



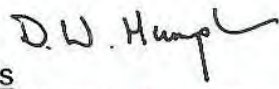
TSQA 5

**PROCEDURE FOR THE DESIGN AND MANUFACTURE OF
CRITICAL VENDOR PARTS**

Table deleted

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1. INTRODUCTION

This document defines procedures and requirements to be followed by Vendor Suppliers which hold design authority for parts which are identified as being *critical parts*.

2. PURPOSE

The purpose of this procedure is to ensure that an equivalent standard of safety is applied to critical parts for which the design authority (DA) is a vendor supplier, as would be applied in-house by Westland Transmissions Limited (WTL), and that those standards should meet Regulatory Requirements.

3. SCOPE

This procedure applies to Vendor Parts procured by Westland Transmissions Limited which have been identified as *critical parts* according to the definitions in this procedure.

4. RELATED DOCUMENTS

Def Stan 00-970	Design and Airworthiness Requirements for Service Aircraft
EN ISO 9001-2000	Quality Management Systems Requirements
IAQS9100:2000	Aerospace Quality Assurance in Design, Development, Production Installation and Servicing
JAR 1	Joint Aviation Requirements - Definitions and Abbreviations
JAR 29	Joint Aviation Requirements – large Rotorcraft
Mil Std-1629	Failure Modes Effects and Criticality Analysis
Q500-QRS01	AgustaWestland Group Quality Requirements For Suppliers
TQAP 408	Design traceability (WTL Design Manual)
TQRM 400-5-19	Re-substantiation of Critical Parts following Changes of Source or Production Method
TSQA-1SQA50	Raw Materials Procedure for WTL designed components

5. DEFINITIONS

5.1 Critical Parts

5.1.1 JAR 1 defines *critical parts* as:

Critical Part – where the failure analysis shows that a part must achieve and maintain a particularly high level of integrity if Hazardous Effects are not to occur at a rate in excess of extremely remote, then such a part shall be identified as a Critical Part.

5.1.2 Parts which meet the definitions of Grade of Part listed below, fall into the category of *critical parts* as defined by paragraph 5.1.1:

- a)
- Grade V (Vital) parts
 - Grade A (Airworthiness-critical parts)

The above grades relate to the WTL grading system. Certain contracts may invoke the Original Equipment Manufacturer (OEM) customer's grading system, in which case the relevant grading system and its definitions will be referenced in the Design Procurement Specification.

5.2 Definitions of Critical Grades of Parts

5.2.1 **Grade V (Vital)**

Vital parts are parts which meet the following criteria:

- Failure would cause a catastrophe, or
- The parts meet the criteria for Airworthiness-Critical parts, and:
- The parts are subject to fatigue loading or are non-redundant parts subject to significant static loading.

5.2.2 **Grade A (Airworthiness-Critical)**

A part shall be *Airworthiness-Critical (Grade A)* if the deformation or failure of the part would result in one or more of the following:

- Structural collapse
- Loss of control
- Failure of motive power
- Unintentional operation of, or inability to operate any systems or equipment essential to the safety or operational function of the aircraft
- Incapacitating injury to any occupant of the aircraft

NOTE: Grade A (Airworthiness-Critical parts) are always categorised as Cat F for traceability and are, therefore, always critical parts.

5.2.3 Clause deleted.

5.2.4 Clause Deleted

5.3 Catastrophe

For the purposes of the definitions in paragraph 5.2, a *catastrophe* shall be defined as:

- Loss of the aircraft, or
- A fatality

5.4 Extremely Remote

For the purposes of definitions given in paragraph 5.2, *extremely remote* shall be defined as:

A probability of occurrence of the order of once per 10⁹ flight hours.

5.5 Traceability – Categories of Parts – Definitions:

The following categories relate to the WTL system of classification. Certain contracts may invoke the OEM customer's own system in which case the relevant categorisation will be referenced in the Design Procurement Specification.

