, Availability, Maintainability
- g) Supportability
- h) Life cycle costs and benefits
- i) Quality
- j) Risks
- k) Documentation
- l) Configuration Management
- m) Interface Risks

Typical analysis processes are shown in Appendix A.

## 2.4 Trial Installation

A trial installation is generally required, to evaluate the installation, operation, compatibility and reliability of the item in the ARTC's infrastructure. The trial site will be chosen to meet ARTC's requirements.

Depending on the nature of the item, the trial installation may be subjected to periods of 'normal' operation, with continuous monitoring and logging where considered appropriate, and to intermittent periods of planned testing of system performance under abnormal or failure conditions.

The trial installation requirement may be waived if there is an operational installation in Australia that is similar to the ARTC proposed application, available to be inspected by the ARTC GM ISP or nominated Signalling representative, and for which relevant data on operational history are available.

## 2.5 Evaluation Report and Records

An evaluation report is prepared, describing the significant points of the item, and the reasons for its rejection or acceptance, or any limitations considered necessary on its approval.

Documented records shall be retained of the submissions and all accompanying information and material, details of referenced information and referees, reviewers, issues, analysis, tests, risk assessments, and relative assessments against the evaluation criteria inputs in determining the type approval status.

## 2.6 Approval

If the item is considered to require a period of proving under ARTC's operating conditions, then a provisional type approval may be issued, nominating a period of satisfactory service required before final type approval is granted.

If the item is considered suitable for ARTC's purposes, a formal statement of type approval is issued. The statement of type approval shall be uniquely referenced and dated and shall be signed by the ARTC GM ISP or nominated Signalling representative.

This type approval statement nominates any limitations or conditions on the use of the item, and also the specific units and versions covered by the approval as well as the effective dates.

If the item is considered unsuitable for ARTC's purposes a formal statement of rejection is issued.

## 2.7 Registration Of Type Approval

When a new type approval is issued, it is allocated a unique Type Approval registration number.

A register of all signalling items holding current type approval will be maintained. This may include standard or specialised signalling materials which have 'de facto' type approval by virtue of their having been adopted as standard equipment for ARTC's signalling systems at some time in the past (Type Approval by Prior Use).

Formal type approval by another Owner organisation may be accepted by ARTC. This will depend on ARTC GM ISP or nominated Signalling representative being satisfied that the application and operating environment to which the type approval refers are relevant to ARTC's own railway and being satisfied that the type approval process in the other organisation meets ARTC's own requirements for expertise and rigour.

## 2.8 Revision Of Type Approval When An Item Changes

A type approval is specific to an item of a particular design, materials and manufacturer. Changes to any one of these will render the existing type approval void. (After consideration of a submission, if the item does not require the issue of a new type approval, a statement to this effect is issued.)

When the design of a type approved item is varied, or the Supplier intends to source the item from a different manufacturer, a brief submission should be made for variation of the type approval. The submission should detail the way/s in which the modified item varies from the type approved details.

Depending on the nature of the changes, a brief evaluation will be carried out, and a revised type approval registration number issued for the modified item.

## 2.9 Loss Of Type Approval

A type approval is valid for an indefinite period, unless otherwise stated at the time of approval, or unless the approval is withdrawn or lapses for any of the reasons stated below.

- The item is no longer manufactured.
- There is no further need for the item, due to changes in signalling design.
- The design or construction of the item, or of a significant part, has been altered.
- The Supplier has sourced the item from a different manufacturer.
- The performance of the item in use is unsatisfactory.

- The safety, reliability, availability, maintainability or cost-effectiveness requirements in relation to the item are changed by ARTC.
- The type approval evaluation, or the data on which it was based, is found to be deficient.

The supply of any unit part of a complex item as type-approved, which is in fact not so either by virtue of design changes or by not having been submitted for type approval, will be sufficient reason for ARTC GM ISP or nominated Signalling representative to suspend immediately the type approval for the entire item, until the omission is corrected.

## **2.10 Items Developed For Owner**

Items being specifically developed for ARTC are required to be developed under a regime of quality and safety assurance, to recognised applicable international standards, which will inherently include the procedures and documentation that is required to be demonstrated or produced to meet the type approval requirement. Formal acceptance of such an item is de-facto type approval for use in the specific application for which the item has been developed.

The final decision on whether subsequently to accept the item for general use by issuing formal type approval rests with ARTC.

