Ministry of Defence

Defence Standard 00-970 Part 3

Issue 2 **Date:** **14th March 2021**

Certification Specifications for Airworthiness

Part 3: SMALL AND MEDIUM TYPE AIR SYSTEMS

Section 1
Foreword

Defence Standard Structure

Section 1 (Generated by the StanMIS toolset)

- Revision Note
- Historical Record
- Warning
- Standard Clauses

Section 2 (Technical information provided by Subject Matter Expert)

- Title
- Introduction (optional)
- Table of Contents
- Scope
- Technical Information to include Tables and Figures
- Annexes (as required)

Section 3 (Generated by StanMIS toolset)

- Normative References
- Definitions
- Abbreviation

REVISION NOTE

The Def Stan 00-970 (970) Transformation Programme changed 970 Part 1 from Fixed Wing Aeroplanes to Fixed Wing Combat Air Systems resulting in references to 970 Part 1 from 970 Part 3 being made obsolete.

970 Part 3 transformation Phase 1 reviewed all references to 970 Part 1 and where possible, incorporated those requirements into this issue. Where significant engineering review (Phase 2) is required to incorporate these requirements, the 970 Part 1 requirement reference has been retained and changed to point to the pre-transformed Issue of the 970 Part 1.

Phase 2 will incorporate the remaining references to 970 Part 1 while also reformatting 970 Part 3 to align with the current and subsequent amendments of CS 23.

HISTORICAL RECORD

This standard supersedes the following:

Defence Standard (Def Stan) 00-970 Part 3 Issue 1 dated 28 September 2017

WARNING

The Ministry of Defence (MOD), like its contractors, is subject both to United Kingdom law and any EU-derived law that has been retained under the European Union (Withdrawal) Act 2018 regarding Health and Safety at Work. Many Defence Standards set out processes and procedures that could be injurious to health if adequate precautions are not taken. Adherence to those processes and procedures in no way absolves users from complying with legal requirements relating to Health and Safety at Work.

STANDARD CLAUSES

a) This standard has been published on behalf of the MOD by UK Defence Standardization (DStan).

b) This standard has been reached following broad consensus amongst the authorities concerned with its use and is intended to be used whenever relevant in all future designs, contracts, orders etc and whenever practicable by amendment to those already in existence. If any difficulty arises which prevents application of the Defence Standard, DStan shall be informed so that a remedy may be sought.

c) Please address any enquiries regarding the use of this standard in relation to an invitation to tender or to a contract in which it is incorporated, to the responsible technical or supervising authority named in the invitation to tender or contract.

d) Compliance with this Defence Standard shall not in itself relieve any person from any legal obligations imposed upon them.

e) This standard has been devised solely for the use of the MOD and its contractors in the execution of contracts for the MOD. To the extent permitted by law, the MOD hereby excludes all liability whatsoever and howsoever arising (including, but without limitation, liability resulting from negligence) for any loss or damage however caused when the standard is used for any other purpose.

SECTION 2

CERTIFICATION SPECIFICATIONS FOR AIRWORTHINESS

PART 3 – SMALL AND MEDIUM TYPE AIR SYSTEMS

2.0.1 PREFACE

Applicable EASA Certification Specifications (CS) 23 – Amendment 4

2.0.2 Changes Incorporated in this issue

Requirement		Changes	Page
01	As Required	Editorial changes resultant from DS 970 Transformation task. (Phase 1 – Updated Part 1 references and associated text)	
02			
03			
04			
05			
06			
07			
08			
09			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			

2.0.3 CONTENTS

2.1 GENERAL REQUIREMENTS

2.1.1 INTRODUCTION

2.1.1.1 This Part of the Defence Standard (Def Stan) has been issued to provide requirements and guidance for the design of UK Military Small to Medium Size Aeroplanes for operation in all classes of airspace.

2.1.1.2 This document shall be used as described in Def Stan 00-970 Part 0 - Procedures for Use, Guidance and Definitions. In addition to the requirements of this Part of Def Stan 00-970, users must also include relevant requirements contained in Part 11 and Part 13.

2.1.2 SCOPE

2.1.2.1 Where CS 23 makes reference to ‘the Agency’, this should be considered to mean the certifying authority.

2.2 CS 23 Related Certification Specifications, Acceptable Means of Compliance (AMC) and Guidance

Requirement	Compliance	Guidance
SUBPART A - GENERAL		
CS 23.1 Applicability	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1a This standard is applicable to Small and Medium Type Fixed-wing Air Systems, fulfilling roles similar to Air Systems designed to CS 23 (such as primary trainers and light observation/utility) that retain a significant degree of commonality with similar civilian aircraft. Accordingly, CS 23 requirements are adopted as the basis of Def Stan 00-970 Part 3; however, where more-stringent requirements are required (eg Birdstrike) CS 25 requirements either supplement, or replace, CS 23 requirements. Furthermore, where the civil CS are either insufficient or inappropriate, military-specific requirements either supplement, or replace, CS 23 requirements. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.3 Aeroplane Categories	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.3a Aeroplane Classification	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
In addition to CS 23.3 and dependent on the role and type of aeroplane as agreed by the TAA, the following classifications shall apply: Aeroplanes shall be classified in accordance with the requirements of Def Stan 00-970 Part 0 Tables 1 and 5. This Part 3 shall apply to: (a) Aeroplanes in Class I which meet the requirements of CS 23.1 and CS 23.3 (b) Aeroplanes in Class II which meet the requirements of CS 23.1 and CS 23.3 Issue 2		

Requirement	Compliance	Guidance
SUBPART B - FLIGHT		
General		
CS 23.21 Proof of Compliance	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.23 Load Distribution Limits	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.25 Weight Limits	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.25a Weight Limits Consideration shall be given to the anthropometric requirements as follows; Weights for the 3rd, 50th and 99th percentile range of aircrew are given below: PERCENTILE VALUES % - Kg 3 - 61.4 50 - 81.0 99 - 110.6	These values are for the nude body, so allowances must be made for clothing and aircrew equipment. Both the minimum and maximum aircrew equipment assembly weights must be considered. Typically these are given by the summer/land clothing assembly and the winter/sea assembly respectively. Specialist advice should be sought in the definition of appropriate clothing assemblies and additional aircrew equipment such as maps, CBRN protection, personal weapons, body armour, survival equipment and Night Vision Goggles (NVGs).	INTENTIONALLY BLANK
CS 23.29 Empty Weight and Corresponding Centre of Gravity	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.31 Removable Ballast	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.33 Propeller Speed and Pitch Limits	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Performance		
CS 23.45 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.45a Performance External Loads All external load combinations appropriate to the tasks as defined in the Aeroplane Specification or as required by the Type Airworthiness Authority (TAA) shall be considered.	Where different missions require different combinations of external stores the effect on the performance model shall be checked in flight trials.	INTENTIONALLY BLANK
UK23.45b Range, Combat Radius and Endurance Dependent on the aeroplane type and role, the following requirements shall be applied as agreed by the TAA. The range of the aeroplane in level cruising flight shall be evaluated for the atmospheric conditions, configuration, external load and powerplant conditions for all appropriate combinations of altitude, speed or Mach Number, mass and stores configuration.	In evaluating the range allowance may be made for reduction of mass due to use of fuel and oil and release of stores. The performance effects of externally carried stores and other removable excrescences shall be expressed in terms of a Drag Index.	INTENTIONALLY BLANK
UK23.45c INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.49 Stalling Speed	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.49a Stalling Speed	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Dependent on the aeroplane type, role and usage, the aeroplane shall comply with stall characteristic requirements of Def Stan 00-970 Part 1 Section 2 (Issue 15 dated 14 May 17) Clause 2.24.2 as agreed by the TAA. Issue 2		
CS 23.51 Take-Off Speeds	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.53 Take-Off Performance	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.55 Accelerate-Stop Distance	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.57 Take-Off Path	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.59 Take-Off Distance and Take-Off Run	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.61 Take-Off Flight Path	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.63 Climb: General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.65 Climb: All Engines Operating	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.66 Take-Off Climb: one engine-inoperative	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.67 Climb: one engine inoperative	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.69 En-Route Climb/Descent	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.71	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Glide (Single-Engine Aeroplanes)		
CS 23.73 Reference Landing Approach Speed	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.75 Landing Distance	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.77 Balked Landing	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.77a Crosswind landings Approaches and landings shall be made in crosswinds up to the limit given in the Aeroplane Specification. If necessary, a separate crosswind limit shall be established when a braking parachute is used.	(a) For these tests, normal threshold speeds and handling techniques shall be used, and the runway surface shall be wet. (b) Higher threshold speeds may be used if necessary to cater for high crosswind conditions, but if higher speeds are used the performance implications shall be taken into consideration. (c) Due allowance shall be made for flooded, snow-packed or icy runways if the aeroplane is required to operate under such conditions.	INTENTIONALLY BLANK
Flight Characteristics		
CS 23.141 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Controllability and Manoeuvrability		
CS 23.143 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.143a The Air System shall meet Level 1 Handling Qualities for the Mission Task Elements (MTE) defined for the roles stated in the SOI. As a minimum, the Air System shall meet Level 2 Handling Qualities at all other times.	The Operational mission requirements of the Air System should be determined and clearly defined: (a) In particular, Adequate and Desired performance for each MTE should be defined in order to provide a basis for the assessment of Handling Qualities; (b) The Adequate and Desired performance for each	(a) Handling Qualities have traditionally been assessed using the Cooper-Harper Handling Rating Scale, or variants thereof; see Section 2.4 (2.4.2.1.1) Figure 1 and Advisory Information in Section 2.4 (2.4.2.1.2). The applicant may use other assessment

Requirement	Compliance	Guidance
Issue 2	MTE should be defined in terms of the required precision to capture and maintain parameters relevant to that MTE; for example, speed, attitude, altitude, load factor and angle of attack; (c) When identifying each MTE and the Air System performance required to meet the Operational requirement, account should be taken of: (1) Required manoeuvres; (2) Usable Cue Environment; (3) Environmental conditions, including wind, turbulence, snow, ice, rain, sand, temperature, humidity and air density; (4) All combinations of mass, CG and stores (including expendables and weapons); (5) Air System configuration, including position of undercarriage, high lift devices, airbrakes, weapon bay doors, AAR probe etc; (6) Degraded modes and systems, including flying controls, autopilot, engines and avionics; (7) Landing surface, including slope and movement, eg deck operations; (8) Aircrew equipment assembly. Issue 2	methods, where equivalence can be demonstrated. (b) Degraded modes and systems may be the result of bird strikes, lightning strikes, or other environmental factors. Issue 2
UK23.143b Level 1 handling shall be met in moderate turbulence, with relaxation to Level 2 in severe turbulence. Issue 2	Unless otherwise defined in the Air System Specification, handling should be demonstrated at the turbulence levels identified in Section 2.4 (2.4.2.2.1). Table 1 Issue 2	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
UK23.143c There shall be no tendency for Air System-pilot coupling to cause intrusive oscillations that degrade handling below the required levels. Issue 2	INTENTIONALLY BLANK Issue 2	Air System-pilot coupling can result either from the efforts of the pilot to control the Air System (ie Pilot Induced Oscillation) or bio-mechanical feedback. Issue 2
UK23.143d The Air System shall maintain a minimum 10% control margin for the MTEs defined for the roles stated in the SOI, throughout the Service Flight Envelope. Issue 2	Compliance should be demonstrated with the worst-case aerodynamic and mass asymmetries, in the worst-case environmental conditions and with likely variations in piloting technique. Issue 2	Control margins may be margins of control moment or motivator travel. Issue 2
UK23.143e In demonstrating running up against the brakes to effect maximum take-off performance, it shall be shown that there are no adverse handling characteristics. Issue 2	(a) This demonstration should be performed with the wheels un-chocked, brakes fully applied and in wind strengths from all quarters, up to the maximum specified for the Air System under demonstration. (b) The power should be increased on each engine in turn and collectively, until: (1) Wheel skid occurs; (2) The brakes slip; or (3) Maximum take-off power is reached. Issue 2	The techniques listed under the compliance would typically be used for a deck short take-off but are equally applicable to normal runway operations. Issue 2
CS 23.145 Longitudinal Control	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.145a INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
UK23.145b Longitudinal Control - External Stores	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
If the aeroplane is capable of carrying external stores, the tests shall first be made without the stores fitted to establish the basic stability of the aeroplane, and then repeated with the stores fitted to establish any de-stabilising effect of the stores. The loading shall include combinations of stores which result in: (a) highest mass, (b) highest pitch inertia, (c) the most probable store loading(s) for service use if this is/these are not covered by (a) and (b) above. (d) the most aerodynamic destabilising configuration. The requirements of CS 23.145 shall apply for such symmetric and asymmetric combinations of internal and external stores as are stated in the aeroplane specification. The effects of internal and external stores on the mass and its distribution and on the aerodynamic characteristics of the aeroplane shall be considered for each mission flight phase. When the stores contain expendable loads, the requirements of CS 23.145 apply throughout the range of store loadings.		
CS 23.147 Directional and Lateral Control	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.147a Coupling between the roll mode and the spiral mode shall not cause piloting difficulties incompatible with Level 1 Handling Qualities. Issue 2	The combined effects of spiral stability, flight control system characteristics and lateral trim change with speed should not cause piloting difficulties incompatible with Level 1 Handling Qualities. Issue 2	INTENTIONALLY BLANK.

Requirement	Compliance	Guidance
CS 23.149 Minimum Control Speed	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.151 Aerobatic Manoeuvres	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23 151a INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
CS 23.153 Control During Landing	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.153a INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
CS 23.155 Elevator Control Force in Manoeuvres	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.155a Inceptor Feel and Stability in Manoeuvring Flight- Where applicable to the aircraft type and role, the requirements of Def Stan 00-970 Part 1 Section 2 (Issue 15 dated 14 May 17) Clauses 2.21.9 to 13 shall be applied as agreed with the TAA. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.157 Rate of Roll	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.157a DELETED Issue 2	DELETED Issue 2	DELETED Issue 2
Trim		

Requirement	Compliance	Guidance
CS 23.161 Trim	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Stability		
CS 23.171 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.173 Static Longitudinal Stability	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.175 Demonstration of Static Longitudinal Stability	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.177 Static Directional and Lateral Stability	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.181 Dynamic Stability	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Stalls		
CS 23.201 Wings Level Stall	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.203 Turning Flight and Accelerated Turning Stalls	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.207 Stall Warning	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.207a Stall Warning Where CS 23.207 is deemed to provide insufficient safety margins for the type and role of the aeroplane the requirements of CS25.207 shall be applied as agreed by the TAA.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Spinning		