5.5.1 Fully Serialised (Cat F) Parts

Parts categorised as *fully serialised* (Cat F) shall have unique serial numbers applied and maintained from the start of the manufacturing process through to final inspection.

The serial number shall be traceable to:

- Source material heat lot, casting or forging. The full manufacturing process followed by the part, including traceability to batch cards and any split batch routing.

Parts for which Category 'F' traceability are mandatory are:

- Vital parts (or Grade A-Vital)
- Castings and forgings for Grades V, Grade A-Vital or Grade A, Category F parts.
- Airworthiness-critical parts.:

5.5.2 Utilisation Parts (Category U) (Ref)

Utilisation parts are components or assemblies which do not meet the criteria to require Category F traceability but which have a limited service life (through fatigue or wear) which requires a record to be kept to ensure timely replacement.

Utilisation parts are to be marked with a unique serial number, which may be applied at the end of the manufacturing process and which must be traceable to:

- Material lot
- Batch card at final inspection

Note: Category U is not applicable to Critical parts, but the definition is provided here for reference.

5.6 Resubstantiation Classes of Parts

The design or sources of supply of critical parts may not be changed without the appropriate resubstantiation being performed. The degree of resubstantiation required is indicated by a Class X or Class Y designation in the classification code. The determination of whether a part shall be designated resubstantiation class 'X' or 'Y' shall be in accordance with TQRM 400-5-19.

5.6.1 Full Resubstantiation Parts (Class X)

Parts designated resubstantiation Class 'X' require repetition of full scale component testing performed for qualification (including fatigue and static testing), if the source material, manufacturing method or manufacturer, or design are changed. (See TQRM 400-5-19).

5.6.2 Partial Resubstantiation (Class Y)

In accordance with TQRM 400-5-19, parts which do not meet the requirements of Class 'X' but which require a limited scope of resubstantiation shall be designated Class 'Y'. The limited resubstantiation requirements shall be defined on the Critical Parts Plan

5.7 Vendor Parts

A *Vendor Part* is a component or assembly produced by a supplier which holds Design Authority for the component or assembly. The supplier of such a part is known as a *Vendor Supplier*.

5.8 Buyer

The *Buyer* is defined as Westland Transmissions Limited.

5.9 Drawing Change Classifications

5.9.1 **Class I Changes**

Class I Changes are drawing changes which affect interfaces defined by the customer, or the performance of the part with respect to: safety, weight, strength, service life, interchangeability, operating instructions, overhaul, maintenance or installation.

5.9.2 **Class II Major Changes**

Class II Major changes are changes which do not meet the definition of Class I and which affect: Form fit or function, NDT, surface treatments, tolerances, raw material or moulding, or source of a critical part.

5.9.3 **Class II Minor Changes**

Class II Minor changes are drawing changes which are either a clerical correction or a clarification of a drawing requirement which does not materially change the design intent.

6. GENERAL QUALITY REQUIREMENTS

6.1 Documented Procedure

The Vendor Supplier shall have a documented procedure which satisfies the requirements of this document, for the control of the design, qualification, manufacture or procurement of Critical Parts.

6.2 Quality Records

The Quality Records to be retained by the Vendor Supplier, in association with critical vendor parts, are listed in Appendix 1. NOTE: The scope of these records is, in some cases, over and above the normal requirements to ~~ISO 9001:2000 or IAQS 9100-2000.~~
ASEN9100 or ISO9000:2000

The Vendor Supplier shall have a written procedure to ensure that personnel responsible for checking or authorising documents which affect or control the integrity of critical parts, hold qualifications and experience which are adequate and appropriate to the types of part.

6.4 General Aerospace Requirements

The requirements for Critical Parts defined in this document are to be considered as being supplementary to the General Aerospace Requirements called up by Q500-QRS01, Q500 Supplement D and to the requirements of the latest issue of ISO9001-ASEN9100 and ISO9001:2000 currently in force.