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## 3 Appendix A: Outline Of A Typical Analysis Process For Type Approval

### 3.1 Form And Fit Analysis

A 'form and fit' analysis considers the compatibility of the item with the rest of the signalling system:

- is the item physically compatible with current ARTC installation, housing and mounting arrangements?
- is the item compatible with current ARTC power supply systems?
- can the item be maintained with existing tools and equipment and, where applicable, workshop facilities?
- does the item generate any outputs, intentional or incidental, which affect the safe and reliable operation of other parts of the signalling system?
- does the item offer significant benefits to ARTC, which outweigh the cost of introducing a novel format?

### 3.2 Function Analysis

A functional analysis considers:

- does the item do what ARTC needs, now and in the foreseeable future?
- can it interface to ARTC's existing hardware?
- do its inputs/outputs suit ARTC's methods of operating?
- will the item function in the environment where it will be installed?
- is the item provided with sufficient protection against vandalism, misuse or incorrect operation?

### 3.3 Life Cycle Analysis

A life cycle analysis considers the following aspects of the item offered.

**Reliability :** The item's reliability, availability, and failure modes are considered. For critical systems with potential for major impact on rail operations, reliability data, empirically and/or theoretically predicted may be required. Predicted reliability figures shall be derived using a recognised method of calculation.

**Spares :** The range of spares, variety of sources of spares, the lead time and cost of spares, the guaranteed time that spares will continue to be available at reasonable cost.

**Repairs :** The availability of repairs and replacement items

- Is the item suitable for in-house repair, by suitably trained and equipped in-house personnel?
- Are special equipment or test fixtures required for in-house repair, adjustment and test ? What is the source, availability and cost of such equipment?
- Which organisation is nominated to carry out the repair of units? What is the location of repairers, whether in NSW, interstate Australia, or overseas?
- What is the delivery time for spares, and the turn around time for repairs?
- Will repairs continue to be available for life of item?
- What are the availability and conditions of maintenance agreements?

**Technical Support:** The level of technical support available in Australia and overseas now and in the future.

**Maintainability :** The amount and convenience of preventive and corrective maintenance required.

- Preventative maintenance required.
- Fault finding facilities and self-diagnostics.
- Specialist test equipment requirements.
- Modularity, access and ease of module replacement.
- Adjustment and configuration.
- Training - range and quality.
- Documentation - range and quality.

**Expected Life :** A determination of the expected useful life of the item.

**Expansion and upgrade paths:** An evaluation is made of the potential for extending the useful life and functionality of the item. For software-based systems, this includes consideration of the licensing arrangements for the software, and the facilities provided for modification of the software, by ARTC or third parties, to accommodate future alterations to ARTC's signalling arrangements.

**Life Cost :** The expected cost of installing and supporting the item, for its expected lifetime including consideration of the following factors:

- initial cost of item, including spares and support equipment supplied with the item.
- unit cost of spares, over lifetime of the item.
- estimated MTBF of all modules



- cost, conditions and services included in any maintenance or support contract
- time and cost of preventative maintenance specified to achieve item lifetime.
- predicted usage and cost of consumable parts of the item and its support equipment

### 3.4 Quality Analysis

An analysis of the overall quality of the item considering the following aspects: **Manufacture**

- What sort of quality control system covers the production of the item?
- Does the manufacturer have an accredited quality control system?
- What sort of quality documentation is provided/available?
- What sort of production methods and testing are used?
- How consistent is the product quality?
- How good are construction methods, wiring harnesses, and assembly? **Materials**
- Housings/chassis.
- Circuit Boards.
- Components.
- Connectors.
- Coatings and finishes.
- Use of non-standard or specialised components.
- Conformance to relevant standards.

**Design :** Evaluation of the item for aspects of design, including

What is the layout and design? Is there ready access for connections, adjustment and module replacement? Is interconnecting cabling properly routed and supported? Does wiring and module placement minimise interference?

What are component operating stress levels? Are component ratings, system configuration and ventilation selected for optimum life?

How is the equipment housed? Does the housing provide adequate support and protection from physical damage and environmental factors.

Does the item conform to relevant Standards?

### 3.5 Safety Analysis

For safety systems, a safety analysis of the item is required, to confirm that the item's design and manufacture are suitable to provide the level of safety integrity required by ARTC, for the particular application.

The intent of this analysis is to determine the level of safety which the designer /manufacturer aimed to achieve in the item, the design features and design processes applied to achieve the aims, and the degree to which independent testing and evaluation have confirmed that the safety goals have been realised.

As a general guide, ARTC's requirements for safety systems follow the requirements defined in IEC 1508. Specific requirements for CBI systems are detailed in specification SCP 17 "Computer Based Interlocking Requirements".