Requirement	Compliance	Guidance
CS 23.221 Spinning	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.221a Dependent on the role type and usage, the requirements of Def Stan 00-970 Part 1 (Issue 14 dated 13 Jul 15) Section 2 Clause 2.24.2 shall be applied as agreed by the TAA. Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
UK23.221b Spinning and Spin Recovery When the aeroplane is designed to carry external stores the most severe combinations of mass, moments of inertia and aerodynamic drag shall be considered at each phase of the manoeuvre.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.221c Spinning and Spin Recovery When available flight test results will be regarded as the final evidence of the aeroplanes characteristics as regards spinning and recovery. However, to ensure a reasonable probability of satisfactory full scale behaviour advance information shall be derived by appropriate model tests and/or calculations as agreed with the TAA.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Ground and Water Handling Characteristics		
CS 23.231 Longitudinal Stability and Control	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.233 Directional Stability and Control	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
UK23.233a Directional Stability and Control It shall be possible to perform the following manoeuvres in still air and in the average crosswind (8 Kts.) at all relevant speeds up to 1.15 times maximum take-off speed at the level of handling quality specified and at 1 level lower in maximum design crosswind conditions (35 Kts), or with one tyre of a twin wheel nose unit burst: (a) Straight take-off at level 1 (b) Take-off with one engine failed at level 2 (c) Rejected take-off with heavy braking and/or reverse thrust and/or brake parachute and/or arresting hook in operation, if provided, at level 2 (d) Straight landing with reverse thrust and/or brake parachute and/or arresting hook in operation, if provided, at level 2 (and in winds up to 45 Kts from any direction) (e) Straight taxiing over a step, bump or hollow as defined for a Class A runway in Def Stan 00-970 Part 1 Section 4 (Issue 15 dated 14 May 17) Clause 4.13 with and without braking at level 1. (f) Transition from straight taxiing to constant radius cornering and back again with any necessary combination of braking and engine power at level 1 within the distance specified or agreed with the TAA. (g) Taxying at constant speed and constant radius and round specified corners, with and without braking at level 1. (h) 180° turn at level 1 within a space specified or agreed with the TAA.	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Issue 2		
UK23.233b Directional Stability The aeroplane shall be directionally stable and steerable when performing the manoeuvres of UK23.233a in all practical combinations of mass, CG position, braking devices, and those means of directional control which may be required to effect those manoeuvres.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.235 Operation on Unpaved Surfaces	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.235a Operation from Surfaces other than Smooth and Hard Airfield Pavements The applicable take off, landing and ground handling requirements of CS 23 Subpart B shall be satisfied for operations on airfield pavements (including runways) other than those assumed by CS 23, where called for in the aircraft specification. Refer also to UK23.473b	INTENTIONALLY BLANK	UK23.473b provides AMC and Guidance on airfield pavement characterisation and loading cases.
CS 23.237 Operation on Water	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.239 Spray Characteristics	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Miscellaneous Flight Requirements		
CS 23.251 Vibration & Buffeting	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
CS 23.253 High Speed Characteristics	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
SUBPART C - STRUCTURE		
General		
CS 23.301 Loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.301a INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
UK23.301b INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
UK23.301c A Principal Structural Elements list shall be established. Issue 2	INTENTIONALLY BLANK Issue 2	Principal Structural Elements can also be referred to as Grade A Parts, Critical Parts, Class 1 Structures, Structurally Significant Items or Airworthiness Limitation Items. Issue 2
UK23.301d Issue 2	Compliance should be shown by selecting design values that assure material strength with 90% probability with 95% confidence ('B' basis). Issue 2	INTENTIONALLY BLANK
UK23.301e Proof of compliance with the strength requirement shall also include proof load tests. Issue 2	This should be shown by applying proof loads to the structure in a static test for selected critical load cases and establishing that no detrimental deformation occurs at proof load. Issue 2	Component and airframe test articles need not be environmentally conditioned, provided that either degradation factors are applied, or environmental degradation has been substantiated at all previous test levels. Issue 2

Requirement	Compliance	Guidance
UK23.301f Strength requirements shall be specified in terms of proof loads (limit loads multiplied by prescribed proof factor). Issue 2	INTENTIONALLY BLANK Issue 2	INTENTIONALLY BLANK Issue 2
UK23.301g In addition to CS 25.305(a) the structure shall be able to support proof loads without detrimental or permanent deformation. At any load up to proof loads, the deformation shall not interfere with safe operation. Issue 2	INTENTIONALLY BLANK Issue 2	Detrimental deformation includes structural distortion that could induce hazards to essential systems. Issue 2
CS 23.302 Canard or Tandem Wing Configurations	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.303 Factor of Safety	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.303a Unless otherwise provided, a proof factor of 1.125 shall be used. Issue 2	A factor of safety of 1.4 and proof factor of 1 should be used where exceedances of limiting conditions are extremely remote provided all underlying rational cases multiplied by the conventional factors are covered. Issue 2	INTENTIONALLY BLANK Issue 2
UK23.303b Design Limit Load The Design Limit Load shall be the maximum and most critical combination of loads and environmental conditions resulting from the specified ground and flight operation of the aircraft.	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
CS 23.305 Strength and Deformation	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.305a Structural Repair, Reserve Factors Repairs shall comply with all relevant design requirements for the aeroplane as a whole. Based on the evaluations required by this clause, if additional inspections or other procedures are required for continued airworthiness of the repair , these must be included in the Airworthiness Limitations Section of the Instructions for Continued Airworthiness as required by CS 23.1529	The design of repairs should, in general, be such that the reserve factor of the repaired member is not lower than 1.2 or that of the undamaged member, whichever is the less. It is, however, undesirable to repair one member in such a manner that its strength is relatively much below that of the surrounding structure. If the application of a particular repair would considerably reduce the reserve factor of the member, care shall be taken to ensure that a combination of two or more repairs could not reduce the reserve factor below the safe limit. Alternatively, a warning shall be included drawing attention to, and prohibiting the application of, the dangerous combination. If compliance with these requirements is difficult to attain, the matter shall be referred to the TAA.	INTENTIONALLY BLANK
CS 23.307 Proof of Structure	AMC 23.307	INTENTIONALLY BLANK
Flight Loads		
CS 23.321 General	AMC 23.321 (c)	INTENTIONALLY BLANK
UK23.321a INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
CS 23.331 Symmetrical Flight Conditions	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.331a Symmetrical Manoeuvring Conditions, Low Level Flight Aspect	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Dependent on the role of the aircraft and in particularly with regards to aircraft types where tactical low level flight is specified, a combined positive symmetrical manoeuvring load and CS 23.341 / UK23.341 discrete tuned gust load case must be evaluated.		
CS 23.333 Flight Envelope	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.333a External Stores If the Aeroplane is capable of carrying external stores, flight tests shall first be made without stores fitted to establish the basic handling characteristics of the Aeroplane and then repeated with the stores fitted to establish any effects due to the stores.	The stores loadings should include combination of stores which result in: (a) Highest mass (b) Highest pitch inertia (c) Highest roll inertia (d) Highest yaw inertia (e) Lowest lateral and/or directional stability (f) Largest drag (g) The most probable store loading(s) for Service use if this is/these are not covered by (a) to (d) above.	INTENTIONALLY BLANK
CS 23.335 Design Airspeeds	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.335a INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
CS 23.337 Limit Manoeuvring Load Factors	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.341 Gust Load Factors	AMC 23.341 (b)	INTENTIONALLY BLANK
UK23.341a Gust Loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Dependent on the type, role and usage, the applicable requirements of Def Stan 00-970 Part 1 Section 3 (Issue 15 dated 14 May 17) Section 3 Clause 3.5 and leaflets 11 and 12 shall be applied as agreed with the TAA. Issue 2		
CS 23.343 Design Fuel Loads	AMC 23.343 (b) & (c)	INTENTIONALLY BLANK
CS 23.345 High Lift Devices	AMC 23.345 (d)	INTENTIONALLY BLANK
UK23.345a High Lift Devices Dependent on the role and type of aeroplane, the requirements of Def Stan 00-970 Part 1 Section 3 (Issue 15 dated 14 May 17) clause 3.6 shall be applied as agreed with the TAA. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.347 Unsymmetrical Flight Conditions	AMC 23.347 (b)	INTENTIONALLY BLANK
CS 23.349 Rolling Conditions	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.349a Combined Rolling and Pitching The loads arising from the combined application of the pitch and roll motivators shall be considered for all speeds up to the design diving speed, V_D, and all altitudes up to the maximum operating altitudes for the following conditions:	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
(a) The deflection, or set of deflections, of the roll motivator shall be: (i) The critical value specified in Para 349 for all values of normal acceleration from -1.0g up to $0.67n_1g$ except that for transport aeroplanes the normal acceleration values shall be from zero to $0.67n_1g$, and (ii) One half of the critical value specified in Para 349 associated with a normal acceleration of $0.9n_1g$, and (iii) Linear variation between the values specified in (i) and (ii) with normal accelerations between $0.67n_1g$ and $0.9n_1g$. (b) The yaw motivator(s) shall be: (i) Held fixed in the position(s) for trim with the aeroplane in wings-level flight, and (ii) Deflected to reduce the sideslip angle to zero, or if this is not possible, to minimise the sideslip angle, Air brakes shall be either open or closed, as appropriate to the speed.		
CS 23.351 Yaw Conditions	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.351a Cross Coupling Considerations In those cases where inertial or aerodynamic cross-coupling results in the aeroplane rolling or pitching during the manoeuvres described by CS 23.351, unless the aeroplane flight control system ensures that there are smaller limited values of bank angle and normal acceleration increments, corrective action shall be assumed as follows: (a) Deflection of the roll motivator(s) to arrest the rolling motion, but not until the angle of bank has	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
reached 15° or the maximum dynamic sideslip angle, described in 3.4.6 (Compliance (b)), has been achieved, whichever comes first. (b) Deflection of the pitch motivator to reduce the pitching response, but not until the increment in normal acceleration has reached 0.25g. Additionally, dependent on the role and type of aeroplane, the requirements of CS25.351 should be considered for applicability.		
CS 23.361 Engine Torque	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.363 Side Load On Engine Mount	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.365 Pressurised cabin loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.365a Pressure Cabins Dependent on the role of the aircraft the applicable requirements of Def Stan 00-970 Part 1 Section 3 (Issue 15 dated 14 May 17) clause 3.7 and leaflet 14 shall be applied as agreed by the TAA. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.367 Unsymmetrical Loads Due to Engine Failure	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.369 Rear Lift Truss	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.371 Gyroscopic and Aerodynamic Loads	AMC 23.371 and 23.371 (a)	INTENTIONALLY BLANK
CS 23.373 Speed Control Devices	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Control Surface and System Loads		
CS 23.391 Control Surface Loads: General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.393 Loads Parallel to Hinge Line	AMC 23.393 (a) and AMC 23.393 (b)	INTENTIONALLY BLANK
CS 23.395 Control System Loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.397 Limit Control Forces and Torques	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.397a Control System Loads Conventional Controls (a) Pitch Inceptor (i) Stick control column 800 N (180 lbf) (two hands together on a single hand grip) (ii) Wheel or W type 1000 N (225 lbf) (two control column hands, 500 N (112 lbf) at each hand grip) (iii) Wheel or W type 500 N (112 lbf) (one hand only) column (b) Roll inceptor (i) Stick type control column 300 N (67.5 lbf) (ii) Wheel or W type. The torque resulting from two control column equal and opposite loads of 300 N (67.5 lbf) applied tangentially at diametrically opposed points of the wheel of diameter D metres (inches). (c) Yaw inceptor (i) Rudder bar/pedals 1350 N (303 lbf) (on one side only)	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
(ii) Rudder bar/pedals 800 N (180 lbf) (simultaneously on each side in the same direction) except where overridden by brake loads.		
UK23 397b Side Stick Side Stick Inceptor 665 N (150 lbf) in any direction in a horizontal plane.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.399 Dual Control System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.399a Dual Control System The inceptor forces shall be suitable for all phases of flight within the permissible flight envelope and result in handling qualities compliant with UK23.143a. Issue 2	INTENTIONALLY BLANK	The following points may be assessed when considering the suitability of the Air System's control system: (a) The heaviness and effectiveness of the inceptors, and the response of the Air System to inceptor inputs; (b) The harmonisation of the flying controls; (c) Any tendency for the inceptors to overbalance and the condition at which this occurs; (d) Any tendency for the inceptors to oscillate, snatch or twitch and the condition at which this occurs; (e) The self-centring tendency of each inceptor, and whether any circuit friction or excessive break-out forces lead to objectionable control characteristics; (f) The sensitivity of the control(s) at high speed and whether this results in any pilot handling difficulties, or tendency for the pilot to induce oscillations by use of the inceptor(s); (g) Any peculiarities of the flying control system such as:

Requirement	Compliance	Guidance
		(1) effects due to bob-weights, dashpots etc; (2) non-linearities due to feel systems etc; (3) juddering associated with high rate of inceptor movement etc; Issue 2
CS 23.405 Secondary Control System	AMC 23.405	INTENTIONALLY BLANK
UK23.405a Secondary Control System In addition to CS 23.405 and dependent on the type, role and usage as agreed by the TAA, the following shall be applied. (a) Crank, wheel or lever (applied only to flaps, slats, tabs, stabiliser, spoiler or wing sweep operation) $220\frac{(1+40R)}{3}$ N [$50\frac{(1+R)}{3}$ lbf] where R - is the radius at which the load is applied metres (inches) but not less than 220 N (50 lbf), nor more than 660 N (150 lbf) (b) Twist 15 Nm (133 lbf in) (c) Push-pull controls - There are no specific loads.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.407 Trim Tab Effects	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.409 Tabs	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.415	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Ground Gust Conditions		
UK23.415a Ground Gust Conditions Dependent on the type, role and usage, the applicable requirements of Def Stan 00-970 Part 1 Section 3 (Issue 16 dated May 17) Clauses 3.12.6 to 9 shall be applied. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Horizontal Tail Surfaces		
CS 23.421 Balancing Loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.423 Manoeuvring Loads	AMC 23.423	INTENTIONALLY BLANK
UK23.423a INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
CS 23.425 Gust Loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.425a Gust Loads In addition to CS 23.425, and dependent on the type, role and usage, the applicable requirements of Def Stan 00-970 Part 1 Section 3 (Issue 16 dated 14 May 17) leaflets 11 and 12 shall be applied as agreed with the TAA. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
CS 23.427 Unsymmetrical Loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Vertical Surfaces		
CS 23.441 Manoeuvring Loads	AMC 23.441	INTENTIONALLY BLANK
UK23.441a INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
CS 23.443 Gust Loads	AMC 23.443	INTENTIONALLY BLANK
UK23.443a Gust Loads In addition to CS 23.443, and Dependent on the type, role and usage, the applicable requirements of Def Stan 00-970 Part 1 Section 3 (Issue 15 dated 14 May 17) leaflets 11 and 12 shall be applied. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.445 Outboard Fins or Winglets	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Ailerons and Special Devices		
CS 23.455 Ailerons	AMC 23.455 (a)(2)	INTENTIONALLY BLANK
CS 23.459 Special Devices	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
UK23.459a Bomb Bay and Door Loads The flight loading cases which arise from the conditions specified in CS 23.349, CS 23 351 and CS 23.367 are applicable to bomb bays when the doors are open and to bomb doors, their operating mechanisms and supporting structure when the doors are in all positions from fully open to fully closed and locked.	The aerodynamic loads on the bomb doors, and their distribution, shall be obtained from full scale or wind tunnel tests. Consideration shall be given to buffet effects.	INTENTIONALLY BLANK
UK23.459b Airbrakes The time for full extension or retraction of the airbrakes shall be as short as possible consistent with the handling requirements of the aeroplane.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.459c Airbrake Useable Speeds The airbrakes shall be safely usable at all speeds up to the maximum permissible speed appropriate to any possible configuration of the aeroplane, for example, high lift devices and undercarriage extended where appropriate, external stores carried, etc.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Ground Loads		
CS 23.471 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.473 Ground Load Conditions and Assumptions	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.473a Ground Load Conditions and Assumptions	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Consideration shall be given to the impulse load caused by traversing an arresting gear hook cable at all speeds up to maximum take-off speed.		
UK23.473b Operation from Surfaces other than Smooth and Hard Airfield Pavements The applicable ground load requirements of CS 23 Subpart C shall be satisfied for operations on airfield pavements (including runways) other than those assumed by CS 23, where called for in the aircraft specification.	The demonstration shall consider the following cases: (a) Rough ground operation (b) Soft ground operation (c) Operation from damaged and repaired runways. The runway surface shall be categorised using appropriate parameters. To limit the amount of testing required the applicant may consider defining a limited number of surfaces that could be defined as 'reference surfaces. A combination of modelling and flight testing, which may include both small scale and full scale model tests comprising aircraft models and ground models, should be agreed with the TAA. When applying the requirements of this section either the tyre or the shock absorber, but not both together, may be allowed to bottom provided that the ultimate reaction is not exceeded. Rough ground operation: The aeroplane configuration should be agreed with the TAA. Using the agreed model the designer shall perform a dynamic analysis of the behaviour of the whole aeroplane in the pitching and rolling planes to determine if, at any speed up to 1.15 times the maximum take-off speed, the behaviour of the aeroplane will cause burst tyres, or stresses in any of the units greater than the design ultimate stresses.	The requirements of CS-23 are based on the assumption that the surfaces from which the aeroplanes are designed to operate are smooth and hard. This clause states variations from those requirements necessary to ensure satisfactory operation from runways which do not have these characteristics. See Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), , Leaflet 48 "Operation from surfaces other than smooth hard runways" for general background to the problems of operating from semi-prepared surfaces and from damaged and repaired runways. The arbitrary stressing cases of Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Leaflet 43 may be used for design purposes in conjunction with the requirements of this section but may not be used for demonstration of compliance. An assessment shall be made of the differences in the fatigue loading spectrum from that assumed for normal operation. See Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Leaflet 49 "Specification of continuous ground unevenness" for details of surface profiles applicable to the classes of prepared and