7. DETERMINATION OF THE GRADE OF CRITICALITY OF PARTS AND ASSEMBLIES

7.1 Responsibility for Grading Parts or Assemblies

The grades of criticality of vendor parts and assemblies are to be determined by one of the following methods:

7.1.1 **Grading by the Buyer**

The grade of a part or assembly may be defined to the Vendor Supplier, in the Design Procurement Specification, by the buyer who then takes responsibility for verifying the grade(s) by a Hazard Analysis and a Failure modes Effects and Criticality Analysis (FMECA), or:

7.1.2 **Grading by the Vendor Supplier**

The buyer may furnish the Vendor Supplier with a Functional Hazard Analysis, for the vendor parts/assemblies, in which the criticality of the outcome of all probable functional failure modes are defined as

- Catastrophic, or
- Hazardous, or
- Major, or
- Minor

The Vendor Supplier is then responsible for determining the criticality of their scope of supply of parts and assemblies as defined in paragraph 7.2.

7.2 Method to Determining Grades of Parts and Assemblies

7.2.1 **Grading of Parts**

7.2.1.1 The Vendor Supplier shall perform a parts FMECA to Mil Std 1629 for all components in the vendor part assembly. With reference to the functional Hazard Analysis provided by the buyer the potential failure modes for each component in the assembly are to be categorised as:

- Catastrophic, or
- Hazardous, or
- Major, or
- Minor

7.2.1.2 For all failure modes categorised as *Catastrophic*, per Mil Std 1629, the definition for Grade V (Vital) shall be applied. If the parts meet the definition of Vital Parts then they shall be graded as *Vital* or according to the OEM customers' grading system if defined in the Design Procurement Specification.

Parts not meeting the definitions of Vital Parts, but having a catastrophic failure outcome shall be graded as *Airworthiness-Critical* or in accordance with the OEM customer's grading system if defined in the Design Procurement Specification.

7.2.1.3 For all failure modes categorised as *Hazardous* the parts are to be reviewed against the definitions of *Airworthiness-Critical*. Those parts meeting these definitions are to be so graded or in accordance with the OEM customer's grading system if defined in the Design Procurement Specification, otherwise the parts may be allocated a grade as a non-critical part, according to contract.

7.2.1.4 Parts with failure outcomes defined as *major* or *minor* per Mil Std 1629, are to be graded as non-critical parts, according to contract.

7.2.1.5 The Grade and Category of parts shall be carried on to the next assembly if that assembly cannot be dismantled without destroying the part.

7.2.1.6 The grade of a finished detail part shall be flowed upstream to any casting or forging (but not to stock material such as sheet, bar etc) from which the detail is produced. If a moulding is applicable to more than one part number, it shall be graded according to the highest grade of part made from it.

7.2.1.7 Assemblies (which can be dismantled) do not necessarily carry the same level of grade, but are graded as assemblies in accordance with paragraph 7.2.2.

7.2.2 Grading of Assemblies

7.2.2.1 The Vendor Supplier is to perform a FMECA to Mil Std 1629 on the assemblies and sub-assemblies which form the deliverable vendor product.

The grade of the assembly or sub-assembly shall depend upon the consequences of:

- Mis-assembly during production or maintenance, or
- Inadvertent disassembly during service use, or
- The failure of a critical process used during assembly

7.2.2.2 Where the assembly failure mode has been assessed as *catastrophic* and that assembly is dependant on a single fastener or process, then the assembly shall be reviewed against the same definition as for vital parts. Assemblies, which meet those definitions, shall be graded as Grade V , Vital or in accordance with the OEM customer's grading system if defined in the Design Procurement Specification.

Assemblies not meeting the definitions of *Vital* but assessed as having a catastrophic failure mode involving single point failure fasteners or processes, shall be graded as *Airworthiness-Critical* or in accordance with the OEM customer's grading system if defined in the Design Procurement Specification.

