

## RA 5602 – Propulsion Systems Part Lifting, Critical and Common Pool Parts

### Rationale

*Propulsion Systems are complex, have multiple failure modes and contain a number of critical parts whose failure could have a significant impact to the Air Safety of the Air System in which it is installed. In order to assure the Integrity of critical parts within a Propulsion System, the production, identification, and usage of such parts will be controlled and managed. Additionally, the control and management of common pool parts, conduct of Quality Verification Tests (QVT) and utilization of acceptance and test criteria ensure the Airworthiness of the Air System.*

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### Regulation 5602(1)

#### Classification of Critical Parts

5602(1) The Propulsion System Design Organization (DO) **shall** identify the critical parts contained within the Propulsion System.

### Acceptable Means of Compliance 5602(1)

#### Classification of Critical Parts

1. As part of the Type Certification process, Propulsion System DOs **should** conduct Safety analyses in order to identify critical parts whose failure has the potential to cause hazardous Propulsion System effects, or where failure would have unacceptable consequences.
2. Critical parts **should** be clearly detailed in the Configuration Status Record (CSR)<sup>1</sup> and **should** be appropriately identified<sup>2</sup>.
3. Where life marking is deemed necessary to record critical part usage, the marking system, location and means of marking **should** be detailed in the Air System Document Set (ADS) and authorized by the Type Airworthiness Authority (TAA)<sup>3</sup>.

### Guidance Material 5602(1)

#### Classification of Critical Parts

4. Whilst civil Certification Specifications may be used as guidance, military design features may introduce hazardous Propulsion System effects not captured by civil requirements.
5. Life marking of the specified critical parts provides a record of usage, whereby the usage is marked onto the part. The process will be closely controlled to ensure that the markings do not compromise the Integrity of the part.

### Regulation 5602(2)

#### Determination of Critical Part Life

5602(2) The Propulsion System DO **shall** determine critical part lives and exchange rates using a recognized process and **shall** present the lives to the TAA.

<sup>1</sup> Refer to RA 5301 – Air System Configuration Management.

<sup>2</sup> Refer to RA 5885 – Identification of Products, Parts and Appliances (MRP Part 21 Subpart Q).

<sup>3</sup> Refer to RA 1162 – Air Safety Governance Arrangements for Civilian Operated (Development) and (In-Service) Air Systems. Dependant on the agreed split of Type Airworthiness responsibilities, Type Airworthiness Manager may be read in place of TAA as appropriate throughout this RA.

**Acceptable  
Means of  
Compliance  
5602(2)**

**Determination of Critical Part Life**

6. Propulsion System critical part approved lives **should** be formulated using processes consistent with the Type Certification Basis<sup>4</sup>.
7. The rationale for the lifing of non-critical parts **should** be recorded by the Propulsion System DO and provided to the TAA.

**Guidance  
Material  
5602(2)**

**Determination of Critical Part Life**

8. In the early stages of a project, part life may be released proportionately in-line with greater operating experience and sample testing. The proportional release of life is not considered a life extension<sup>5</sup>.
9. The Propulsion System DO may also propose lives for non-critical parts whose failure or reduced reliability would erode safety margins. Non-critical lives include overhaul, inspection and recondition lives. Through Reliability Centred Maintenance<sup>6</sup> analysis the DO, or service provider (for performance-based support contracts), may propose Maintenance lives such as overhaul, inspection and recondition. Whilst these lives may be formulated to optimize Maintenance and availability of Propulsion Systems, they may also guard against specific non-critical failures. The rationale behind the life will be recorded in order to ensure that any extension of such life does not compromise safety or availability.

**Regulation  
5602(3)**

**Control of Critical Parts**

- 5602(3) The Propulsion System DO **shall** control the manufacture of critical parts and **shall** record the manufacturing history.

**Acceptable  
Means of  
Compliance  
5602(3)**

**Control of Critical Parts**

10. The Propulsion System DO **should** demonstrate, to the satisfaction of the TAA, the processes for the control<sup>2</sup> and verification of critical parts, including those from alternative methods or sources of manufacture.
11. Decisions on introducing alternative methods or sources of production **should** be recorded in Local Technical Committee and Configuration Control Board<sup>1</sup> meeting minutes.