Requirement	Compliance	Guidance
	An assessment shall be made of the resultant motion of the aeroplane and the effects of this motion, on the aeroplane, the crew and the equipment. Particular attention shall be paid to effects on crew performance, avionics, and external stores. Soft ground operation: An assessment shall be made of the effects of roughness on vertical, drag, and side loads during landing. An assessment shall be made of the effects of softness on take-off and landing distances. An assessment shall be made of the effects of softness on vertical, drag, and side loads during take-off and landing. Operation from damaged and repaired runways: The cases to be considered are stated in Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Tables 8, 9, 10. Each case shall be applied to each undercarriage unit separately and considered for: (a) Its effect on the dynamics of the whole aeroplane and, (b) The effects of the consequent vibration on crew, equipment and structure. Issue 2	semi-prepared surface which may be specified for a particular project. See Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Leaflet 50 "Estimation of ground flotation" for a method of calculating the number of passes and sorties which may be possible from a particular semi-prepared surface. See Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Leaflet 51 "Estimation of aeroplane rolling wheel drag" for a method of estimating aeroplane performance. Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Table 8 gives the mass, speed, and special limits applicable to the obstacles to be encountered. Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Table 9 gives definitions of the bumps and hollows. Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Table 10 gives details of the repaired craters and associated load limits to be observed. Values of L to be considered are 6.5m, 12.5m and 22.5m. Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Section 4 (Issue 15, dated 14 May 17), Figs 2, 3 and 6 illustrate the obstacles. Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Figs 4 and 5 give dimensions of the bumps and hollows to be considered.

Requirement	Compliance	Guidance
		Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Leaflet 52 “The damaged and repaired runway" for background information on repair of damaged runways and the selection of a Minimum Operating Strip. See Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Leaflet 53 "Design Principles" for a summary of design features which have been found to improve the ability of the aeroplane to operate from damaged and repaired runways. For the definition of steps, bumps and hollows experienced during ground manoeuvres, for different classes of runway surface, see Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Table 7. (a) The step is defined as a simple 90° rectangular step. See Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Fig.2. (b) The bump is shown in Def Stan 00-970 Part 1, Section 4 (Issue 15, dated 14 May 17), Fig.3 and is defined as $2hx = Hs (1-\cos 2\pi x/L)$. Where L is normally assumed to be any value between 0.25m and 1.25m. (c) The hollow is the bump of (b) inverted. Issue 2
UK23.473c Trampling of Aerodrome Arresting Gear Hook Cables The design aim is to avoid impact between	At an early stage in the design, the ground clearance of all parts of the aeroplane with and without external stores shall be assessed against the recommendations of Def Stan 00-970 Part 1, Section 4 (Issue 15 dated 14 May 17), Leaflet 60. Where there	Arresting gear hook cables are now installed at many aerodromes throughout the world and aeroplanes of all types have to trample these cables during taxiing, take-off and landing.

Requirement	Compliance	Guidance
the cable and any part of the Air System except the tyres. Where impact cannot be avoided the design shall be such that the damage to the hook cable and to the aeroplane will not affect their safety or operational efficiency.	is any doubt whether adequate clearance can be provided, trampling tests at various speeds (using dummy stores where necessary) shall be done at an early stage in the development test programme. If tests show that any part of the aeroplane may be struck the action to be taken shall be discussed and agreed with the TAA in accordance with the recommendations of Def Stan 00-970 Part 1, Section 4 (issue 15 dated 14 May 17), Leaflet 60. Issue 2	For load cases related to the traversing of arrestor hook gear cables, see UK23.473a.
CS 23.477 Landing Gear Arrangement	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.479 Level Landing Conditions	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.481 Tail Down Landing Conditions	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.483 One Wheel Landing Conditions	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.485 Side load Conditions	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.493 Braked Roll Conditions	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.497 Supplementary Conditions for Tail Wheels	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.499 Supplementary Conditions for Nose Wheels	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.499a Reverse Taxi Where the aeroplane has the ability to taxi backwards, the requirements of Def Stan 00-970	Controllability of the aeroplane and the effects of braking when moving backwards should be assessed and particular attention should be given to the possibility that the aeroplane will tip onto its tail.	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Part 1 Section 4 (Issue 15 dated 14 May 17) Clauses 4.11 and 4.14 shall be applied in this sense. Issue 2	Issue 2	
CS 23.505 Supplementary Conditions for Ski Planes	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.507 Jacking Loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK25.507a Slings Proof and Ultimate Factors of not less than 2.25 and 3.0 respectively shall be achieved when either: (a) the whole aeroplane at its maximum design take-off mass less passengers and crew, if required by the aeroplane specification, or (b) any component of the aeroplane, which is required to be slung, is hanging freely from the slinging gear.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.509 Towing Loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.511 Ground Load: Unsymmetrical Loads on Multiple Wheel Units	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Water Loads		
CS 23.521 Water Load Conditions	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.523 Design Weights and Centre of Gravity Positions	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
CS 23.525 Application of Loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.527 Hull and Main Float Load Factors	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.529 Hull and Main Float Landing Conditions	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.531 Hull and Main Float Take-off Conditions	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.533 Hull and Main Float Bottom Pressures	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.535 Auxiliary Float Loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.537 Sea-wing Loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Emergency Landing Conditions		
CS 23.561 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.562 Emergency Landing Dynamic Conditions	AMC 23.562	INTENTIONALLY BLANK
UK23.562a Emergency Landing Dynamic Conditions - Military Occupant Masses. The requirements of Def Stan 00-970 Part 1, Section 4 (Issue 15 dated 14 May 17), Clause 4.22.66 and the UK Military anthropometric requirements of Def Stan 00-970 Part 1, Section 4 (Issue 15 dated 14 May 17), Leaflets 63 & 76 Table 3 shall be considered. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Fatigue Evaluation		
CS 23.571 Metallic Pressurised Cabin Structures	AMC 23.571 and AMC 23.572	INTENTIONALLY BLANK
UK23.571a INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
CS 23.572 Metallic Wing, Empennage and Associated Structures	AMC 23.571 and AMC 23.572	INTENTIONALLY BLANK
CS 23.573 Damage Tolerance and Fatigue Evaluation of Structure	AMC 23.573 (a)(1) & (3) and AMC 23.573 (b)	INTENTIONALLY BLANK
UK23.573a INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
UK23.573b INTENTIONALLY BLANK DELETED Issue 2	(a) Following completion of fatigue testing, a tear-down inspection should be conducted to reveal any significant damage to Principle Structural Elements. (b) Pending completion of the tear-down inspection, the test life used for the substantiation of any components that have not failed during the course of the test - and which may therefore contain undetected damage - should be limited to 90% of the life demonstrated by test. Issue 2	INTENTIONALLY BLANK
UK23.573c Service Monitoring DELETED Issue 2	(a) A means should be provided to estimate the fatigue damage accumulation on each individual Air System such that a fleet-wide monitoring system can be established for Air System Integrity Management.	Monitoring of Service usage links the intrinsic fatigue consumption of the structure, as achieved by design and proven by test, with the damage to which the structure is

Requirement	Compliance	Guidance
	(b) The fleet-wide monitoring system should be classified safety-related. (c) Validation of the monitor and monitoring system should be by the flight test programme. Issue 2	actually exposed. Either misidentification or underestimation of fatigue damage accumulation is a risk to Airworthiness and as such the design and implementation of the fleet-wide monitoring system will be adequate for continued safe operation of Air System where the margins for error from any source may be limited. Issue 2
UK23.573d Structural Testing Structure, fully assembled wherever possible, or otherwise in representative sub-assemblies, shall be tested at a pre-production standard. Account shall be taken of the monotonic and cyclic effects of service temperatures where these may have a significant deleterious effect on performance.	Pre-production testing must be timed so that any consequent design changes can be introduced into production with the minimum of retrospective modifications and should be under a representation of the Design Spectrum which is acceptable to the Project Authority.	INTENTIONALLY BLANK
UK23.573e Residual Strength Following completion of fatigue testing, a satisfactory residual strength shall be demonstrated. This shall be accomplished by analysis, supported, where appropriate, by evidence from additional testing and tear-down inspections.	Notwithstanding the ultimate strength capability requirements, it is permissible to use a residual strength of 1.2 $\times$ Design Limit Load in the determination of safe lives and critical crack sizes, since, by definition, these terminal conditions have a very low probability of occurrence. It is noteworthy that this assumption would be invalidated if an inspection-dependent aircraft were permitted to remain in service indefinitely. Exceptionally, the factor of 1.2 may be reduced by agreement with the Project Authority, but the factor shall never be less than 1.0, as might apply, for example, where loads are naturally limited, or Design Limit Load is associated with a discrete case that is provided to cover extreme circumstances that are independent of fatigue loading.	INTENTIONALLY BLANK DELETED Issue 2
CS 23.574	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Metallic Damage Tolerance and fatigue Evaluation of Commuter Category Aeroplanes		
CS 23.575 Inspections and Other Procedures	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
SUBPART D - DESIGN AND CONSTRUCTION		
General		
CS 23.601 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.603 Materials and Workmanship	AMC 20-29	INTENTIONALLY BLANK
UK23.603a Marking of Air System Parts In addition to the requirements of EASA Regulation 748/2012, the requirements of Def Stan 00-970 Part 1, Section 4 (Issue 15 dated 14 May 17), Clause 4.2 shall be applied to additional parts. Issue 2	The marking of existing parts to Def Stan 00-970 Part 1, Section 4 (Issue 15 dated 14 May 17), Clause 4.2 should be considered. Issue 2	INTENTIONALLY BLANK
CS 23.605 Fabrication Methods	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.605a INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
CS 23.607 Fasteners	AMC 23.607 (b)	INTENTIONALLY BLANK
UK23.607a Controlled Tightening of Bolts The application of controlled tightening to those bolts in joints which may require dismantling during servicing shall be limited to those joints	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
where the loss of tightness could result in unacceptable degradation of structural integrity, or failure of the part to perform its function. The bolt elongation technique shall not be used in such applications.		
UK23.607b Torque loading When the torque loading technique is to be used, adequate access shall be available for the use of standard service tools.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.607c Pre-loading The drawing shall show the type of pre-loading to be used, the necessary data to achieve the correct pretension and the lubricant required. The lubricant shall be compatible with any seals or non-metallic materials in the vicinity.	Consideration shall be given to controlling the pre-load of bolts in the following applications: (a) heavily loaded tension joints, (b) heavily loaded shear joints, (c) joints with a group of bolts sharing the load, (d) joints subject to thermal strain (see UK23.607d), (e) joints where the manner of carrying load in the joint is affected by the pre-load of a bolt, (f) Joints subjected to Cyclic Loading.	INTENTIONALLY BLANK
CS 23.609 Protection Of Structure	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.609a INTENTIONALLY BLANK DELETED Issue 3	INTENTIONALLY BLANK DELETED Issue 3	INTENTIONALLY BLANK DELETED Issue 3
CS 23.611 Accessibility Provisions	AMC 23.611	INTENTIONALLY BLANK
UK23.611a Accessibility Provisions	(a) The intent is to ensure that EWIS components are installed so that inspections, tests, repairs, and	See CS25.1719 and AMC25.1719

Requirement	Compliance	Guidance
Means must be provided to allow for inspection of the Electric Wire Installation System (EWIS) and the replacement of its components as necessary for continued airworthiness.	replacements can be undertaken with a minimum of aircraft disassembly. When adjacent structures and aircraft systems components must be removed to allow access to wire installations, new possibilities for contamination, chafing, and other types of damage are introduced. (b) As far as practicable, EWIS components should be installed so that inspections, tests, repair, and replacements can be done without undue disturbance to the EWIS installation or to surrounding aircraft systems. During the design phase, consider minimizing the amount of aircraft disassembly required to perform such tasks. For example, wiring inside conduit may incur damage from chafing against the sides of the conduit. If failure of wiring inside a conduit can lead to an unsafe condition, a means should be provided for inspection of those wires. Inspection may be by testing or other means acceptable to the TAA and should be included in the maintenance requirements that are part of the Instructions for Continued Airworthiness.	
CS 25.613 Material Strength Properties and Design Values	AMC 23.613	INTENTIONALLY BLANK
CS 25.619 Special Factors	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 25.621 Casting Factors	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.623 Bearing Factors	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.625 Fitting Factors	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 25.627 Fatigue Strength	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
CS 23.629 Flutter	AMC 23.629	INTENTIONALLY BLANK
Wings		
CS 23.641 Proof of Strength	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Control Surfaces		
CS 23.651 Proof of Strength	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.655 Installation	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.657 Hinges	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.659 Mass Balance	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Control Systems		
CS 23.671 General	AMC 23.671	INTENTIONALLY BLANK
UK23.671a Having reached any operating point in the Permissible Flight Envelope, there shall be adequate margin of control available to enable the Air System to be safely restored to the appropriate Service Flight Envelope without any design limitations being exceeded. Issue 2	(a) The Service Flight Envelope should include the manoeuvres and profiles necessary to meet the Operational requirement. In particular, the rates and accelerations of roll, pitch, yaw, heave, angle of attack and sideslip, thrust and combinations thereof should be considered. (b) Ground operations, including starting, taxying, take-off, landing and stopping should be included in the Service Flight Envelope. When addressing ground operations, the slope, surface and movement (deck motion) should be considered.	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
	Issue 2	
UK23.671b Where appropriate, the design shall be such that each control system will retain any given setting and will not tend to creep under control loading or vibration. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK Issue 2
CS 23.672 Stability Augmentation and Automatic and Power Operated Systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.672a Active Control Systems (where fitted) Issue 2	INTENTIONALLY BLANK	Where necessary for reasons of safety, an override facility for specific active control system modes may be provided as required in the Air System Specification, subject to remaining within structural limits. Issue 2
CS 23.673 Primary Flight Controls	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.675 Stops	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.677 Trim Systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.679 Control System Locks	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.681 Limit Load Static Tests	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.683 Operation Tests	AMC 23.683	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
CS 23.685 Control System Details	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.687 Spring Devices	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.689 Cable Systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.689a The ultimate factor for cables The ultimate factor for cables shall be 2.0 and for chains shall be 3.0.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.693 Joints	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.697 Wing Flap Controls	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.699 Wing Flap Position Indicator	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.701 Flap Interconnection	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.703 Take-Off Warning System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Landing Gear		
CS 23.721 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.721a INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2

Requirement	Compliance	Guidance
UK23.721b Shimmy or related dynamic instabilities Shimmy or related dynamic instabilities of any of the undercarriage units shall not occur at any speeds up to 1.15 times maximum take-off speed at any aeroplane CG and loading conditions and under any required runway surface conditions.	(a) All relevant positions of steerable and castoring wheels shall be considered. (b) Some sub-critical torsional oscillations in the shimmy mode may be acceptable provided that: (i) they can be shown to be not dangerous, (ii) they are considered in fatigue analysis, (iii) they do not affect the performance of the crew. (a) Compliance with the requirements shall be shown either by analysis or tests or both. Analysis is required if tests are limited to maximum take-off speed. Any doubts about the acceptability of residual oscillations shall be discussed with the TAA.	INTENTIONALLY BLANK DELETED Issue 2
UK23.721c Ground Clearance With the exceptions of arresting hooks and tail bumpers if fitted, there shall be positive ground clearance of all parts of the aeroplane, including all control surfaces in the most adverse position with all external stores, on a smooth hard surface in all practicable take-off and landing attitudes, with the maximum undercarriage closure and tyre compression including any combination of burst tyres and total collapse of the shock-absorber.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.721d Trampling of Aerodrome Arresting Gear Hook Cables The design aim is to avoid impact between the cable and any part of the aeroplane except the tyres. Where impact cannot be avoided the design shall be such that the damage to the hook	At an early stage in the design, the ground clearance of all parts of the aeroplane with and without external stores shall be assessed against the recommendations of Def Stan 00-970 Part 1, Section 4 (Issue 15 dated 14 May 17), Leaflet 60. Where there is any doubt whether adequate clearance can be provided, trampling tests at various speeds (using dummy stores where necessary) shall be done at an early stage in the development test programme.	Arresting gear hook cables are now installed at many aerodromes throughout the world and aeroplanes of all types have to trample these cables during taxiing, take-off and landing. For load cases related to the traversing of arrestor hook gear cables, see UK23.473a.