7.2.2.3 Where an assembly failure mode has been assessed as *hazardous* and that assembly is dependant on a single point failure fastener or process then the assembly shall be reviewed against the definition of *Airworthiness-Critical* or in accordance with the OEM customer's grading system if defined in the Design procurement Specification. Those meeting those definitions shall be so graded; otherwise the assemblies may be allocated non-critical grades according to contract.

7.2.4 Where an assembly is graded as *Vital* the drawing shall identify the assembly operation as a vital point, calling up double independent inspection and/or appropriate process verification measures.

7.2.5 Where an assembly is graded as *Airworthiness-Critical* or *Grade A-Cat F*, the drawing shall identify the assembly operation as a *critical point* calling up double independent inspection and/or appropriate process verification measures.

7.2.6 Clause deleted

7.2.7 Where a critical assembly depends upon a single point failure fastener, then that fastener shall be graded as a critical part and shall meet the requirements for *Class A double locking* per Def Stan 00-970.

8. ENGINEERING DESIGN REQUIREMENTS FOR CRITICAL PARTS AND ASSEMBLIES

8.1 Drawing Requirements

8.1.1 Vital parts shall be drawn on separate drawings. All sheets of vital part drawings shall carry the statement; *VITAL PART* in letters 25mm high.

8.1.2 Drawings shall state the classification of the parts and assemblies using a 3-character code:

- a) The first character shall define the criticality of the part, 'V' for Vital, 'A' for Airworthiness-critical or Grade A.

- b) The second character defines the traceability requirements. All critical parts are to be categorised as Category 'F', full traceability is required.
- c) The third character defines the resubstantiation class which defines whether a part or assembly requires full or partial resubstantiation in the event of a design change or a change in supplier.

The resubstantiation class shall be determined in accordance with TQRM 400-5-19, to be either:

- 'X' – full resubstantiation required, or
- 'Y' – partial resubstantiation required

NOTE: Class 'Z' (no resubstantiation required) cannot be allocated to critical parts.

- 8.1.3 Drawings of assemblies which contain Critical parts shall carry a label in 25mm high characters stating: *This assembly contains Vital Parts* or *This assembly contains Grade A Category F Parts* as appropriate..
- 8.1.4 Drawings of critical castings shall call up:
- Qualification requirements including mechanical properties testing from test pieces excised from cut-ups of castings wherever possible
 - Sequential production cut up testing defining an appropriate periodicity to ensure that the casting process remains secure
 - Radiographic examination of 100% of production items and defining areas of the casting which are identified as being *highly stressed*. (*Highly stressed* is defined as areas where the stress levels exceed 60% of the allowable fatigue limit).
 - The casting technique sheet number
 - The name of the foundry qualified to produce the part
- 8.1.5 Drawings of critical forgings shall call up:
- Ultrasonic inspection of the billet prior to forging, to an appropriate grade
 - Qualification requirements including cut-ups to produce test pieces to assess:
 - Mechanical properties
 - Metallurgy
 - Grain flow
 - Sequential cut-ups of production parts to an appropriate defined periodicity.
 - The forging's technique number
 - The name of the Forgemaster company qualified to produce the part
- 8.1.6 As a minimum, drawings shall call out the following NDT requirements on detail parts:
- Magnetic Particle Inspection of ferrous parts
 - Dye penetrant inspection of non-ferrous parts
 - Nital etch inspection of corrodible steel parts
 - Hardness testing of all heat-treated materials with the results to be recorded on the job cards
- 8.1.7 Critical welded assemblies shall be subject to radiographic inspection of the welds.

8.1.8 Materials for critical parts shall meet the requirements of recognised aerospace specifications, or be controlled by proprietary company specifications. The material specifications and heat treatment condition shall be defined on the drawing.

(References: JAR29.613, JAR29.603
Def Stan 00-970 – Ch 200, Ch 401)

8.1.9 Critical part drawings shall carry, as a minimum, signatures for; Drawn by, checked by, and for approval for :

- Design, and
- Stress, and
- Materials
- Quality

by personal approved as holding appropriate qualifications and experience for these disciplines.