**Guidance  
Material  
5602(3)**

**Control of Critical Parts**

12. An alternative method of manufacture is a method other than that previously used to produce the critical part that requires a change to the information recorded on the relevant drawings and supporting documentation.
13. An alternative manufacturing source is a Production Organization (PO) or manufacturer other than that which has previously produced the critical part, or a change in location of production by an existing PO or manufacturer.
14. Critical parts from alternative methods or sources of manufacture which require validation testing may be included in engines on test for other purposes.

**Regulation  
5602(4)**

**Quality Verification Tests and Acceptance and Test Criteria**

- 5602(4) The Propulsion System DO **shall**:
- a. Propose a test schedule programme for QVT to the TAA for agreement.
  - b. Submit acceptance and test schedules for the Propulsion System to the TAA for agreement.

<sup>4</sup> Refer to Defence Standard 00-970 Part 11 – Certification Standard for Service Aircraft.

<sup>5</sup> Refer to RA 5724 – Life Extension Programme.

<sup>6</sup> Refer to RA 5320 – Air System Maintenance Schedule – Design and Validation.

**Acceptable  
Means of  
Compliance  
5602(4)**

**Quality Verification Tests and Acceptance and Test Criteria**

15. The first Propulsion System accepted post production<sup>7</sup> and after Type Certification **should** be subject to QVT, with further routine samples taken as agreed by the TAA.
16. The agreed acceptance and test criteria **should** be published in the Propulsion System Maintenance Manual(s) for all new, repaired and overhauled Propulsion Systems by the TAA.
17. The Propulsion System DO **should** ensure the accuracy and consistency of measurement, of all test facilities used for production testing to ensure consistency of Propulsion System performance.

**Guidance  
Material  
5602(4)**

**Quality Verification Tests and Acceptance and Test Criteria**

18. The QVT programme assures that production standard parts and systems are representative of those used for the certification process. Inspection and test is integral to the production verification process. QVT is a specific element of the control and verification process for Propulsion Systems.
19. The TAA may involve QVT on any Propulsion System that has completed production acceptance as deemed necessary. Occasions where QVT would be appropriate include:
- a. On initial production.
  - b. On a change of PO or after significant changes at a PO's facilities, such as methods of manufacture or manufacturing source.
  - c. After a significant break in production or overhaul.
  - d. On commencement of a major overhaul or major repair<sup>8</sup>.
  - e. On embodiment of a Major Change<sup>9</sup>, rework, conversion, or update programme.
  - f. After detection of significant quality failings, such as during production or overhaul.
20. The QVT programme will include strip and inspection activity, appropriate and sufficient testing (to include endurance and performance elements) and the QVT report.
21. The agreed acceptance and test criteria may include but is not limited to, parameters such as performance, vibration and oil consumption.
22. Performance trending of test facilities may be used to supplement test facility calibration records.

**Regulation  
5602(5)**

**Common Pool Parts**

5602(5) The TAA **shall** approve the use of common pool parts.

**Acceptable  
Means of  
Compliance  
5602(5)**

**Common Pool Parts**

23. Where the use of common pool parts is approved, the TAA **should** define and promulgate the set acceptance criteria for the use of such parts in the Propulsion System Support Policy Statement<sup>10</sup> of the Air System Topic 2(N/A/R)1 publication.
24. The TAA **should** approve the Propulsion System Maintenance Organization to use the common pool parts.

<sup>7</sup> Refer to AS9102 – Aerospace First Article Inspection Requirement.

<sup>8</sup> Refer to RA 5865 – Repairs (MRP Part 21 Subpart M).

<sup>9</sup> Refer to RA 5820 – Changes in Type Design (MRP Part 21 Subpart D).

<sup>10</sup> Refer to ► [RA 5407 – Support Policy Statement](#). ◀

**Guidance  
Material  
5602(5)****Common Pool Parts**

25. Common pool parts can be defined as those from other nations or operators that lie outside MOD control and maybe made available for use in the production, repair or overhaul of Service equipment.

26. When considering the use of common pool parts the TAA needs to be assured that the configuration standards, life / usage and provenance of a part would be acceptable for use within the Propulsion System.