Requirement	Compliance	Guidance
cable and to the aeroplane will not affect their safety or operational efficiency.	If tests show that any part of the aeroplane may be struck the action to be taken shall be discussed and agreed TAA in accordance with the recommendations of Def Stan 00-970 Part 1, Section 4 (Issue 15 dated 14 May 17), Leaflet 60. Issue 2	
CS 23.723 Shock Absorption Tests	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23 723a Shock Absorption Tests Refer to Def Stan 00-970 Part 1 Section 4 (Issue 15 dated 14 May 17) 4.11.42 to 4.11.45 Leaflet 46 Paragraph 3.1 for design vertical load velocity. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.725 Limit Drop Tests	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.726 Ground Load Dynamic Tests	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.727 Reserve Energy Absorbsion Drop Tests	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.729 Landing Gear Extension and Retraction System	AMC 23.729 (g)	INTENTIONALLY BLANK
CS 23.731 Wheels	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.733 Tyres	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.735 Brakes	AMC 23.735 (c)	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
UK23.735a Parking Brake The parking brake shall be capable of meeting the requirements of CS 23.735 for at least 24 hours when all engines are stopped, when flying control locks have been applied, and no power is supplied from an outside source.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.735b Capacity of the Normal Power Supply The capacity of the normal power supply with main or auxiliary power units working as in the normal landing run, and the capacity of the reserve power supply with no main or auxiliary power units working, shall have the capacity for at least 10 full applications of the brakes when the anti-skid system is not in action or is not fitted.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.735c Anti-Skid System Unless otherwise stated in the Aeroplane Specification an anti-skid system approved by the TAA shall be provided for all braked wheels. CS 23 and AMC Anti-Skid requirements shall be met.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.737 Skis	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.745 Nose/Tail-Wheel Steering	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Floats and Hulls		
CS 23.751	INTENTIONALLY BLANK	Refer to Mil-A-8864

Requirement	Compliance	Guidance
Main Float Buoyancy		
CS 23.753 Main Float Design	INTENTIONALLY BLANK	Refer to Mil-A-8864
CS 23.755 Hulls	INTENTIONALLY BLANK	Refer to Mil-A-8864
CS 23.757 Auxiliary Floats	INTENTIONALLY BLANK	Refer to Mil-A-8864
Personnel and Cargo Accommodations		
CS 23.771 Pilot Compartment	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.771a INTENTIONALLY BLANK DELETED Issue 2	(a) The requirements for the pilot compartment should also apply to all crew workstations and consider all members of the crew. (b)The pilot compartment and any other crew workstation design should consider: (1) the anthropometric range specified for that air system within the platform Target Audience Description; (2) the clothing and equipment detailed in the Aircrew Equipment Assembly Schedule appropriate to the particular Air System; and (3) normal and emergency tasks required to be conducted by the crew. Issue 2	The design of all crew workstations including the pilot compartment is to consider the relevant technical guides supporting Def Stan 00-251 (Human Factors Integration in Defence Systems). Issue 2
UK23.771b The noise environment within the Air System shall allow all crew members to maintain effective performance during safety critical tasks: (a) Without undue noise interference with communications or auditory monitoring tasks; (b) Without undue risk of hearing impairment and	(a) The whole crew communications system including any flying helmets and headsets should be evaluated for both noise level and the amount of speech that is audible to crew members when communicating. (b) In order to provide adequate protection against permanent hearing losses, the noise level, from all sources, at the ear, measured over a whole mission	(a) See Section 2.4 (2.4.4.1) for specialised guidance regarding the evaluation of Air System internal noise levels with respect to safe operation and health, effective crew communication and auditory monitoring tasks.

Requirement	Compliance	Guidance
mental or physical fatigue; and (c) Without allowing the non-auditory effects to unduly interfere with their performance. Issue 2	profile, should not exceed an 8-hour leg (equivalent continuous noise level) of 85 dBA. Issue 2	(b) The exposure limit values within the UK Control of Noise at Work Regulations is to be considered. Issue 2
UK23.771c The vibration environment within the Air System shall not impair the working efficiency of all crew members to the extent that it compromises safe operation, nor shall it constitute a long-term health risk. Issue 2	The effect of vibration on visual and manipulative tasks and crew fatigue and discomfort should be assessed. Issue 2	INTENTIONALLY BLANK Issue 2
CS 23.773 Pilot Compartment View	AMC 23.773	INTENTIONALLY BLANK
UK23.773a External Vision Issue 2	The external view at all crew workstations should provide a sufficiently extensive, clear, and undistorted view, to enable all crew members to maintain spatial awareness and perform all of their tasks, including during precipitation, fogging and icing conditions. Issue 2	Crew tasks to be considered include, but are not limited to: (a) Air System handling during all manoeuvres within the operating limitations of the Air System, including VSTOL flight; (b) monitoring external landing aids; (c) close and tactical formation flying; (d) lookout; (e) navigation; (f) crew members providing information the handling pilot to support Air System manoeuvring; (g) AAR (including viewing the in-flight refuelling system and associated visual signals when approaching and when in the refuelling position); (h) weapon aiming; (i) delivery of stores; (k) surface and maritime search; (l) contrail formation observation;

Requirement	Compliance	Guidance
		(m) Night vision device operation. Issue 2
UK23.773b In-flight Refuelling - Vision In aeroplanes utilizing in-flight refuelling, sufficient vision must be provided for the pilot to see the tanker, refuelling signal lights, boom and probe (or drogue) when approaching and when in position for refuelling.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.773c Crew Station Layout Controls, consoles, instrument panels, head-up display ancillary equipment and other structures shall be located so as not to critically restrict the vision of the pilot(s), neither directly nor as a consequence of reflections from the surfaces of the transparencies.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.773d INTENTIONALLY BLANK DELETED Issue 2	A sufficient space envelope should be available to enable the head movement required to allow a sufficiently extensive, clear and undistorted view for safe operation in the Air System's intended role: (a) whilst wearing all clothing and equipment detailed in the Aircrew Equipment Assembly Schedule for all crew stations appropriate to the particular Air System; (b) considering the anthropometric range specified in the platform Target Audience Description. Issue 2	Note: a pilot does not view from the Air System design eye position when wearing Night Vision Devices. Issue 2
CS 23.775 Windshields and Windows	AMC 23.775 (f) & (g)	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
UK23.775a INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
UK23.775b Windshields and Windows – Bird-strike Windshield and Windows, Bird strike requirements are contained in Clause UK 3.3.3 Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK Issue 2
CS 23.777 Cockpit Controls	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.777a Three-Position Toggle Switches Three-position toggle switches shall be "OFF" when the dolly is at the central position, unless operationally or technically undesirable.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.777b INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
UK23.777c Prevention of Inadvertent Operation (a)..Locking wire or pins shall not be used to prevent inadvertent operation of controls or switches for any normal, standby or emergency services which may be required at any time during flight.	For the emergency controls and switches defined in UK23.777b, the guards shall be so designed that operation of the controls by a single movement of a gloved hand is possible; such guards should where practicable, be of the "blinker" type. For standby controls and switches, a gate device is an acceptable form of guard.	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
(b)..All emergency and standby controls and switches which are liable to accidental operation shall be protected by guards.		
UK23.777d 'Tell-Tail' Devices A "tell-tale" device to indicate that an emergency or standby system has been operated shall only be fitted where the system is irreversible from the cockpit control or where the fact that the system has been operated is not immediately obvious.	Copper wire may be used as a tell-tale in accordance with FAP101A-0001-1, Chapter 2, but only where no other method is possible because there is a chance that incorrect quality of wire (for example steel locking wire) might be used as a replacement. To prevent broken wire becoming a loose article hazard the method of attaching the tell-tale shall follow the principles contained in FAP101A-0001-1, Chapter 2.	INTENTIONALLY BLANK
UK23.777e INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
CS 23.779 Motion and Effect of Cockpit Controls	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.781 Cockpit Control Knob Shape	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK.781a Operation with Gloved and Cold Hands The design and installation of all hand operated controls and switches shall be such that there is no difficulty in obtaining an effective grip or in operating the control with cold hands. Control knobs shall be of distinctive shape to assist both visual identification and tactual identification with the gloved hand. Control wheels and knobs should be made of material of poor conductivity (e.g., plastic) where they will be touched or gripped.	Control wheels and knobs shall be as large as possible for their function and the periphery shall be corrugated in preference to being milled or knurled. Press switches shall not be used unless they are essential to the operation of the service controlled, e.g., gun firing, bomb release, etc.	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
All hand operated controls and switches shall be so positioned that they may be readily operated with gloved hands.		
UK.781b INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
CS 23.783 Doors	AMC 23.783 (b)	INTENTIONALLY BLANK
UK23.783a Inspection or Access Panels and Hatches Inspection or access panels and hatches which it may be necessary to use in flight, shall be so arranged that it is impossible for them to be obstructed by seats or other role equipment.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.783b Doors, Proof and Ultimate Load Factors Doors, hoods and hatches shall have proof and ultimate factors of not less than 1.125 and 1.5 respectively on the loads arising during any of the follow conditions (a) flight conditions for which the aeroplane is designed. (b) The aeroplane stationary with the doors, hoods and hatches secured in the fully open position in winds of up to 20 m/s (39 kt) from any direction. (c) With doors, hoods and hatches secured in the fully closed positions for the landing and take-off cases.	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
In addition, if the doors, hood or hatch is part of the pressure cabin it shall meet the strength requirements of CS 23 365.		
UK23.783c Gaps Measures shall be taken to minimise gaps occurring at leading edges of doors, hoods and hatches when locked and under any flight condition likely to be encountered.	Gaping which may occur elsewhere shall be such as to minimise stresses, buffet or vibration.	INTENTIONALLY BLANK
CS 23.785 Seats, Berths, Litters, Safety Belts and Shoulder Harnesses	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.785a Crew restraint - Open door in flight Structural attachment points shall be provided for the attachment of crew harness configurations when operations require crew members to stand near an open door in flight.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.785b There shall be a proof factor not less than 1.0 for ejection seats, all parts of their installation and adjacent parts of the air system structure which might by failing: (a) prevent the proper completion of the ejection, or in the case of multi-seat Air Systems, (b) prejudice the escape of the crew members, or (c) adversely affect the flying characteristics of the Air System. Issue 2	This should be shown under the combination of the most critical flight loads and the ejection gun thrust. Issue 2	INTENTIONALLY BLANK
UK23.785c (a) Crew harness shall prevent injury to the user	The design of the structure, seats, harnesses and all relevant systems should consider:	(a) Human Tolerance Limits are provided in Table 1 (2.4.4.2.1).

Requirement	Compliance	Guidance
caused by multi-directional forces acting singly or together up to the level of human tolerance. (b) The occupant mass for design cited in CS 23.785 shall not apply; it is inappropriate for military aircrew; instead, occupant mass for design shall use the platform Target Audience Description, wearing Aircrew Equipment Assemblies as required. Issue 2	(a) ejection, where an ejection seat is fitted. (b) the anthropometric range specified for that Air System within the platform Target Audience Description (TAD); and (c) the clothing and equipment detailed in the Aircrew Equipment Assembly Schedule appropriate to the particular Air System; (d) the relevant technical guides supporting Def Stan 00-251; (e) if the Air System's intended role includes the possible use of an Air System arresting system during normal or emergency landings. Issue 2	(b) Maximum practical area is to be provided by the harness webbing in order to distribute the loads without injury. Issue 2
UK23.785d (a) It shall be impossible to fasten or use the harness incorrectly. (b) Release of the crew member from the seat without a parachute or survival equipment shall be provided by activation of a single control to permit immediate ground escape. Where parachute harnesses are used separately from restraint harnesses, the same requirements apply. When harnesses are so combined, it is essential that the parachute function of the harness is not compromised Issue 2	It should be possible for an aircrew member to fit their harness without aid. Issue 2	(a) Retention of the survival equipment may be required when ditching. (b) Suitable stowage for the components of the unfastened harness are be provided as an aid to strapping in, especially in confined cockpits Issue 2
UK23.785e Crew harness shall incorporate a negative g strap. Issue 2	INTENTIONALLY BLANK.	INTENTIONALLY BLANK
UK23.785f	Where parachute harnesses are used separately from restraint harnesses, the same requirements should apply.	When harnesses are combined, it is essential that the parachute function is not

Requirement	Compliance	Guidance
Where restraint and parachute harnesses are combined into one assembly, either torso or seat mounted, the restraint harness requirements shall cover both applications, with the proviso that the harness geometry shall positively exclude inadvertent escape from the harness. Issue 2	Issue 2	compromised Issue 2
UK23.785g (a) The restraint and parachute harness and release fitting shall be designed so that all components of the harness can be released from a single point. (b) In order to prevent inadvertent release, a release action requiring two separate, differing and sequenced actions shall be incorporated. Issue 2	(a) The action should be either a rotary, depressing or lifting type and the particular actions required should be clearly described on the fitting. (b) In addition, the action should be simple, capable of being conducted with either hand in hot, cold or wet environments and in darkness wearing equipment appropriate to the crew task. Aircrew should be able to determine by feel alone whether the quick release fitting is locked or released. (c) Variations of the types of release action should be minimised to reduce confusion in an emergency. Issue 2	Quick release fittings which eject the lugs or attachments on release to prevent inadvertent re-locking are preferable. Issue 2
UK23.785h (a) Multi-directional rather than unidirectional sensitive inertia reels shall be used. (b) A control shall be provided so that the reel can be mechanically locked. Issue 2	(a) The force retracting the strap into the reel should not be less than 22 N at 50 mm extension of the strap and not less than 10 N at full retraction. (b) Inertia reels incorporating powered retraction devices should be capable of retracting the most critical aircrew member and equipment specified into the correct position with minimal time delay against a minimal acceleration load of 3 g acting in any direction. Issue 2	INTENTIONALLY BLANK Issue 2
UK23.785i Unoccupied seats shall be provided with a means of preventing the movement of articles attached to or associated with the seat.	The stowage arrangements should ensure the security of the articles under all conditions and manoeuvres throughout the Flight Envelope.	INTENTIONALLY BLANK Issue 2

Requirement	Compliance	Guidance
Issue 2	Issue 2	
CS 23.787 Baggage and Cargo Compartments	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.791 Passenger Information Signs	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.803 Emergency Evacuation	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.803a Each crew member, when wearing the clothing and equipment detailed in the Aircrew Equipment Assembly Schedule for the particular Air System, shall be able to leave the Air System safely: (a) in all conditions of symmetric and asymmetric controlled flight within the operating limitations of the Air System; (b) all conditions likely to arise after control has been lost, including a spin; (c) after crash landing or ditching; (d) on the ground Issue 2	INTENTIONALLY BLANK Issue 2	INTENTIONALLY BLANK
UK23.803b All Air System capable of speeds in excess of 260 Kts EAS in level flight shall be provided with an assisted escape system that provides a means of escape. Issue 2	An assisted escape system should provide means for crew to get clear of the Air System with the least physical effort, in the least possible time and to make a safe descent. Issue 2	INTENTIONALLY BLANK
UK23.803c Where assisted escape systems are used, there shall be a means for ground crew or aircrew to inhibit the escape system to prevent inadvertent	Unless it can be shown by safety analysis that failure of the inhibit system is improbable, the devices that inhibit the system should be mechanical only.	The number of devices, error modes and the likelihood of human error are to be addressed in the safety analysis.

