RA 5103 – Certificate of Design

Rationale

Each Air System (including related products, parts, appliances[1], and Air Launched Weapons (ALW)) is to be designed to meet the specification requirements. Any deviation from meeting the specification requirements could have significant Air Safety implications. The Certificate of Design (CofD) identifies the extent to which the requirements of the specification have been achieved.

Contents

Regulation 5103(1)

Approval of Certificate of Design

5103(1) The CofD **shall** be signed by approved members of the Design Organization (DO) and the Type Airworthiness Authority (TAA) or Commodity ►Delivery◄ Team Leader (►DTL◄) or his authorized representative.

Acceptable Means of Compliance 5103(1)

Approval of Certificate of Design

1. The DO **should** submit the CofD and its supporting documentation to the TAA or Commodity ►DTL◄ prior to the first in-service flight or the first post-delivery flight of a new or modified Air System (including related products, parts, appliances, and ALW).

2. The CofD **should** certify the extent to which the design satisfies the requirements of the specification issued by or on behalf of the MOD, including any exceptions or limitations.

3. The TAA or Commodity ►DTL◄ or his authorized representative **should** signify the acceptance of the CofD, including any exceptions and limitations, by signing the box on the CofD reserved for this purpose.

Guidance Material 5103(1)

Approval of Certificate of Design

4. The methods of checking design calculations, including the procedure for verifying computer outputs, may be subject to the agreement of the TAA or Commodity ►DTL◄, eg in the case of novel or contentious areas or where substantiation by the MOD is required.

5. Where significant changes are made to a certified design a new certificate may be required by the TAA or Commodity ►DTL.◄

6. The DO is to note that under some circumstances, due to the declared limitations and exceptions against which the materiel meets the specifications, the TAA or Commodity ►DTL◄ may conditionally accept a standard of design. In such cases he will indicate the qualified acceptance by endorsing the CofD with the relevant conditions.

7. The certification procedure for previously designed commercially available materiel (commonly known as Commercial Off The Shelf (COTS) materiel) will be that already described with a requirement specification and a CofD. The DO may submit previous evidence to demonstrate compliance with the requirements of the specification.

[1] The 'products, parts and appliances' terminology supersedes that of 'components, equipment or systems'.

Guidance Material 5103(1)

8. Acceptance by the TAA or Commodity ►DTL◄ of the CofD does not imply acceptance of responsibility for the design, which remains with the DO.

9. DO signatories must be approved in accordance with ►RA 1005[2]◄ and as identified in RA 5850[3].

10. The Board Signatory requirement in Appendix A1, Appendix B1 and Appendix C1 is not required for design activity approved under privilege[4]; it is necessary only for a new design or for a major change[5] in Design.

Regulation 5103(2)

Format of Certificate of Design

5103(2) CofDs **shall** be provided on the appropriate form.

Acceptable Means of Compliance 5103(2)

Format of Certificate of Design

11. Appropriate forms for CofDs can be found in Annexes A – C and **should** be supported by:

a. A Configuration Status Record (CSR) or equivalent drawing list appropriate to the materiel.

b. A list of reports on all tests conducted to show compliance with the specification.

c. A list of subsidiary CofDs agreed by the DO for materiel designed and developed by other DOs and incorporated in the Design. The CofD for Government Furnished Assets (GFA) integrated into the design **should** be provided to the DO by the ►Delivery Team (DT) .◄

d. Specific evidence of structural integrity as defined in Annexes A – C.

e. A Safety Assessment in accordance with Def Stan 00-056 that demonstrates that the certified design is tolerably safe for the intended purpose.

Guidance Material 5103(2)

Format of Certificate of Design

12. The CofD forms are to be reproduced locally. The DO is to consult the ►DT◄ if there is any doubt which form is appropriate, selecting from:

a. Appendix A1 – CofD for Air Systems.

b. Appendix B1 – CofD for a Product, Part and Appliance.

c. Appendix C1 – CofD for ALW.

13. The security classification applicable to each CofD must be marked in accordance with the Contractor's Security Handbook.

Regulation 5103(3)

Retention of Certificate of Design

5103(3) The DO **shall** retain the original signed CofD with the master records.

Acceptable Means of Compliance 5103(3)

Retention of Certificate of Design

14. The DO **should** distribute copies of the accepted CofD and the master records in accordance with the instructions of the TAA or Commodity ►DTL.◄

[2] ►Refer to RA 1005 - Contracting with Competent Organizations.
[3] Refer to◄ RA 5850 – Military Design Approved Organization (MRP 21 Subpart J).
[4] For clarification of privileges refer to RA 5850.
[5] As defined in RA 5820 – Changes in Type Design (MRP 21 Subpart B).