8.1.10 Where variation in a manufacturing process could produce a condition of a 'thin wall' which could affect the integrity of the part, the Vendor shall have a procedure to ensure the following:

- Features which are vulnerable to thin wall conditions shall be identified on the drawing with instructions that the feature be subject to a primary and reference inspection.
- Wherever possible, the primary and reference inspections should be based upon different methods, and where necessary, the inspections shall be controlled by Thin Wall Inspection Technique Sheets. Table 1 below gives typical examples of acceptable alternatives.

Table 1

Primary Inspection	Reference Inspection
Mechanical	Ultrasonic Thickness gauge
Mechanical	X-Ray
Mechanical	Coordinate Measuring machine (CMM)
CMM	Ultrasonic Thickness gauge
CMM	X-Ray
Ultrasonic Thickness gauge	X-Ray

8.2 Drawing Change Control

Over and above the normal requirements for drawing change control (See EN ISO 9001-2000 and IAQS-9100:2000), the following shall apply to critical parts drawing changes:

- a) Changes of material shall require a change of part number
- b) Change requests must be formally documented and authorised

- c) A change request to a drawing of a Grade A part or assembly must be approved by the required drawing signatories before work may proceed on the parts, to that change
- d) Change requests for vital parts or assemblies must be embodied in the drawing and the drawing signed and up-issued before work may proceed on parts to that change.
- e) Following a point in the programme to be agreed with the buyer, Class II Major design changes must be referred to Westland Transmissions Limited for approval before parts are manufactured to the revised configuration. Class I changes are to be referred to WTL at any time in the programme. Class II Minor changes do not require approval by WTL.

9. DESIGN VERIFICATION OF CRITICAL PARTS

9.1 Primary Stress Analysis

A primary stress analysis for static and fatigue loads shall be carried out by an appropriately qualified person using validated tools and techniques, and applying the safety factor and other factors required, and using materials data which is validated.

(References: JAR29.303, JAR29-305, JAR29.337, JAR29.547, JAR29.561, JAR29.619, JAR29.621 to JAR29.625
Def Stan 00-970 Ch 200, Ch 403, Lft 403/1)

9.2 Fatigue Evaluation

A fatigue evaluation shall be carried out, defining the fatigue philosophy as either:

- Safe life, or
- Fail safe, or
- Flaw tolerant

(References: JAR29-571
Def Stan 00-970, Ch 201, Lfts 201/1, 201/3, 201/5
Ch 403, Lft 403/1
Ch 705)

9.3 Check Stress

Static and fatigue analyses shall be checked by a competent person who did not take part in the original analyses.

10. VALIDATION OF CRITICAL PARTS

10.1 Component tests of critical parts are normally required to demonstrate static and fatigue load capabilities unless the part may be cleared by analysis by virtue of high reserve factors and evidence that the analytical methods used are reliable and well understood. The qualification strategy is to be agreed with the buyer.

11. ENGINEERING AIRWORTHINESS REQUIREMENTS OF CRITICAL PARTS

11.1 Critical Parts Plan

- 11.1.1 A critical parts plan, in accordance with JAR29-602, shall be compiled which shall include, for each critical part and assembly, a compliance matrix checklist against the clauses of this specification. Compliance against each applicable requirement shall be demonstrated by reference to the identification number and issue of the drawing or document in which that compliance was checked and verified.
- 11.1.2 The Vendor Supplier shall hold and maintain a listing of all Vital and Grade A critical parts. For convenience, this listing may be part of the critical parts plan.
- 11.1.3 The Vendor Supplier shall have documented the qualification requirements for each critical part and assembly. For convenience this may form part of the critical parts plan.

12. MANUFACTURING REQUIREMENTS FOR CRITICAL PARTS

12.1 Process Layouts

- 12.1.1 For each critical part, a process layout shall be prepared which defines a comprehensive, clear and unambiguous method of manufacture, including any special inspection techniques or assembly procedures, and including any lower tier supplier operations.