Requirement	Compliance	Guidance
initiation of the system when the Air System is parked or undergoing maintenance. Issue 2	Issue 2	Issue 2
UK23.803d There shall be prominent and clear visual indications to the aircrew and the ground crew as to whether an assisted escape system is in an inhibited or enabled state. Issue 2	Where removable devices are used as part of the system to inhibit an assisted escape system, suitable stowage should be provided within the Air System. Issue 2	INTENTIONALLY BLANK
UK23.803e Where an assisted escape system is not used, the entire crew shall be able to exit the crew compartments during flight, wearing a parachute, within 10 seconds of the order to abandon being given. Issue 2	Exit of the air system should be possible when wearing the clothing and equipment detailed in the Aircrew Equipment Assembly Schedule appropriate to the particular Air System. Issue 2	INTENTIONALLY BLANK
CS 23.805 Flight Crew Emergency Exits	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.805a Flight Crew Emergency Exits Dependent on the type and role of aircraft the requirements for escape in flight listed in Def Stan 00-970 Part 1 Section 4 (Issue 15 dated 14 May 17) Clause 4.23 and Def Stan 00-970 Part13 – Section 11 (Issue 13 dated 28 Sep 17) Clause 11.6 shall be applied. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.807 Emergency Exits	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
UK23.807a Emergency Exits Dependent on the type and role of aircraft, the requirements for escape in flight listed in Def Stan 00-970 Part 1 Section 4 (Issue 15 dated 14 May 17) Clause 4.23 and Def Stan 00-970 Part 13 Section 1 (Issue 13 dated 28 Sep 17) Clause 1.6.15.2 shall be applied for number of exits required. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.811 Emergency Exit Marking	Dependent on the type and role of the aeroplane, the TAA shall, in consultation with MAA/CAA, decide the use of either CS 23.811 or UK23.811a	INTENTIONALLY BLANK
UK23.811a Emergency Exit Marking Military Dependent on the type and role of the aeroplane, the TAA shall, in consultation with MAA/CAA, decide the use of either CS 23.811 or UK23.811a. The words "EMERGENCY EXIT", plus any supplementary information, e.g., "DITCHING EXIT" as may be necessary, together with instructions in simple terms for operating, e.g., "PULL" or "TURN", with an arrow indicating the direction of operation shall be placed as near as possible to the control.	The arrow shall be golden yellow (BS381#356) and the letters shall be black on a golden yellow background. The letters of the title shall be not less than 25.4mm high and the letters of the instructions not less than 12.7mm high. On transport and maritime aeroplanes, the contour of the emergency exits shall be indicated by slanting alternatively black and golden yellow stripes.	This requirement will need to be assessed against the aeroplane type and operational requirement by the TAA. See also STANAG 3230 - Emergency Markings on Aircraft.
CS 23.812 Emergency Lighting	INTENTIONALLY BLANK	INTENTIONALLY BLANK DELETED Issue 2
CS 23.813	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Emergency Exit Access		
UK23.813a Stretchers and Support Structure Stretchers and their support structure shall be designed to minimise interference with evacuation. Harnesses shall be designed not to form obstructive loops when not in use.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.815 Width of Aisle	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.815a Minimum Width of Aisle Dependent on the aircraft type and role, Minimum Aisle Widths shall be increased above the values of CS 23.815 if required by the TAA to meet military specific requirements' Examples of such requirements are passengers flying with bulky equipment while seated (e.g. body armour, weapons/kit etc.).	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.831 Ventilation	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.831a If an oxygen system is installed in the Air System, it shall: (a) effectively provide oxygen to each user to prevent the effects of hypoxia; and (b) be free from hazards in itself, in its method of operation, and its effect upon other components. Issue 2	INTENTIONALLY BLANK	Note that some compartments will be susceptible to contaminants from smoke, gun gas and fuel vapours, etc, which must be prevented from entering the Air System ventilation system. Issue 2

Requirement	Compliance	Guidance
Pressurisation		
CS 23.841 Pressurised Cabins	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.841a Pressurised Cabins Dependent on the type and role of the aeroplane the following shall apply; In addition to the requirements of clause CS25.841 (provision of cabin pressure altitude of not more than 2438 m (8000 ft.) at the maximum operating altitude under normal operating conditions), the maximum cabin differential pressure shall be as high as possible consistent with weight and other considerations. At least it shall be such that a cabin altitude of 1,850 m (6,060 ft.) is maintained at the maximum cruising altitude stated in the Aeroplane Specification.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.841b Pressurised Cabins Dependent on the aeroplane type and role, means shall be provided whereby the pressure differential can be reduced to zero at any altitude. Caution information must be provided to alert the crew when the aeroplane is under controlled depressurisation in flight conditions above 8000 ft. to remind them that oxygen supply for the crew and occupants is required.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.843 Pressurisation Tests	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.843a	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Tests for pressurised cabins Dependent on type and role as agreed by the TAA the requirements of Def Stan 00-970 Part 1 Section 3 (Issue 16 dated 14 May 17) Clauses 3.7.42 to 46 shall be applied. Issue 2		
Fire Protection		
CS 23.851 Hand Fire Extinguishers	AMC 23.851 (c)	INTENTIONALLY BLANK
UK23.851a Hand Fire Extinguishers In addition to the requirements of CS 23.851 the aeroplane shall be fitted with handheld extinguishers as follows: (a) For aeroplanes fitted with electronic equipment or any other equipment which may cause fire or smoke, and which is accessible to the crew there shall be hand-held fire extinguishers located throughout the cabin in positions which are easily accessible to the crew. (b) Where the role or specific mission of the aircraft increases the likelihood of fire in the cabin to a greater extent than a CS 23 certified aircraft the TAA shall determine, together with the Aircraft Designer, the appropriate number and location of extinguishers to mitigate such risks.	See AMC CS 23.851 Extinguishers should comply with approved specifications such as AFNOR NF EN 3 Part 1-6, BS 5306 and BS 7867.	INTENTIONALLY BLANK
UK25.851b INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2

Requirement	Compliance	Guidance
CS 23.853 Passenger and Crew Compartment Interiors	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.853a Interior Aeroplane Colours Military aircraft internal colour schemes shall comply with the requirements of Def Stan 00-970 Part 1, Section 7 (Issue 14 dated 14 May 17) Clause 7.4 unless otherwise agreed by the TAA. Issue 2	Also refer to DAP 119-0601-0 Series and Def Stan 05-18	INTENTIONALLY BLANK
CS 23.855 Cargo and Baggage Compartment Fire Protection	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.859 Combustion Heater Fire Protection	INTENTIONALLY BLANK	Intentionally
CS 23.863 Flammable Fluid Fire Protection	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.865 Fire Protection of Flight Controls, Engine Mounts, and Other Flight Structure	AMC 23.865	INTENTIONALLY BLANK
CS 23.867 Electrical Bonding and Protection against Lightning and Static Electricity	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.867a INTENTIONALLY BLANK DELETED Issue 2	Electrical systems for Flammable Fluid Fire Protection should comply with STANAG 3659 (Electrical Bonding Requirements for Metallic Aircraft Systems),(latest version). Electrical systems for Flammable Fluid Fire Protection should comply with Defence Standard 59-411 'Electromagnetic Compatibility Parts 1-5', (Latest Version) and Defence Standard 59-113' Lightning Strike Protection Requirements for Service Aircraft' (latest version).	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
	'Safety Principles for Electrical Circuits in Systems Incorporating Explosive Components', (latest version). Issue 2	
Miscellaneous		
CS 23.871 Levelling Means	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
SUBPART E - POWERPLANT		
General		
CS 23.901 Installation	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.901a Installation In in place of CS 23.901(d)(2), the following shall be applied. Ensure that the capability of the installed engine to withstand the ingestion of rain, hail, ice and birds into the engine is not less than the capability established for the engine itself under CS 23.23.903(a)(1).	INTENTIONALLY BLANK	This reflects EASA Special Conditions and 14 CFR Part 23 [Docket No. FAA-2009-0738; Amendment No. 23-62].This should be read in conjunction with FAA AC 23-16A.
CS 23.903 Engines and Auxiliary Power Units	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.903a Military Requirements for Gas Turbine Engines Engines fitted to small aeroplanes should be certificated to the requirements of Def Stan 00-970 Part 11. Where reference is made in CS 23 to a requirement in CS-E then this shall be interpreted to mean the corresponding requirement in Def Stan 00-970 Part 11. Where applicable to the role and use of the aeroplane, the requirements of Def Stan 00-970 Part 11 Section 4 shall be applied as determined by the TAA in conjunction with the MAA Project Certification Manager.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.903b	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Embedded Engines For engines embedded in the fuselage behind the cockpit or cabin, the effects of a fan exiting forward of the inlet case (fan disconnect) must be addressed, the occupants must be protected, and the aeroplane must be controllable to allow for continued safe flight and landing.		
CS 23.904 Automatic Power Reserve System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.905 Propellers	AMC 23.905 (e) & (g)	INTENTIONALLY BLANK
CS 23.907 Propeller Vibration	AMC 23.907 (a)	INTENTIONALLY BLANK
CS 23.909 Turbo Charger Systems	AMC 23.909 (d)(1)	INTENTIONALLY BLANK
CS 23.925 Propeller Clearance	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.929 Engine Installation Ice Protection	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.933 Reversing Systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.934 Turbo-jet and Turbofan Engine Thrust Reverser System Tests	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.937 Turbo-propeller-Drag Limiting Systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.937a Turbo-propeller-Drag Limiting Systems & Feathering Systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Dependent on type and role as agreed with the TAA the following requirements shall be applied: Feathering: (a) Each propeller must have the capability of being feathered under the most adverse conditions of altitude and airspeed likely to arise following sudden engine failure. (b) On multi-engine aeroplanes, a cycle of feather, unfeather and feather shall be possible over the range of operating conditions approved for the aeroplane. (c) On single engine aeroplanes, it is desirable that the conditions of (b) shall be met, unless a system capable of carrying out only one complete feather can be justified with the agreement of the TAA who will assess the need for carrying out feathering and unfeathering during training. (d) The feathering system for each propeller shall be separate from and independent of those of other propellers. Means to prevent inadvertent operation shall be provided.		
CS 23.939 Powerplant Operating Characteristics	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.943 Negative Acceleration	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Fuel System		
CS 23.951 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.951a INTENTIONALLY BLANK	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
DELETED Issue 2	DELETED Issue 2	DELETED Issue 2
CS 23.953 Fuel System Independence	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.954 Fuel System Lightning Protection	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.955 Fuel Flow	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.957 Flow Between Interconnected Tanks	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.959 Unusable Fuel Supply	AMC 23.959 (a)	INTENTIONALLY BLANK
CS 23.961 Fuel System Hot Weather Operation	AMC 23.961	INTENTIONALLY BLANK
CS 23.963 Fuel Tanks: General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.963a Fuel Tanks: General In addition to CS 23.963 and dependent on the type and role of the aeroplane as agreed by the TAA. All aeroplanes shall have at least two fixed internal tanks unless otherwise agreed with the TAA. These may be built as a single unit provided that the divisions between them are fuel tight and that each has an independent inlet, outlet and venting connection. Each metal tank must be protected against corrosion and the possibility of corrosion resulting from microbiological contamination of fuel.	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Each jettisonable tank shall be provided with a fuel feed system arranged so that not less than 95 per cent of the maximum tank capacity is available when the aeroplane is in the normal flying attitude.		
CS 23.965 Fuel Tank Tests	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.965a Fuel Tanks Tests In aeroplanes designed for military operations, all production metal tanks, integral tanks, flexible bag tanks and jettisonable tanks when installed, shall be subjected to a static pressure test of not less than one third of the appropriate design proof pressure without leakage.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.967 Fuel Tank Installation	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.969 Fuel Tank Expansion Space	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.971 Fuel Tank Sump	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.973 Fuel Tank Filler Connection	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.975 Fuel Tank Vents and Carburettor Vapour Vents	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.977 Fuel Tank Outlet	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.979 Pressure Fuelling System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.979a	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Suction De-fuelling System For aeroplanes employing suction defueling systems the de-fuelling system (not including fuel tanks and fuel tank vents) must withstand an ultimate load that is 2.0 times the load arising from the maximum permissible defueling pressure (positive or negative) at the aeroplane fuelling connection.		
Fuel System Components		
CS 23.991 Fuel Pumps	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.993 Fuel System Lines and Fittings	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.994 Fuel System Components	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.995 Fuel Valves and Controls	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.997 Fuel Strainer or Filter	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.999 Fuel Systems Drains	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1001 Fuel Jettisoning System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1001a INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
Oil System		

Requirement	Compliance	Guidance
CS 23.1011 General	AMC 23.1011 (b)	See also AMC23.1011(c)
CS 23.1013 Oil Tanks	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1015 Oil Tank Tests	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1017 Oil Lines and Fittings	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1019 Oil Strainer or Filter	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1021 Oil System Drains	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1023 Oil Radiators	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1027 Propeller Feathering System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Cooling		
CS 23.1041 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1043 Cooling Tests	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1045 Cooling Test Procedures for Turbine Engine – powered Aeroplanes	AMC 23.1045 (b)	INTENTIONALLY BLANK
CS 23.1047 Cooling Test Procedures for Reciprocating Engine powered Aeroplanes	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Liquid Cooling		