Guidance Material 5103(3)

Retention of Certificate of Design

15. Nil.

Regulation 5103(4)

Certification of Subcontracted Items

5103(4) The DO **shall** submit a CofD to the TAA or Commodity ►DTL◄ for subcontracted items when they are accepted by the DO.

Acceptable Means of Compliance 5103(4)

Certification of Subcontracted Items

16. If the CofD for subcontracted items contain exceptions or limitations affecting overall system performance, the DO **should** list the exceptions or limitations and state their likely consequences.

Guidance Material 5103(4)

Certification of Subcontracted Items

17. Nil.

ANNEX A

PARTICULAR REQUIREMENTS FOR AIRSYSTEMS

Note: For products, parts and appliances installed in Air Systems where separate certification is a requirement, see Annex B.

A.1 Certificates of Design

A.1.1 The CofD to be used is MAA Form 100 (see Appendix A1).

A.1.2 Following MAA agreement a DO may use other methods of design certification in the following circumstances:

A.1.2.1 When a contract for the work calls for special methods of certification.

A.1.2.2 For a Service derivative of a civil type when it is appropriate to work to:

a) British Civil Airworthiness Requirements (BCAR).

b) Joint Airworthiness Requirements (JAR).

c) Federal Airworthiness Requirements (FAR).

d) European Aviation Safety Agency (EASA) Implementing Rules (IR) and Certification Specifications (CS).

Note: When materiel designed by a subcontractor to the DO is incorporated into a design, the DO is recommended to seek certification in the style of the Declaration of Design and Performance (DDP) in BS G 262:1998.

A.2 Structural Integrity

A.2.1 The requirements of RA 5103(2) must be satisfied by the provision of a Type Record comprising:

a) A general arrangement and description of the aircraft.

b) A summary of the design assumptions and/or criteria for the aircraft and all major components.

c) The critical loading, shear-force, bending moment and torque distributions with mass distributions.

d) Calculation of reserve factors at critical sections and at a number of points in the main structural elements, particularly at joints or discontinuities. The associated structural and material data must be tabulated for the relevant critical and near critical design cases, with a reference to the final stress files. (See the following Note).

Note: All cases of reserve factors less than 1.2 for Structurally Significant Items (SSI) must be included, all cases of reserve factors less than 1.0 for minor structural items must be included.

e) A list of final check stress reports/files.

f) A summary of the results of all tests made to confirm the design assumptions/criteria (A.2.1 b**.** above).

g) A summary of tests confirming the functional integrity of software used in structural calculations.

A.2.2 A Fatigue Type Record for Aircraft[6] may also be a requirement.

[6] ►Refer to◄ RA 5309 – Fatigue Type Record for Aircraft.

APPENDIX A1

MINISTRY OF DEFENCE CERTIFICATE OF DESIGN FOR AIR SYSTEMS OR AIR SYSTEM MODIFICATIONS

Reference No (or Type Certification Basis reference)	
Issue No	
Aircraft Type	Contract No
Modification No (if applicable)	See note overleaf
Installation of (if applicable)	See note overleaf
CSR Reference	Issue
Test Report List Reference	Issue
Subsidiary CofDs List Reference	Issue
Type Record Reference	Issue
Software Standard Reference	Issue

We, the designers of the above, hereby certify that:

1. With the exceptions and limitations stated in List No 1 attached, the above complies with the design airworthiness requirements of:

Specification	Issue
Up to and including Amendment	
Issued by	

2. The calculations made during the course of design have been checked and every reasonable precaution taken to ensure their accuracy.

3. The design data, calculations, reports on tests and list of drawings supplied by us to MOD are a true and accurate record of the design.

4. All supporting CofDs have been received.

5. With the exceptions stated in List No 2 attached, compliance with the flying performance, including handling qualities, defined by the above Specification, has been demonstrated by flight tests covered by the reports in List No 3 attached.

6. A Safety Assessment has been prepared.

7. If applicable, any changes made that affect the airworthiness of the Air System have been approved by the DO responsible for the design of the Air System. Their approval is recorded in:

MAA Form 100

Attachments:

List No 1 Exceptions and Limitations.

List No 2 Flying performance characteristics, including handling qualities, which have not been demonstrated by flight tests.