All process layouts (including sketches) shall carry the label *Vital Part* or *Grade A-Critical Part* as applicable. Process layouts shall identify the issue of the drawing and be issue-controlled themselves.

Process layouts shall be labelled *Frozen Layout* before the finalised copy is sent for approval.

- 12.1.2 The process layout is to be approved by the Vendor Supplier personnel authorised in the disciplines of:

- Manufacturing engineering
- Design
- Stress
- Materials
- Quality

- 12.1.3 Once approved by the Vendor Supplier a copy of the frozen layout is to be submitted to Westland Transmissions Limited Procurement for overview by Westland Transmissions Limited Engineering personnel. Westland Transmissions Limited shall raise a *Vital and Identifiable Part Approval Sheet* (Form GWAT/MFG/0155.2) and on satisfactory overview it shall be signed by authorised Westland Transmissions Limited signatories and a copy returned to the Vendor as confirmation that the overview has taken place and that a copy is duly held by WTL.

Note: The overview by WTL can only be a top-level check that the manufacturing process appears to be logical and correct. Responsibility for the correctness of the planning layout in detail rests with the Vendor.

- 12.1.4 Once the layout is approved it shall be strictly adhered to. Any changes shall require a raise of issue and re-approval by the Vendor Supplier and by Westland Transmissions Limited.

Manufacture may not commence until the layout is approved.

- 12.1.5 From the approved and frozen process layout, job cards are to be prepared for each batch of parts. The job card is to accompany the batch through all stages of manufacture.

- 12.1.6 The process layout shall state that the part is to be fully serialised and that serial numbers are to be carried through on parts from raw material to finished status-; for bearings refer to 12.1.15

The first operation on the process layout shall be to record the serial numbers from castings/forgings or existing parts, where applicable, on the job card.

The process layout shall ensure that serial numbers removed by machining operations are immediately reapplied to ensure traceability.

- 12.1.7 The Process Layout shall reference the material specification and initial condition. This also applies to parts made from castings or forgings.

- 12.1.8 The process layout shall specify an inspection check to ensure that:

- The raw material (including forgings and castings) is to the correct specification and initial condition
- Only one material batch is allocated per job card
- No alternative materials are permitted

- 12.1.9 The process layout shall (where applicable) specify inspection operations to check the release documentation of sub-tier suppliers.

- 12.1.10 For steel parts requiring hardening, tempering or precipitation processes, an inspection check of the materials manufacturer's release documentation shall be made to identify the heat treatment parameters used to release the material. They shall be recorded on the job card to control the subsequent heat treatment of the parts.

- 12.1.11 Where processes stipulate a maximum time period between removal from one process and the start of another operation, that requirement is to be detailed on the process layout with provision for the actual times of transfer and duration of operations. The planning layout shall include an inspection to ensure that requirements have been met.

- 12.1.12 The process layout shall specify requirements to protect from handling damage and corrosion.

- 12.1.13 Where applicable, the process layout shall specify thickness requirements of plating or coatings.

12.1.14 The process layout shall call up the appropriate tooling by a unique identity and NC Tapes shall be specified and issue controlled.

12.1.15 Bearings

12.1.15.1 Bearings shall be individually identified by a **unique serial number** marked on the bearing allocated by the manufacturer.

12.1.15.2 Identification and traceability

The traceability that has been maintained throughout the component part manufacture shall also be maintained throughout the assembly process.

Note:-the manufacturing history of any detail part shall be traceable through the **serial number** of the bearing assembly

12.2 Control of Special Processes

Special processes, where the integrity of the operation cannot be determined by inspection of the parts, shall be controlled by an identifiable, issue controlled treatment process sheet, which shall be approved by appropriately qualified personnel on behalf of the Vendor Supplier.

The treatment process sheets shall cover all parameters germane to the integrity of the process. These process sheets shall be called up by the process layout.