Requirement	Compliance	Guidance
CS 23.1061 Installation	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1063 Coolant Tank Tests	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Induction System		
CS 23.1091 Air Induction System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1091a Air Intake System If the engine air intake system contains parts or components that could be damaged by foreign objects entering the air intake, it must be shown by tests or, if appropriate, by analysis that the air intake system design can withstand the foreign object ingestion test conditions of CS–E 790 and CS–E 800 without failure of parts or components that could create a hazard.	See CS25, AMC25.1091	INTENTIONALLY BLANK
CS 23.1093 Induction System Icing Protection	INTENTIONALLY BLANK	Refer also to CS 23.1419
CS 23.1095 Carburettor De-Icing Fluid Flow rate	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1097 Carburettor De-Icing Fluid System Capacity	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1099 Carburettor De-Icing Fluid System Detail Design	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1101 Induction Air Pre-heater Design	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1103 Induction System Ducts	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
CS 23.1105 Induction System Screens	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1107 Induction System Filters	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1109 Turbocharger Bleed Air System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1111 Turbine Engine Bleed Air System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Exhaust System		
CS 23.1121 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1123 Exhaust System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1125 Exhaust Heat Exchangers	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Powerplant Controls and Accessories		
CS 23.1141 Powerplant Controls: General	AMC 23.1141 (g)(2)	INTENTIONALLY BLANK
CS 23.1142 Auxiliary Power Unit Controls	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1143 Engine Controls	AMC 23.1143 (g)	INTENTIONALLY BLANK
CS 23.1145 Ignition Switches	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1147 Mixture Controls	AMC 23.1147 (b)	INTENTIONALLY BLANK
CS 23.1149	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Propeller Speed and Pitch Controls		
CS 23.1153 Propeller Feathering Controls	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1155 Turbine Engine Reverse Thrust and Propeller Pitch Settings below the Flight Regime	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1157 Carburettor Air temperature Controls	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1163 Powerplant Accessories	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1165 Engine Ignition Systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Powerplant Fire Protection		
CS 23.1181 Designated Fire Zones; Regions Included	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1182 Nacelle Areas Behind Firewalls	AMC 23.1182	INTENTIONALLY BLANK
CS 23.1183 Lines, Fittings and Components	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1189 Shut-Off Means	AMC 25.1189 (a)(5)	INTENTIONALLY BLANK
CS 23.1191 Firewalls	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1192 Engine Accessory Compartment Diaphragm	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1193 Cowling and Nacelle	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1193a	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Cowling and Nacelle For aircraft with engine(s) embedded in the fuselage or in pylons on the aft fuselage, the requirements of CS 23.1193(g) shall be applied as agreed with the TAA.		
CS 23.1195 Fire-Extinguishing Systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1195a Fire-Extinguishing Systems For aircraft with engine(s) embedded in the fuselage or in pylons on the aft fuselage, the requirements of CS 23.1195(a), CS 23.1197, CS 23.1199 and CS 23.1201 shall be applied as agreed with the TAA. In addition, for aircraft with engine(s) embedded in the fuselage, the requirement to fit a "one-shot" or a "two-shot" fire extinguishing system in compliance with CS 23.1195(a)(2) shall be agreed with TAA.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1197 Fire-Extinguishing Agents	AMC 23.1197	INTENTIONALLY BLANK
CS 23.1199 Extinguishing Agent Containers	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1201 Fire Extinguishing System Materials	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1203 Fire-Detector System	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
SUBPART F - EQUIPMENT		
General		
CS 23.1301 Function and Installation	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1301a INTENTIONALLY BLANK Issue 2	Air System EMC should comply with: (a) Defence Standard 59-411 'Electromagnetic Compatibility Parts 1-5' (b) Defence Standard 59-114 'Safety Principles for Electrical Circuits in Systems Incorporating Explosive Components' (c) Defence Standard 59-113 'Lightning Strike Protection Requirements for Service Aircraft' Issue 2	INTENTIONALLY BLANK Issue 2
UK23.1301b Essential lettering to denote the purpose or mode of operation of controls shall be in small white letters on a black background, and clearly visible to the aircrew. For emergency controls, the lettering shall be on the control only when this can be done without impairing the clarity of the black and yellow stripes; in other cases, the lettering shall be adjacent to the control and there shall be no possibility of it being taken to refer to the wrong control Issue 2	INTENTIONALLY BLANK Issue 2	INTENTIONALLY BLANK DELETED Issue 2

Requirement	Compliance	Guidance
UK23.1301c INTENTIONALLY BLANK Issue 2	Identification symbols which can be mistaken as representing a direction of movement or flow should not be used. Issue 2	INTENTIONALLY BLANK Issue 2
UK23.1301d INTENTIONALLY BLANK Issue 2	INTENTIONALLY BLANK Issue 2	Consider the environmental effects on circuits and systems due to weapon firing, gun firing and defensive aids when designing the Air System. Issue 2
UK23.1301e INTENTIONALLY BLANK Issue 2	The design should include means for checking and adjusting the alignment of all directionally sensitive equipment and weapons with respect to a reference datum in the air system and to a tolerance acceptable to the whole system Issue 2	Where practicable, shipborne Air Systems will have means for checking and adjusting alignment at sea Issue 2
UK23.1301f Installed Systems and Equipment for use by the Flight / Mission Crew Where operation of the aeroplane requires additional crew members not located on the flight deck to use equipment that could influence the safety of the aeroplane, the design, crew member interfaces with and behaviour of these systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
and equipment shall meet the requirements of CS25.1302		
CS 23.1303 Flight and Navigation Instruments	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1305 Powerplant Instruments	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1305a Powerplant Instruments Dependent on the aeroplane type and role and as agreed with the TAA the following shall apply. If the fuel system is designed to control the c g of the aeroplane by appropriate fuel system operating procedures, then continuous indication of cg position of the aeroplane shall be provided on the pilot's instrument panel. This indication shall be based on signals received concerning the zero fuel state of the aeroplane and on signals received continuously from the fuel quantity indicator system. The indicator accuracy shall be to a standard that will satisfy the tolerances prescribed for the different c g positions according to the flight configuration and handling requirements of the aeroplane.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1306 Electrical and Electronic System Lightning Protection	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1306a System Lightning Protection	Compliance against this requirement shall be shown using Def Stan 59-113	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
All electrical and electronic flight and mission critical systems shall be designed and installed to ensure that the operation and operational capabilities of the systems to perform safe flight and landing and operational missions detailed in the Aircraft Specification are not adversely affected when the aeroplane is exposed to lightning. For functions whose failure would contribute to or cause a condition that would reduce the capability of the aircraft or the ability of the flight crew to cope with adverse operating conditions, each electrical and electronic system that performs these functions must be design and installed to ensure that these functions can be recovered in a timely manner that does not impact flight safety after the aeroplane is exposed to lightning.		
CS 23.1308 High Intensity Radiated Fields	Refer to UK23.1301c	INTENTIONALLY BLANK
CS 23.1309 Equipment, Systems and Installations	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1309a The cumulative probability of all failure conditions that result in fatalities (catastrophic and hazardous failure conditions, or as otherwise agreed with the MAA) shall be equal to, or less than, the agreed Design Safety Target at Air System level. Issue 2	Hazard analysis should be in accordance with Defence Standard 00-056 (latest version). Issue 2	INTENTIONALLY BLANK Issue 2
UK23.1309b	INTENTIONALLY BLANK	Refer to AC.23.1309-1E for guidance

Requirement	Compliance	Guidance
External rockets shall be installed so that the rocket exhaust will not be a hazard to fuel tank vent lines. Issue 2		
UK23.1309c INTENTIONALLY BLANK Issue 2	INTENTIONALLY BLANK.	See Section 2.4 Table 1 (2.4.6.1.1) for guidance on pilot response times. Issue 2
UK23.1309d Operation of an assisted escape system by any one crew member shall not result in injury to any other crew member, nor prejudice their chances of safe escape. Issue 2	INTENTIONALLY BLANK. Issue 2	INTENTIONALLY BLANK. Issue 2
UK23.1309e Safety-related Programmable Elements (PE) Verification and validation of safety-related PE shall be undertaken in accordance with Def Stan 00-055 Issue 2	To meet the stated requirement, compliance is provided in four sections: (a) System-level Safety; (b) Air System Safety-Related Software (SRS); (c) Air System Safety-related Electronic Hardware; and (d) Safety-related Multi-Core Processors: (a) System-level Safety (1) At the system level, the Safety Assessment process should define the top-level safety requirements and design objectives of the PE, as detailed in the guidance contained in Aerospace Recommended Practices (ARPs) 4761 and 4754A. (2) All aspects of the PE should be supported by a Safety Assessment Report, as described in Def Stan 00-056. Where data integrity is identified as contributing to airworthiness, assurance of the entire	Guidance Material (GM) can be found in Section 2.4 (2.4.6.2.) Issue 2

Requirement	Compliance	Guidance
	data chain should be explicitly addressed in the Safety Assessment Report. (b) Air System Safety-related Software (SRS) (1) RTCA DO-178C and its appropriate supplements (DO-248C, DO-330, DO-331, DO-332 and DO-333), should be used as an AMC to provide design assurance of Air System SRS when supported by a robust, documented and auditable Safety Assessment, as described in Def Stan 00-056. (2) For legacy SRS which is intended to be used in a new application, or as a significant development of an existing system, the following principles should apply: (a) For systems developed under Def Stan 00-55 Issue 2, it may continue to be applied as an AMC, provided the requirements of that standard continue to be met. (b) For software developed using RTCA DO-178B, it should continue to be used as an AMC under the following circumstances: i. The new application does not require a higher level of software assurance; ii. The development life-cycle is not updated to include technologies that have specific supplements in DO-178C; iii. No new software criteria 1 or 2 (as defined in DO-178C) tool qualification is required. If this is the only differentiator, then DO-178B should continue to be applied, with the tool qualification objectives provided by DO-330 being used for the new tools; iv. No new Parameter Data Item files (as defined in DO-178C) are introduced. Where this is the case,	

Requirement	Compliance	Guidance
	DO-178C should be applied to all affected areas of the software and an argument developed in the supporting safety case to show that the change has been contained. Where this is not feasible, DO-178C should be applied; and v. All the lifecycle processes and artefacts from prior certification have been maintained. (c) Air System Safety related Electronic Hardware (1) RTCA DO-254 (EUROCAE ED-80) should be used as an AMC to provide design assurance of Air System Safety-related Electronic Hardware, when supported by a robust, documented and auditable Safety Assessment, as described in Def Stan 00-056. (d) Safety-related Multi-Core Processors (MCP) (1) There is currently no definitive AMC for the assurance of MCPs in safety related applications. Issue 2	
Instruments: Installation		
CS 23.1311 Electronic Display Instrument Systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1321 Arrangement and Visibility	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1321a Magnetic Indicators When used in a cautionary category, magnetic indicators shall show a change from black to black and white diagonal stripes to indicate the non-availability or failure of a service.	In the black and white diagonal stripe presentation, there shall be at least two white stripes of not less than 0.76mm width.	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
UK23.1321b Head up Sight or Display Any head-up sight or display shall be positioned so that the pilot can see a fully deflected graticule from the aircraft design eye position. Either side of the head-up sight or display, the downward view provided for the pilot shall be in accordance with the requirements of Def Stan 00-970 Part 1 Section 4 (issue 15 dated 14 May 17) Clause 4.17 Issue 2	The design of any head-up sight installation shall be agreed with the TAA in the initial stages.	INTENTIONALLY BLANK
UK23.1321c Cockpit Lighting for NVDs Where the Air System's intended role includes the use of crew-worn night vision devices, the crew workstation controls, indications and compartment lighting shall be compatible.. Issue 2	Class C NVGs are compatible with Class B HUD lighting owing to their “leaky green” filter.	INTENTIONALLY BLANK
CS 23.1322 Warning, Caution, and Advisory Lights	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1323 Airspeed Indicating System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1325 Static Pressure System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1325a Static Pressure System The requirements of Def Stan 00-970 Part 1 Section 6 (Issue 17 dated 14 May 17) Clauses	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
6.3.1 to 6.3.36 and Def Stan 00-970 Part 1 Section 6 (Issue 17 dated 14 May 17) Leaflets 5 to 7 shall be applied. Issue 2		
CS 23.1326 Pitot Heat Indication Systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1327 Magnetic Direction Indicator	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1327a Magnetic Compass Installations Dependent on the type and role of the aeroplane, the requirements of Def Stan 00-970 Part 1 Section 6 (issue 17 dated 14 May 17) Clause 6.4 and Def Stan 00-970 Part 1 Section 6 (issue 17 dated 14 May 17) Leaflets 8 to 11 & 36 shall be applied. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1329 Automatic Pilot System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1329a Automatic Pilot System The TAA shall declare a Minimum Use Height for modes of operation where the Aeroplane Specification requires the use of Flight Guidance Systems in areas of operation which are not covered by CS25 and for which deviations in flight path as a result of system performance or failure would be hazardous. Example Low Level flight under AP/AT control.	Under the flight and environmental conditions stated in the Aeroplane Specification the System shall meet the mode requirements as defined by the TAA and shall operate in a specified flight envelope as agreed by the TAA. Any envelope restricting device or algorithm shall meet with the integrity requirements specified by the TAA.	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
CS 23.1331 Instruments Using A Power Source	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1335 Flight Director Systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1337 Powerplant Instruments Installation	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Electrical Systems and Equipment		
CS 23.1351 General	AMC 23.1351 (a)(2) and AMC 23.1351 (b)(5)(iv)	INTENTIONALLY BLANK
UK23.1351a Radio and Radar Equipment Dependent on the type and role of the aeroplane, the requirements of Def Stan 00-970 Part 1 Section 6 (Issue 17 dated 14 May 17) Clauses 6.1.1 to 6.1.41, Clauses 6.1.43 to 6.1.47 and Def Stan 00-970 Part 1 Section 6 (Issue 17 dated 14 May 17) Leaflets 1 to 3 and 10 shall be applied. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1351b Avionic Equipment Installations Dependent on the type and role of the aeroplane, the requirements of Def Stan 00-970 Part 1 Section 6 (Issue 17 dated 14 May 17) Clauses 6.2.1 to 6.2.57, Clauses 6.2.59 to 6.2.60, Clauses 6.2.62 to 6.2.63 and Def Stan 00-970 Part 1 Section 6 (Issue 17 dated 14 May 17) Leaflets 0, 2, 4, 35, and 64 shall be applied. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
UK23.1351c Electrical Systems Dependent on the type and role of the aeroplane, the requirements of Def Stan 00-970 Part 1 Section 6 (Issue 17 dated 14 May 17) Clause 6.6 and Def Stan 00-970 Section 6 (Issue 17 dated 14 May 17) Leaflets 14 to 16 and 35 shall be applied. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1353 Storage Battery Design and Installation	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1357 Circuit Protective Devices	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1359 Electrical System Fire Protection	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1361 Master Switch Arrangement	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1365 Electric Cables and equipment	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1367 Switches	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Lights		
CS 23.1381 Instrument Lights	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1381a Instrument Lighting, NVD Requirements Where NVDs are to be used, instrument and interior lighting shall be compatible..	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Issue 2		
CS 23.1383 Taxi and Landing Lights	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1383a Taxi Lamps Taxiing lamps shall be fitted on all aeroplanes and shall be such as to illuminate clearly any obstruction to the passage of the aeroplane at a distance of 4 lengths of the aeroplane ahead, and at any point from dead ahead to 8 metres outside each wing tip.	INTENTIONALLY BLANK	INTENTIONALLY BLANK DELETED Issue 2
UK23.1383b External Lighting Circuits (a) On all aeroplanes required to operate at night, the external lighting circuits shall be controlled by a single master switch. All aeroplanes shall be equipped with sufficient illumination for night formation flying. (b) All external lighting shall be dimmable. (c) There should be no possibility of downward recognition lights becoming obscured with mud during take-off.	This should normally include illumination of the sides of the fin and upper surfaces of the wing.	INTENTIONALLY BLANK DELETED Issue 2
CS 23.1385 Position Light System Installation	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1387 Position Light System Dihedral Angles	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1389 Position Light Distribution and Intensities	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
CS 23.1391 Minimum Intensities in The Horizontal Plane of Position Lights	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1393 Minimum Intensities in Any Vertical Plane of Position Lights	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1395 Maximum Intensities in Over-lapping Beams of Position Lights	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1397 Colour Specifications	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1399 Riding Light	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1401 Anti-Collision Light System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Safety Equipment		
CS 23.1411 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1411a Floatation Device Notices The words: (a) "LIFERAFT RELEASE" for the control for liferaft inflation and release, or (b) "AIRCRAFT FLOTATION" for the control for aircraft flotation gear, together with instructions in simple terms for operating, e.g., "PULL TO RELEASE LIFERAFT"', shall be placed as near as possible to the control. The letters shall be golden yellow on a black	If the control is in the form of a switch, the size of the letters may be reduced to a size appropriate to the location.	The operating handles or levers shall be coloured in accordance with UK23.1555a