List No 3 Flight Test Reports.

Note: Insert here the official modification number. If there is no modification number, insert nomenclature of equipment installed.

DESIGN SIGNATORIES

Approved Design ►/Head of the Office of Airworthiness◄ signatory

Name Signature:

Date

Approved Board signatory ►(Chief Executive or Head of DO)◄(required for new Air Systems or major change in Type Design)

Name Signature:

Date

For (Design Organization)

DAOS Approval Reference No.

Note: The same signatory may not sign for both Board and Design on the same form.

FOR MOD USE ONLY

Exceptions and limitations referred to in List 1 are accepted on behalf of the MOD, such acceptance extends only to the matters stated and are not to be treated as extending by implication to any other requirement of the specifications; nor does it imply acceptance by the MOD of responsibility for all or any part of the design.

Name Signature:

Date

MAA Form 100

ANNEX B

PARTICULAR REQUIREMENTS FOR PRODUCTS, PARTS AND APPLIANCES

B.1 Certificates of Design

B.1.1 The CofD to be used is MAA Form 100A (see Appendix B1).

B.1.2 Following MAA agreement a DO may use other methods of design certification in the following circumstances:

B.1.2.1 When the contract for the work calls for special methods of certification.

B.1.2.2 For a Service derivative of a civil type when it is appropriate to work to:

a) BCAR.

b) JAR.

c) FAR.

d) EASA IR and CS.

Note: When materiel designed by a subcontractor to the DO is incorporated into a design, the DO is recommended to seek certification in the style of the DDP in BS G 262:1998.

B.2 Structural Integrity of Air Systems, Products, Parts and Appliances

The requirements of RA 5103(2) must be satisfied by the provision of similar data, suitable to the case, as for aircraft (see Appendix A, clause A.2.1).

B.3 Structural Clearance of Airborne Electronic Equipment

Normally the DO will have an authorized structural design signatory with suitable experience able to sign as the designer on the CofD. However, when the DO does not have an authorized structural design signatory, then the structural design of airborne electronic equipment section must be counter signed by an approved Structural Clearance signatory of an alternative DAOS organization.

APPENDIX B1

MINISTRY OF DEFENCE CERTIFICATE OF DESIGN FOR PRODUCTS, PARTS AND APPLIANCES

Reference No

Issue No

Product/Part/Appliance* Contract No

CSR Reference Issue

Test Report List Reference Issue

Subsidiary CofDs List Reference Issue

►Design◄ Record Reference Issue

Software Standard Reference Issue

We, the designers of the above, hereby certify that:

1. With the exceptions and limitations stated in List No 1 attached and the performance statement stated in List 2, the above complies with the requirements of:

   Specification Issue

   Up to and including Amendment

   Issued by

2. The calculations made during the course of design have been checked and every reasonable precaution taken to ensure their accuracy.

3. The design data, calculations, reports on tests and list of drawings supplied by us to MOD are a true and accurate record of the design.

4. All supporting CofDs have been received.

5. A Safety Assessment has been prepared.

*Delete as appropriate

MAA Form 100A

Attachments:

List No 1 Exceptions and Limitations.

List No 2 Performance statement related to the specification.

STRUCTURAL CLEARANCE OF AIRBORNE ELECTRONIC EQUIPMENT (when required)
RELEVANT / NOT RELEVANT *
Approved Design ►/Head of the Office of Airworthiness◄ signatory
Name Signature:
Date
For (Design Organization)
DAOS Approval Reference No.

DESIGN SIGNATORIES
Approved Design signatory
Name Signature:
Date
Approved Board signatory►(Chief Executive or Head of DO)◄ (required for new or major change to products, parts and appliances)
Name Signature:
Date
For (Design Organization)
DAOS Approval Reference No.
Note: The same signatory may not sign for both Board and Design on the same form.

FOR MOD USE ONLY
Exceptions and limitations referred to in List 1 are accepted on behalf of the MOD**, such acceptance extends only to the matters stated and are not to be treated as extending by implication to any other requirement of the specifications; nor does it imply acceptance by the MOD of responsibility for all or any part of the design.
Name Signature:
Date

* Delete as appropriate. The structural clearance signature is required to confirm either that the design work is complete or that structural clearance is not relevant.

** Acceptance by the TAA or Commodity ►DTL◄ is not a requirement when this form is used by a subcontractor to the DO. The certification box will be deleted by diagonal lines.