ARTC will concentrate on establishing that the required processes, tests and evaluations have been carried out and documented, and that the results demonstrate that the item meets ARTC's requirements. Processes could include the use of Reliability Block Diagrams and/or Hazard and Operability studies.

The following aspects will be of critical interest in the safety analysis.

**System Requirements And Design Specifications** A detailed statement of the safety criteria and design goals against which the item was designed and implemented, and which formed the basis of proof-of-safety evaluation of the item.

These criteria shall be specified in measurable terms including, but not limited to, Mean Time Between Failure and Mean Time Between Wrongside Failure.

A typical safety goal forming part of such a statement might be :

"The safe state of an output shall be the Off state. An output that is incorrectly in the On state shall be detected and forced to the Off state within 0.2 seconds".

**Hardware** An analysis of the hardware which considers:

- How is safety provided?
- How is safety assured?
- How was safety verified and validated?
- How have subsequent changes been controlled?
- What procedures are in place for action and or notification by manufacturer, of safety related problems?
- Is the system designed to be fail-safe?

**Software** For a software-based item, an analysis of the software which considers:

- How is safety provided?
- How is safety assured?
- How was safety verified and validated?
- How have subsequent changes been controlled?
- What procedures are in place for action and or notification by manufacture, of safety relations problems?
- How is user-variable software isolated from fixed software?
- How is user-variable software generated and tested?

**Failure Analysis** Estimation of the impact of specific component and material failures, on system safety. Applicable techniques include:

- Failure Mode and Effects Analysis.
- Fault tree analysis
- Critically analysis

**Testing And Commissioning** Evaluation of any recommendations or requirements by Supplier, for testing and commissioning the item.

- Does the Supplier provide recommended Testing and Commissioning procedures?
- Are these suitable for ARTC?

### 3.6 Interface Risk Analysis

In support of form and fit analysis, an analysis of the item to identify and assess any safety and reliability risks that may arise from interfacing the new item with ARTC's existing infrastructure. The nature and scope of the risk analysis will be scaled to the complexity of the item, and its intended application.

The intent of this analysis is to determine any threats to safety, functionality, or reliability that may arise from use of the item. The threats include those to the item itself, and threats to the existing system from the new item. The analysis should identify any potential threats, estimate the extent of risk posed, and any mitigating factors that have been applied or which may be required. A most common source of risk with novel equipment is interfacing - seen mainly as lack of reliability due to differences which were not properly identified between this and previous applications of the same item in other railway environments.

Typical of the questions used in an interface risk analysis are

- does the item generate any outputs, intentional or incidental, which affect the safe and reliable operation of other parts of the signalling system?

- will the item's power supply loading characteristics adversely affect other equipment on the supply?
- can the item generate unacceptable levels of heat, vibration or noise, which may adversely affect other equipment, or persons working or living in the vicinity? Does the item pose any other environmental risk?
- is the operation of the item adversely affected by power supply interruptions, variations, dips or ripple that may not exist in previous application environment?
- is the item subject to interference sources, such as relay back - emf noise, which may not exist in previous application environments due to the use of different relay designs?
- do the item's interface specifications (supply voltage limits, output driver current limits etc) match the existing system specifications?
- do input and output interfaces operate with correct polarities to match the existing system?
- is the application and configuration of the item such that minor faults can cause major disruption to railway operations?
- can maintenance and repair be carried out without interrupting the functioning of the system?
- can faulty items or modules be repaired quickly and at reasonable cost, or does repair involve high costs and extended delays?
- does the equipment depend on critical, precise adjustments for its safe and reliable operation?
- can the operation of the system be easily disrupted by minor operator or maintainer errors?
- are the limits of tolerance compatible for operation with the interfacing systems operating throughout the whole range of their tolerance limits?

## **4 Appendix B: Typical Information Required To Support A Type Approval Request for a System or Sub-system.**

### **4.1 General**

To enable the proper evaluation of the item being offered for type approval, the Supplier shall provide all the information necessary for a complete understanding of the item and its performance in the intended application. This information should comprise the following, as applicable to the particular item being offered.

### **4.2 Technical Documentation**

Comprehensive documentation is required, to provide a detailed understanding of the design, operation, and maintenance of the item. All documents shall be clearly identified as to their exact nature and purpose.

All documents shall be written in clear plain English. Documents originally written for non-Australian users, albeit in the English language, shall at least be provided with detailed glossaries of the terminology and concepts used, to make them clearly understandable to readers with no detailed knowledge of overseas practice and terminology.

Where the operation or performance of the item offered is limited or affected by the conditions of the particular application, then the installation and maintenance documentation especially shall be written or customised to refer specifically to ARTC's installation and operating environment.