Requirement	Compliance	Guidance
background. The letters of the title shall be not less than 25.4mm high and the letters of the operating instructions not less than 12.7mm high.		
UK23.1411b Life Raft Release Where liferafts are normally released directly overboard, an external means shall be provided for their release, accessible to a survivor outside the aeroplane, in addition to any internal provision for their release.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1411c INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2
UK23.1411d Liferaft and Compartment An indicator shall show if the liferaft inflation cylinder has discharged itself to atmosphere. In particular circumstances on transport aeroplanes liferafts stowed in valises may be accepted in addition to or in lieu of the pre-packed stowage type of installation. In such cases the liferaft valise shall be stowed in a designated compartment so as to be readily accessible after ditching and a suitably placed anchorage shall be provided for the static line. This line shall be incapable of submerging or capsizing the loaded liferaft when the aeroplane sinks.	The unit shall normally be situated in the cover of the liferaft stowage but if the indicator would not be readily seen in that position it can be fitted in some position slightly remote from the liferaft stowage or even in the aeroplane under surface. Consideration should be given to displaying a warning indicator in the flight deck console.	INTENTIONALLY BLANK
CS 23.1415 Ditching Equipment	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
CS 23.1416 Pneumatic De-icer Boot System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1419 Ice Protection	AMC 23.1419	INTENTIONALLY BLANK
UK23.1419a Ice Protection Dependent on the role of the aircraft the requirements of Def Stan 00-970 Part 13 (Issue 13 dated 28 Sep 17) Section 1.5 shall be considered, in particular with regard to external stores and weapon systems. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Miscellaneous Equipment		
CS 23.1431 Electronic Equipment	AMC 23.1431 (e)	INTENTIONALLY BLANK
CS 23.1435 Hydraulic Systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1435a Hydraulic Pressure Gauges Each hydraulic system must have means to minimise the release of harmful or hazardous concentrations of hydraulic fluid or vapours into the crew and passenger compartments during flight.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1435b Hydraulic Systems Refer to Def Stan 00-970 Part 1 Section 6 (Issue 17 dated 14 May 17) Clause 6.11 and CS25.1435	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Issue 2		
CS 23.1437 Accessories for Twin Engine Aeroplanes	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1438 Pressurisation and Pneumatic Systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1438a Pneumatic Systems Where applicable, the requirements of Def Stan 00-970 Part 1 Section 6 (Issue 17 dated 14 May 17) Clause 6.12 shall be applied as agreed with the TAA. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1441 Oxygen Equipment and Supply	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1443 Minimum Mass Flow of Supplemental Oxygen	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1443a Minimum Mass Flow of Supplemental Oxygen In addition to CS 23.1443 (a) (3), a provision for pressure breathing must be provided at cabin pressure altitudes between 38000 and 50000 feet to provide additional short-term protection against hypoxia.	The mean mask cavity pressure (averaged over the respiratory cycle) must increase linearly with the fall of cabin pressure altitude from 11582 m (38000 ft) to 15240 m (50000 ft). The mean mask cavity pressure must be within the range +0.1 to +1.0 kPa (0.75 to 7.5 mmHg) at 12192 m (40000 ft), and within 4.0 to 4.5 kPa (30.0 to 33.8 mmHg) at 15240 m (50000 ft).	The alveolar oxygen tension (PAO2) when 100% oxygen is breathed at ambient pressure falls below 7.3 kPa (55 mmHg) on exposure to altitudes above 40000 feet, this value of PAO2 being that below which tasks requiring complex hand-eye coordination are affected (it is equivalent to breathing air at about 10000 feet altitude). Continuous positive pressure breathing with 100% oxygen is employed above 40000 feet to provide short duration protection against hypoxia on decompression of the cabin and during subsequent emergency descent in the aircraft.

Requirement	Compliance	Guidance
		At cabin altitudes above 38000 feet the requirement for positive pressure breathing will supersede that for safety pressure.
CS 23.1445 Oxygen Distributing System	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1447 Equipment Standards for Oxygen Dispensing Units	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1447a Equipment Standards for Oxygen Dispensing Units In addition to CS 23.1447 if, as required in the Aircraft Specification, it is deemed necessary for flight deck crew to wear masks routinely during certain phases of flight, the design of flight crew masks must provide adequate comfort and robustness for long duration wear.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1447b Equipment standards for oxygen dispensing units In addition to CS 23.1447, it must be possible for the crewmember to check the integrity of connections and the absence of leaks, as well as the functioning of the oxygen system on the ground before take-off. To enable the user to test the integrity of the breathing gas and the pressure breathing system up to and including the mask-to-face seal, for aircraft operating above a pressure altitude of 38000 ft. a facility whereby pressure breathing may be obtained by the operation of a manual control must be provided, together with indication of zero or continuous flow.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1447c	See UK25.1447c for Compliance & Guidance.	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Breathing Gas Endurance In addition to CS 23.1447, the quantity of oxygen carried shall be sufficient to provide a mixture of breathing air and oxygen of acceptable quality, or 100% oxygen, as required by the cabin altitude and the breathing demands of each crewmember. The equipment shall be capable of supplying the crew member(s) with breathing gas of appropriate composition and quality, at satisfactory pressure and flow, under all flight conditions and at all altitudes to which the aircraft is required to operate.		
UK23.1447d Routine Depressurised Operations In addition to CS 23.1447, when oxygen equipment is to be used routinely by flight deck and rear crew (as required in the Aircraft Specification), for example during preoxygenation with 100% oxygen, or depressurised operations in cargo or parachute despatch, the temperature of the inspired gas must not induce discomfort or distraction.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1447e Routine Depressurised Operations In addition to CS 23.1447, when oxygen equipment is to be used routinely by flight deck and rear crew (as required in the Aircraft Specification), for example during preoxygenation with 100% oxygen, or depressurised operations in cargo or parachute despatch, at cabin altitudes between 0 and 38,000 ft. the relationship between mask cavity pressures and respiratory demands	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
(flows) must be such as to reflect minimal impedance to respiration.		
UK23.1447f Routine Depressurised Operations In addition to CS 23.1447, when oxygen equipment is to be used routinely by flight deck and rear crew (as required in the Aircraft Specification), for example during preoxygenation with 100% oxygen, or depressurised operations in cargo or parachute despatch, mask cavity pressures in excess of the requirements above (which may be induced by short-term effects, transient events or equipment failure) must be limited to levels which do not cause distress or discomfort to the crew member.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1447g Routine Depressurised Operations In addition to CS 23.1447, when oxygen equipment is to be used routinely by flight deck and rear crew (as directed by the TAA), for example during pre-oxygenation with 100% oxygen, or depressurised operations in cargo or parachute despatch, there must be minimal oscillatory activity in the mask cavity when the oxygen system is used – such activity is disconcerting for the crew member, may induce hyperventilation and can interfere with verbal communications.	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
UK23.1447h Routine Depressurised Operations In addition to CS 23.1447, when oxygen equipment is to be used routinely by flight deck and rear crew (as directed by the TAA), for example during pre-oxygenation with 100% oxygen, or depressurised operations in cargo or parachute despatch, the equipment must prevent any inadvertent admixture of greater than 2% cabin air with aircraft supplied breathing gas (this does not include deliberate oxygen dilution as part of the breathing regulator function).	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1447i Routine Depressurised Operations In addition to CS 23.1447, when oxygen equipment is to be used routinely by flight deck and rear crew (as directed by the TAA), for example during pre-oxygenation with 100% oxygen, or depressurised operations in cargo or parachute despatch, a breathing system shall not impose excessive rebreathing of expired gas.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1447j Routine Depressurised Operations In addition to CS 23.1447, when oxygen equipment is to be used routinely by flight deck and rear crew (as directed by the TAA), for example during pre-oxygenation with 100% oxygen, or depressurised operations in cargo or parachute despatch, the equipment must prevent pressure generated by trapped gas during rapid decompression from exceeding acceptable physiological limits.	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
CS 23.1449 Means for Determining Use of Oxygen	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1449a Means for Determining Use of oxygen In addition to CS 23.1449, when directed by the Project Team, oxygen system warnings and indications shall be provided at the crew stations. The warning of oxygen failure shall be provided on the Standard Warning System.	(a) No other warnings shall be incorporated in the system without prior agreement by the TAA. (b) The system shall consist of red flashing attention lights, a master audio warning signal and a central panel which indicates the particular emergency. The system shall be designed in accordance with Specification EL 1960 (see however (c) below) (c) The flashing attention lights shall be placed just below the bottom edge of the windscreen, one on either side about 9 in. (228.6 mm) from the centre of the pilot's line of sight when he is looking straight ahead. Two lights only shall be used in aeroplanes with only one pilot's station, or where the pilots sit in tandem; three lights shall be used where the pilots are seated side-by-side.	INTENTIONALLY BLANK DELETED Issue 2
CS 23.1450 Chemical Oxygen Generators	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1450a Gas Generating Systems In addition to CS 23.1450, if an aircraft is fitted with an On Board Oxygen Generator (OBOG) based system producing oxygen-enriched breathing gas from pressurised engine bleed air and/or from an auxiliary source of pressurised air, aircrew (and passengers, if applicable) must be physiologically protected in the event of a failure in the OBOG or its air supply.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1450b Gas Generating Systems	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
In addition to CS 23.1450, if an aircraft is fitted with an OBOG based system, backpressure in the vent path of OBOG beds must be minimised, as any backpressure will reduce OBOG performance and product gas oxygen concentration.		
UK23.1450c Gas Generating Systems In addition to CS 23.1450, if an aircraft is fitted with an OBOG based system, the installation must be designed such that contamination (e.g. by oil and fuel vapours, combustion products or particulate matter) in the compressed air (engine bleed air) supply to the OBOG is minimised and preferably eliminated.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1450d Gas Generating Systems In addition to CS 23.1450, if an aircraft is fitted with an OBOG based system, the installation must be designed such that the frequency and quantity of free water entering an OBOG is minimised and preferably eliminated.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1450e Gas Generating Systems In addition to CS 23.1450, if an aircraft is fitted with an OBOG based system, the installation shall be designed such that temperature differences between the Molecular Sieve Oxygen Concentrator (MSOC) beds and the ambient environment do not give rise to water condensation in the beds.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1450f	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Gas Generating Systems In addition to CS 23.1450, if an aircraft is fitted with an OBOG based system, the management of the air supply to the MSOC shall be such that all contaminants harmful to the molecular sieve are minimised or eliminated.		
CS 23.1451 Fire Protection for Oxygen Equipment	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1453 Protection of Oxygen Equipment from Rupture	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 25.1457 Cockpit Voice Recorders	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1459 Flight Recorders	AMC 23.1459 (b)	INTENTIONALLY BLANK
CS 23.1461 Equipment Containing High-Energy Rotors	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
SUBPART G - OPERATING LIMITATIONS AND INFORMATION		
CS 23.1501 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1501a Where the Air System is certified to use an arrestor system, the capabilities, procedures for use and operating limitations of an arrestor system shall be provided. Issue 2	Data should be provided which permits credit to be taken for use of any available arrestor system. Issue 2	Certification requirements for arresting hooks are detailed in Def Stan 00-970 Part 13 (Issue 13 dated 28 Sep 17), para 13.2. Issue 2
CS 23.1505 Airspeed Limitations	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1507 Manoeuvring Speed	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1511 Flap Extended Speed	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1513 Minimum Control Speed	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1519 Weight and Centre of Gravity	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1521 Powerplant Limitations	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1522 Auxiliary Power Unit Limitations	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1523 Minimum Flight Crew	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1524 Maximum Passenger Seating Configuration	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
CS 23.1525 Kinds of Operation	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1527 Maximum Operating Altitude	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1529 Instructions for Continued Airworthiness	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Markings and Placards		
CS 23.1541 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1541a The controls inside Air System canopies shall be marked as follows: (a) Emergency controls in accordance with UK25.1555a (b) An orange/yellow arrow to indicate the operating direction. (c) The words 'CANOPY JETTISON' or other appropriate wording added inside. Issue 2	INTENTIONALLY BLANK Issue 2	INTENTIONALLY BLANK Issue 2
UK23.1541b INTENTIONALLY BLANK Issue 2	The positions of all strong points provided on the Air System should be marked in accordance with the requirements of Def Stan 05-18 (Symbol Markings of Servicing and Safety/Hazard Points on Air System, Ground Support Equipment and Guided Weapons Systems). Issue 2	INTENTIONALLY BLANK Issue 2
UK23.1541c Issue 2	The boundaries of those parts of an Air System that are designed to be used as walkways or platforms, and any areas within these boundaries that may not be	INTENTIONALLY BLANK Issue 2

Requirement	Compliance	Guidance
	walked on should be marked in accordance with Def Stan 05-18. Issue 2	
CS 23.1543 Instrument Markings; General	AMC 23.1543 (b)	INTENTIONALLY BLANK
CS 23.1545 Airspeed Indicator	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1547 Magnetic Direction Indicator	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1549 Powerplant and Auxiliary Power Unit Instruments	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1551 Oil Quantity Indicator	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1553 Fuel Quantity Indicator	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1555 Control Markings	AMC 23.1555 (e)(2)	INTENTIONALLY BLANK
UK23.1555a Emergency controls shall be coloured matt black with diagonal golden yellow stripes. When electrical switches are emergency controls, an area of at least 25mm square around each shall bear the appropriate emergency colour markings. Issue 2	The stripes on the emergency controls should be 5mm +/- 1mm wide, separated by black bands twice as wide. At least two complete yellow stripes should appear on any emergency control.	(a) Liferaft release, flotation controls and fire extinguisher buttons will be classed as emergency controls and will be coloured accordingly. (b) Golden-yellow is referenced as BS381C No 356.
UK23.1555b Ejection seat firing handles shall have the centre portion of the handle striped yellow and black as in UK25.1555a and the side portions coloured	INTENTIONALLY BLANK	Cherry Red is referenced as BS381C No. 538.

Requirement	Compliance	Guidance
cherry red Issue 2		
CS 23.1557 Miscellaneous Markings and Placards	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK23.1557a Airframe Notices In addition to CS 23.1557 and dependent on the type and role of the aeroplane, the following shall be applied as agreed by the TAA. Airframe notices shall be restricted to: (a) instructions to which crew or passengers may have a definite need to refer in the air, (b) the identification of removable panels or cover plates which would simplify or assist the maintenance procedure, where practicable, (c) emergency or warning notices, neglect of which is likely to cause damage to the aeroplane or injury to personnel. Non-emergency airframe notices shall be positioned in such a manner that they do not detract from the emergency notice.	Emergency notices should be confined to operations relating to a real emergency. Emergency notices should be direct and concise, and all preamble should be avoided	Notices to identify a component, the nature of which is obvious, should be avoided. Where the instruction is adequately covered by periodical drill, the notice should be considered redundant.
CS 23.1559 Operating Limitations Placards	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1561 Safety equipment	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1563 Airspeed Placard	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1567 Flight Manoeuvre Placard	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Aeroplane Flight Manual		
CS 23.1581 General	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1583 Operating Limitations	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1585 Operating Procedures	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1587 Performance Information	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 23.1589 Loading Information	INTENTIONALLY BLANK	INTENTIONALLY BLANK

CS 23 APPENDICES BOOK 1

Requirement	Compliance	Guidance
Appendix A – Simplified Design Criteria for Conventional, Single Engine Airplanes of 2722 Kg (6,000 Pounds) or Less Maximum Weight		
A23.1 General	AMC A23.1	INTENTIONALLY BLANK
UK23.A23.1a Consideration of Additional UK23. Requirements The requirements in CS 23 Appendix A shall also be applied to all additional UK23 requirements listed between UK23.231a and UK23.459d inclusive.	INTENTIONALLY BLANK	INTENTIONALLY BLANK
A23.3 Special Symbols	INTENTIONALLY BLANK	INTENTIONALLY BLANK
A23.5 Certification in More Than One Category	INTENTIONALLY BLANK	INTENTIONALLY BLANK
A23.7 Flight Loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK
A23.9 Flight Conditions	INTENTIONALLY BLANK	INTENTIONALLY BLANK
A23.11 Control Surface Loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK
A23.13 Control System Loads	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Appendix C – Basic Landing Conditions		
C23.1	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
Appendix D – Wheel Spin-up Loads		
D23.1	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Appendix F - Test Procedure for Self-Extinguishing Materials in accordance with CS 23.583, 23.855 and 23.1359		
Appendix G - Instructions for Continued Airworthiness		
G23.1	INTENTIONALLY BLANK	INTENTIONALLY BLANK
G23.2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
G23.3	INTENTIONALLY BLANK	INTENTIONALLY BLANK
G23.4	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Appendix H – Installation of an Automatic Power reserve (APR) System		
H23.1	INTENTIONALLY BLANK	INTENTIONALLY BLANK
H23.2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
H23.3	INTENTIONALLY BLANK	INTENTIONALLY BLANK
H23.4	INTENTIONALLY BLANK	INTENTIONALLY BLANK
H23.5	INTENTIONALLY BLANK	INTENTIONALLY BLANK
H23.6	INTENTIONALLY BLANK	INTENTIONALLY BLANK
Appendix I - Seaplane Loads		
Appendix J - Anthropomorphic Test Dummies for Showing Compliance with 23.562		
Appendix K - HIRF Environments and Equipment, HIRF Test Levels		