12.3 Non-Destructive Testing (NDT)

12.3.1 The following NDT methods shall be controlled by a technique sheet which is referenced on the process layout:

- Magnetic particle inspection
- Radiography
- Ultrasonic inspection where machined *pre-forms* are required to achieve coverage
- Eddy current inspection

NDT Technique sheets are to be approved by an appropriately qualified person on behalf of the Vendor Supplier, and the technique sheets are to be submitted for overview by a Westland Transmissions Limited Level III NDT specialist.

12.3.2 Critical parts machined from corrodible steel shall be subject to nital etch inspection.

12.3.3 For hardness/conductivity test operations the following shall be specified on the process layout:

- Location at which the component is to be hardness tested
- The range of acceptable values
- The actual values achieved for each serial number are to be recorded

12.3.4 All critical titanium or titanium alloy machined parts shall be etch inspected to WTPS1485-WHPS 485 or to an equivalent Vendor specification.

12.4 Design Changes

12.4.1 Requests for design changes shall be formally submitted to the relevant Westland Transmissions Limited buyer.

12.4.2 Design changes may not be introduced into the manufacturing process until:

- The change has been agreed by Westland Transmissions Limited
- The frozen process layout has been up-issued (or a new layout raised where a change of part number is required) and that layout is approved by the relevant Vendor Engineering staff and overviewed by Westland Transmissions Limited

12.5 Job Cards

12.5.1 The job card shall include all the requirements of the approved process layout and make reference to the approved layout issue.

12.5.2 Any subsequent change to the job card resulting from a raise in issue of the process layout shall be clearly recorded. Such changes may only be introduced if the complete requirement of the up-issued layout can be incorporated. This may necessitate splitting the batch to maintain manufacturing history.

12.5.3 The issue status of Treatment Process Sheets shall be declared on the job card.

12.6 Inspection

12.6.1 All critical parts are to be 100% inspected to drawing prior to delivery.

12.6.2 The requirements for inspections shall be detailed on the Process layout and the satisfactory inspection recorded on the job card.

12.7 First Article Inspection

12.7.1 First Article Inspections are to be carried out:

- On new part numbers
- On parts which have not been manufactured for 2 years

12.7.2 The First Article Inspection shall consist of:

- Full dimensional inspection against drawing requirements, with actual values recorded on the inspection checksheet.
- Inspection of compliance with all drawing notes.
- Process integrity checks to be performed in accordance with the Process Integrity Checklist (PIC) which will be raised by Westland Transmissions Limited Materials function, based on the drawing supplied by the Vendor.

NOTE: A completed FAIR with PIC data items is essential for first flight clearance.

12.8 Non-Conforming Product

12.8.1 All non conforming products are to be quarantined to await disposition.

12.8.2 Rework to critical parts shall only be carried out on a rework note, in conjunction with the job card, if that work involves only the completion of the existing operation, and if there is no requirement for additional NDT. In all other cases a separate process

layout shall be raised to cover rework operations. These additional operations shall be approved in the same manner as per process layouts. (See 12.1.2 and 12.1.3).

- 12.8.3 If a critical part cannot be reworked to meet fully the drawing requirements, then a concession may be applicable.
- 12.8.4 Scrap parts are to be mutilated beyond all possible use.
- 12.8.5 Production permits are not permitted on Vital Parts.

12.9 Presentation and Packaging of Bearings

Each package shall be adequately labelled and as a minimum shall include:-

Part Number

Serial Number

Manufacturing Batch Number

Final Inspection Stamp

Date of Packaging

Expiry date for installation

13. IN SERVICE SUPPORT OF CRITICAL PARTS AND ASSEMBLIES

13.1 Technical Publications

Technical publications for the in-service support of military and civil aircraft shall include identification of critical parts. The life limitations of parts are to be flowed down into maintenance and overhaul instructions.