The Supplier is required to provide at least one set of documentation covering the items of information listed below.

- a) Details on the proposed configuration including hardware and software.
- b) System wiring diagrams.
- c) Circuit diagrams and specifications for all interfaces, inputs, outputs, power supplies, and communication lines as applicable.
- d) Technical details for each module with particular emphasis on those containing CPU's.
- e) Technical description of how the item functions.
- f) Details on how the item detects errors, failures and problems, and what the item's response is to these errors, failures and problems.
- g) Full details of all serial communications protocols including message format and content.
- h) Maintenance documentation, including a trouble shooting guide.
- i) Details on the facilities available for diagnostic testing and monitoring of the item.

- j) Details on each configurable item including how it is configured and what options are available.
- k) Details on who would be able to repair faulty modules and how design faults discovered during the life of the item could be corrected.
- l) For items suitable for in-house test and repair, copies of adjustment and test procedures, and circuit diagrams showing normal operating signal levels and waveforms.
- m) Facilities available for software data configuration.
- n) Details on how ARTC would be advised or could find out if new versions of the item were produced.
- o) Applications manuals, giving design and installation requirements for new installations.

### **4.3 Confidentiality Of Technical Information**

ARTC will recognise that some of this material is of a confidential nature, which might be used to commercial advantage by other parties. Confidential documents shall be identified as such by the Supplier. ARTC GM ISP or nominated Signalling representative for type approvals undertake to safeguard and restrict access to such documents on a strict need-to-know, non-disclosure basis.

Documents to be used as design, installation, maintenance or repair guides shall be presented in a form suitable for reproduction. ARTC shall be permitted to make such copies of these as are necessary for their use.

### **4.4 Details Of Current Installations**

Details are required of current installations of the item, including service history of significant installations, giving the quantity, location, application, and period in service. This information must include any differences between the proposed installation and previous installations.

If large scale or standard application then

- standard documents,
- major user application documents,
- applicable codes of practice,
- should be included in the information supplied.

### **4.5 Differences In Application And Interfaces**

Details are required to identify the differences between the interfaces currently in use by ARTC and those supported by the item.

## 4.6 Safety Analysis Documents

Details and reports for any safety analysis (include documentation on which any report is based) either carried out by the Supplier, or independent reports. There may be cases where the item is of a type for which the safety analysis documentation is too voluminous to present with the initial submission for type approval. In that case, sufficient documentation shall be presented initially to demonstrate the standard, typical content and extent of the body of documentation available, together with copies of reports from any independent safety evaluations. ARTC will subsequently nominate those specific documents which should be produced to support the final type approval.

## **5 Appendix C: Single Unit Item Type Approval Requirements**

The pre-requisites for the type approval of unit items of equipment performing a single simple function are as follows.

### **5.1 Equipment Identification.**

The request for type approval shall include a detailed description of the item involved, and of the specific application for which the item is offered.

Where the Supplier is not the manufacturer of the item, the Supplier shall provide details of the identity and location of the actual manufacturer.

### **5.2 Design Documentation.**

The Supplier shall submit drawings, circuit design, operating specifications, design calculations where applicable, to demonstrate the suitability of the item for the intended application.

### **5.3 User Documentation.**

The Supplier shall submit a copy of manuals or instructions for installation and adjustment, routine maintenance, and operation of the item.

### **5.4 Sample Unit/s For Evaluation And Test.**

The Supplier shall submit at least one sample unit or prototype, for inspection and test. More may be required where life testing of consumable items is involved. The prototypes / samples will be subject to:

- Physical examination: to establish the suitability of materials, construction, fixings.
- Functional tests : to examine the operating characteristics of the item, the range of conditions over which it will operate, and the effects of variations in operating parameters.
- Environmental tests : to examine the effects of variations in the operating environment, e.g.- temperature.
- Life tests : where possible, for consumables and items intended for finite life span, normal or accelerated life tests will be carried out to determine the reliability and/or durability of the item.



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## **5.5 Third-Party Approvals.**

If the item has been formally type approved by another owner organisation, the Supplier should submit documentary evidence of such approval, showing the type and configuration of the approved item.

## **5.6 Application History.**

If the item has been in service with another owner organisation, the Supplier should submit details of the service history of significant installations of the item, including the number, location, application, and date of placing into service.

## **5.7 Quality Assurance.**

Where the item is manufactured or supplied under an accredited Quality Assurance system, the Supplier should submit details of the suppliers / manufacturer's QA status, and copies of applicable equipment test certificates etc.