MAA Form 100A

ANNEX C

PARTICULAR REQUIREMENTS FOR AIR LAUNCHED WEAPONS[7]

C.1 Certificates of Design

C.1.1 The CofD to be used is MAA Form 111 (Appendix C1).

C.1.2 Following MAA agreement a DO may use other methods of design certification in the following circumstances:

C.1.2.1 When the contract for the work calls for special methods of certification.

C.1.2.2 For an export product when the ALW is non-UK Government Furnished Equipment.

Note: When material designed by a subcontractor to the DO is incorporated into a design, the DO is recommended to seek certification in the style of the DDP in BS G 262:1998.

C.2 Certification of ALW for Air Carriage, Launch/Release or Jettison

C.2.1 Before a Military Permit To Fly (MPTF) (see RA 5880[3]) can be issued for an ALW to be flown, the DO responsible for the ALW must provide to the Air System DO duly completed CofDs stating the technical limitations of the materiel and highlighting those which may affect the handling and operation of the Air System or jettison of the weapon. During the development phase, such CofDs will only need to be signed by the contractor prior to their issue to the DO for the Air System installation and copied to the TAA.

C.2.2 If design changes are made to the ALW after the commencement of contractors flight trials and such design changes may affect the handling and operation of the Air System or any limitations imposed in the original flight clearance, then the DO for the ALW must initiate further design certification to cover such changes and issue this to the Air System DO.

C.2.3 The DO for the ALW must issue a CofD irrespective of whether their DAOS scope includes endorsement of MPTFs.

C.3 Structural Integrity

The requirements of RA 5103(2) must be satisfied by the provision of a Structural Design Record which must cover all structural parts. This must be compiled progressively from initiation of design and must be issued with a format and content and at stages in development to be agreed with the TAA. The Structural Design Record must meet the requirements of Def Stan 07-085 - Design Requirements for Weapons and Associated Systems.

[7] In this context, Air Launched Weapons refers to rocket-powered weapons and not purely ballistic weapons.

APPENDIX C1

MINISTRY OF DEFENCE CERTIFICATE OF DESIGN FOR AIR LAUNCHED WEAPONS

Reference No	
Issue No	
ALW	Contract No
Equipment Nomenclature	
CSR Reference	Issue
Test report List Reference	Issue
Subsidiary CofDs List Reference	Issue
Performance Statement	Issue
Structural Design Record	Issue
Software Standard Reference	Issue

Which is (indicate as appropriate):

☐	A complete weapon system	☐	An airborne or ground support equipment
☐	A complete missile	☐	Part of a missile or support equipment

The above, subject to the limitations stated in 8 below, is for (indicate all applicable):

☐	Evaluation Trials	☐	Firing at Sea
☐	Practice Firings	☐	Land Carriage
☐	Ground Firing Trials	☐	Firing on Land Vehicles
☐	Service Firings	☐	Carriage on Aircraft
☐	Carriage at Sea	☐	Firing on Aircraft

MAA Form 111

We, the designers of the above equipment, hereby certify that:

1. With the exceptions stated in 8 below, the design of the above hardware and software complies with:
   a. The requirements stated in: Issued by:
   b. Def Stan 07-085.
2. The calculations made during the course of design have been checked and every reasonable precaution taken to ensure their accuracy.
3. The CSR relating to this equipment, all calculations and associated design data, and all test reports submitted by us are a true record of this ALW.
4. Every reasonable precaution has been taken to ensure the safety of all hazardous items directly or indirectly associated with the ALW.
5. All relevant supporting CofDs have been received.
6. A Safety Assessment has been prepared.
7. Installations and other relevant instructions are given in:
8. Exceptions:
9. Limitations:

DESIGN SIGNATORIES

Approved Design ►/Head of the Office of Airworthiness◄ signatory

Name Signature:

Date

Approved Board signatory ►(Chief Executive or Head of DO)◄(required for new or major change to ALW)

Name Signature:

Date

For (Design Organization)

DAOS Approval Reference No.

Note: The same signatory may not sign for both Board and Design on the same form.

FOR MOD USE ONLY

Exceptions and limitations referred to in paragraphs 8 & 9 are accepted on behalf of the MOD*, such acceptance extends only to the matters stated and are not to be treated as extending by implication to any other requirement of the specifications; nor does it imply acceptance by the MOD of responsibility for all or any part of the design.

Name Signature:

Date

*Acceptance by the ►DTL◄ is not a requirement when this form is used by a subcontractor. The certification box will be deleted by diagonal lines.

MAA Form 111