If a Vendor Supplier is not responsible under the contract to supply component overhaul manuals, then the above information shall be supplied to Westland Transmissions Limited for incorporation into higher level component maintenance manuals.

13.2 Repair & Overhaul

- 13.2.1 Repair drawings of critical parts shall follow the same rules as per production drawings (see 8.1).
- 13.2.2 A repair is to be assessed as to whether it is *major* or *minor* per JAR 21. Unless the Vendor Supplier is the holder of Design Organisational Approval (DOA) and has been so authorised by Westland Transmissions Limited, that decision must normally be referred to Westland Transmissions Limited.
- 13.2.3 Major repairs require the approval of the Regulatory Authority and will involve some degree of resubstantiation. (See 8.1.2.c and 11.1.3).

Minor repairs may be approved by the Design Authority. Repair Instructions are to be raised by the Vendor and referred to Westland Transmissions Limited as for design changes. The Vendor Supplier is to maintain an auditable log of all minor repairs approved

- 13.2.4 Repair work is to be carried out to a process layout raised and approved per 12.1.2 and 12.1.3.

13.2.5 Major assemblies or components, which have been repaired, shall have a new serial number plate affixed alongside the existing one.

The new plate shall show the original markings with the original serial number prefixed by the reconditioning contractors symbol followed by the letter 'R'. The identity of the repair instruction shall be marked on the plate.

For smaller detail parts the information shall be marked in a manner and location defined by the repair instruction and approved by the process layout.

14. PROCUREMENT OF CRITICAL PARTS INCLUDING SUB CONTRACT OF OPERATIONS ON CRITICAL PARTS

14.1 Purchase orders for the manufacture of critical parts, or for the sub-contract of operations on critical parts may only be placed on suppliers which have been approved as Vital part or Grade A Cat F part suppliers (as appropriate) by the Vendor and by Westland Transmissions Limited.

14.2 If a supplier has not previously produced Vital or Grade A Cat F parts, the Vendor is to request that Westland Transmissions Limited Procurement raise ~~Form GWAT/QA/0219.1 (SQA 101)~~ QAS 101 form which will request an audit by Westland Transmissions Limited Quality. The application should include information regarding the scope of work being performed by the sub-contractor. Depending on the criticality of the work involved, Westland Transmissions Limited Quality Department may decide to perform a vital part audit themselves, or to notify the Vendor that they may control the sub-contractor Vital Part approval for that scope of work. A supplier which has only been approved for Grade A Category F parts in the past, will require up-grading of their approval by WTL before they produce Vital Parts.

14.3 Approval of a sub-contractor to produce Vital Parts or Grade A Category F parts will require:

- A satisfactory audit
- Substantiation or resubstantiation of the part
- Training and approval of personnel, dependant on the scope of work

14.4 The approved supplier is to be referenced on the drawing

14.5 Purchase orders for critical parts shall carry a warning that the order is for Vital or Grade A Cat F parts, and that the relevant sections of this document apply. The relevant requirements of this document shall be flowed down to sub-tier suppliers.

14.6 Material bar stock for use on critical parts is to be controlled in accordance with ~~TSQA-1SQA50~~, or in accordance with a Vendor procedure to be agreed with the Buyer.

QUALITY RECORDS REQUIRED OF CRITICAL PARTS

The following Quality records are to be held in connection with Critical Parts, which may in some cases, be over and above the Vendor's normal requirements for aerospace work. Data items are to be retained for the service life of the parts.

Data Item

- FMECA/Hazard Analysis
- Drawings and design data
- Drawing change instructions and records
- Stress analysis and check stress reports
- Fatigue evaluation reports
- Test reports
- Critical Parts Plan
- Process layouts
- Job cards and inspection records including CMM reports
- Serial number data
- Manufacturing batch records
- NDT and process Technique sheets
- Concessions
- C of Cs for sub-tier operations
- FAIRs and PIC data
- Repair instructions and drawings and job cards
- Minor repair log
- Thin wall technique sheets