CS 23 APPENDICES BOOK 2

Requirement	Compliance	Guidance
Flight Test Guide (FTG) For the Certification of CS-23 Aeroplanes		
INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2	INTENTIONALLY BLANK DELETED Issue 2

2.3 Military Certification Specifications, Acceptable Means Of Compliance (AMC) And Guidance Not CS 23 Related.

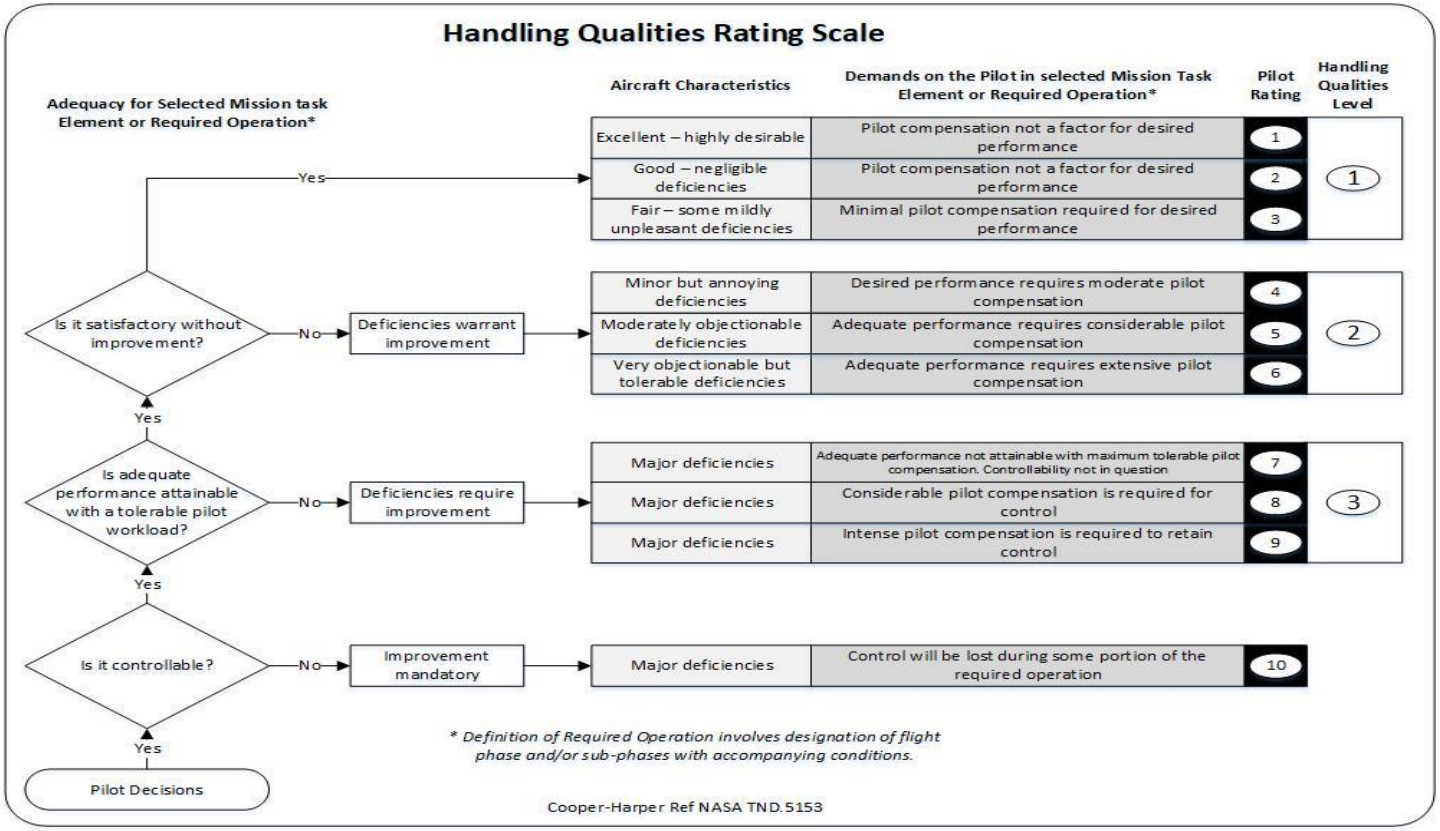
Requirement	Compliance	Guidance
General		
UK3.3.1 Negative acceleration Dependent on the aeroplane type and role, the requirements of CS25.1315 and Def Stan 00-970 Part 1 Section 6 (Issue 17 dated 14 May 17), Leaflet 20 Paragraph 3.6 shall be applied as determined by the TAA. Issue 2	INTENTIONALLY BLANK	INTENTIONALLY BLANK
UK3.3.3a Bird Strike Damage The aeroplane shall be designed to assure capability of continued safe flight and landing of the aeroplane after bird-strike (a) The military criteria to be applied shall be for a 1 kg bird when the velocity of the Air System is VM, up to 480 Kts TAS, at altitude up to 762m (2500 ft) ASL. (b) All other criteria specified within CS 25 relating to bird strikes shall apply. Issue 2	INTENTIONALLY BLANK	The military criteria relate to the European theatre of operation and excludes engines and armaments.
UK3.3.3b Following a bird strike to the military criteria in UK25.631a:	INTENTIONALLY BLANK	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
(a) Windscreens and other transparencies essential to the pilot and crew shall retain sufficient optical properties for Level 2 handling qualities to be maintained; (b) There shall be no damage to the Air System that would degrade handling quality below Level 2; (c) There shall be no detachment of any part of the structure, including aerials, doors or panels likely to cause secondary damage that would; degrade handling quality below Level 2, or exceed engine ingestion limits; (d) Additionally, windscreens shall exhibit no penetration or shattering on impact at speeds up to 1.1 VM, apart from a fracture of a non-load carrying laminate (eg a thin facing glass) providing that the resulting standard of vision is satisfactory. Issue 2		
UK3.3.5 Jettisoning of Stores (a) It shall be possible to jettison safely within an appropriate envelope, all external stores that could be critical for operational or flight safety reasons. (b) It shall be possible to jettison safely all stores carried internally; this may require bomb doors to be opened. (c) When the aeroplane is on the ground, it shall be possible to release mechanically any store and/or its jettisonable carrier without entering the cockpit.	Refer to Def Stan 00-970 Part 1 Section 1 (Issue 14 dated 14 May 17) Clauses 1.1.28 to 33 Issue 2	INTENTIONALLY BLANK

Requirement	Compliance	Guidance
UK3.3.9 Temperature, Humidity & Solar Radiation The aircraft shall be capable of withstanding without cover the temperature, humidity and solar radiation conditions associated with the climatic categories when the aircraft is operating on the ground or parked in the open.	It shall not be necessary to remove or attach any item; neither shall it be necessary for Service Units to alter the aircraft in any way to cater for the effects of climatic conditions including temperature, solar radiation and humidity.	(a) Temperature, humidity and solar radiation diurnal cycles for each climatic category are defined in Def Stan 00-35 Part 4 Chapter 1-02(Multipart), which also presents ambient air temperatures and humidities at altitude. (b) Temperature, solar radiation and humidity and their effects are addressed in Def Stan 00-35 Part 4 Chapters 2-01/2-02, 3-01/3-02 and 4-01/4-02 respectively (Multipart). (c) Temperature limits for design purposes are given in Section 7 Leaflet 1. (d) Humidity conditions are given in Section 7 Leaflet 2. (e) To comply with this requirement (see also Leaflet 1, Paragraph 3) and in order to be capable of immediate operation, the aeroplane and all its instruments and equipment required for operation on the ground or during take-off shall be capable of functioning at all temperatures within the range: +70 °C to -30 °C for world-wide use. (f) In addition to (e) above and to cater for excessive absorption of solar radiation and the occurrence of more severe ground conditions, the aeroplane and all its instruments and equipment shall not be damaged by the acquisition of temperatures within the range: +90 °C to -40 °C for world-wide use.
UK3.3.11	INTENTIONALLY BLANK	Definitions:

Requirement	Compliance	Guidance
Reduced Operating Standard and Military Operating Standard Where the aeroplane type, role or usage will require higher operating risk than the Normal Operating Standard (NOS) the requirements for ROS or MOS must be determined. Performance requirements for additional operating standards for landing and take-off (ROS and MOS) shall be developed in agreement with the TAA.		Normal Operating Standard (NOS). These requirements are intended for use during normal operations. The performance is to be scheduled in accordance with applicable UK23.473a and b and UK23.721b clauses. Reduced Operating Standard (ROS). These requirements are intended for when NOS would not enable a successful execution of a mission. They provide increased performance capability over NOS e.g. greater payload, shorter field length requirements, with a consequent increase in Risk to Life. Military Operating Standard (MOS). These requirements are intended for when NOS and ROS would not enable successful execution of a mission. They provide increased performance capability over ROS with a consequent increase in Risk to Life.

2.4 GENERAL MILITARY ACCEPTABLE MEANS OF COMPLIANCE (AMC) AND GUIDANCE (Additional to CS AMC)

Index	Detail
2.4.1	**SUBPART A – GENERAL**
2.4.2	**SUBPART B – FLIGHT**
2.4.2.1	UK23.143a Guidance
2.4.2.1.1	 Figure 1

Index	Detail
2.4.2.1.2	ADVISORY INFORMATION
2.4.2.1.2.1	Qualitative assessment forms a major part of many tests and pilot opinion usually constitutes the principal means of assessing the acceptability of the handling characteristics exhibited.
2.4.2.1.2.2	To avoid the possibility of bias, qualitative assessments are to be based (in all but minor matters) on the views of at least two pilots. However, minority views are not be disregarded, but the reasons for them resolved. Note is to be made of the prior experience of the pilots involved in the assessment, in terms of their flying hours in total, on the type or on similar types of Air Systems, and in particular role(s) involved.
2.4.2.1.2.3	To facilitate consistent expression and interpretation of pilot opinion, the Cooper-Harper Handling Qualities Rating Scale presented at Figure 1 may be adopted.

<table>
<tr><td>2.4.2.1.2.4</td><td>In order to assess the significance of events (such as autopilot runaways) which cause a disturbance to the initial steady-flight conditions, it is necessary to take into account, amongst other things, the time required for the relevant cues and/or warnings to be recognised by the pilot, and the subsequent time lapse before recovery action is initiated. The choice of appropriate cue recognition, warning and pilot response times must be based, ultimately, on the judgement of the pilots involved in the assessment.</td></tr>
<tr><td>2.4.2.2</td><td>UK23.143b Compliance</td></tr>
<tr><td>2.4.2.2.1</td><td>Table 1: Nominal Grades of Turbulence and Reference Intensity

<table>
<tr><th rowspan="2">Nominal grade of Turbulence</th><th colspan="2">Reference Intensity (σ)</th></tr>
<tr><th>m/s</th><th>ft/s</th></tr>
<tr><td>light</td><td>0.9</td><td>3</td></tr>
<tr><td>moderate</td><td>1.8</td><td>6</td></tr>
<tr><td>severe</td><td>3.7</td><td>12</td></tr>
<tr><td>extreme</td><td>7.3</td><td>24</td></tr>
</table>
</td></tr>
<tr><td>2.4.3</td><td>SUBPART C – STRUCTURE</td></tr>
<tr><td>2.4.4</td><td>SUBPART D – DESIGN AND CONSTRUCTION</td></tr>
<tr><td>2.4.4.1</td><td>UK23.771b Guidance</td></tr>
<tr><td>2.4.4.1.1</td><td>RELATIONSHIP BETWEEN SPEECH AND NOISE</td></tr>
<tr><td>2.4.4.1.1.1</td><td>Flight measurements have shown that normally the main acoustic loading at the ear in terms of hearing damage results from the speech component. This has been established by examining the A-weighted speech and noise spectra, together with their durations, in typical flight missions. Clearly, for speech to be intelligible it has to be detected within the noise background, and this is usually taken to mean that the speech/noise ratio must be positive - for they both have broadband spectra. Ideally, this ratio has a minimum value of 10 dB. During parts of a flight it might not be possible to achieve this ratio. For instance, in a slam, acceleration engine noise can reduce the ratio. In examining typical</td></tr>
</table>

	sorties, however, it is found that speech usually dominates in loudness, and from an examination of communication patterns, it has been taken in this specification that the aircrew are exposed to speech for 50% of the sortie duration. This premise is used as the basis for evaluating the permissible noise levels at the crew's ears within any one 8-hour period.
2.4.4.1.2	OPERATING CONSIDERATIONS
2.4.4.1.2.1	If the main acoustic loading at the ear is due to speech, then its loudness is to be kept to a minimum consistent with intelligibility. It is to be noted here that INTELLIGIBILITY IS NOT INCREASED BY INCREASING THE VOLUME IF THE SIGNAL/NOISE RATIO IS KEPT CONSTANT. The requirement, therefore, is to adjust the gain controls only enough to give an adequate signal/noise ratio above the environmental noise that comes through the helmet. Further increase in gain increases the signal (speech), but also the noise coming down the microphone line in the same ratio. Accordingly, intelligibility is not increased - indeed it may be reduced, and additionally the hearing damage risk be increased.
2.4.4.1.3	TARGET NOISE LEVEL
2.4.4.1.3.1	This criterion is based upon the UK recommended value for the long-term effects of noise on hearing damage in industry [Reference 1 – (2.4.4.1.3.3)]. The assumption behind this requirement is that hearing damage is an accumulative process - such that noise energy levels can be traded for the duration of the noise. That is, the permissible 8 hour leq value can be increased by 3 dBA for each halving of the evaluation duration. For a mission time of one hour within an 8 hour period, therefore, where the exposure to speech will be one half-hour, the maximum permissible overall A-weighted 8-hour leq value at the ears is 97 dBA. However, at all times the observation about minimising gain values, discussed above, applies.
2.4.4.1.3.2	Intelligibility is preserved by the requirement for a Speech Intelligibility Index (SII) (historically referred to as Articulation Index (AI)) of not less than 0.5, calculated in accordance with ANSI/ASA 3.5 1997 [Reference 2 – (2.4.4.1.3.3)]. The SII is evaluated by comparing the speech and noise-without-speech spectra, in certain frequency bands, and allotting a figure of merit of each band according to the amount by which the speech in the band exceeds the noise in that band, and then adding up the total. It has been established that 95% intelligibility is achieved for a value of 0.5SII when using military jargon phrases.
2.4.4.1.3.3	REFERENCES 1. HEALTH and SAFETY CONSULTATIVE DOCUMENT. Prevention of damage to Hearing from Noise at Work. Draft proposal for Regulation and Guidance. ISBN 011 883495 9, Pub HMSO 1987. 2. AMERICAN NATIONAL STANDARDS INSTITUTE. Methods for Calculation of the Speech Intelligibility Index. ANSI/ASA 3.5-1997 (R2017).

2.4.4.2	UK23 785c Guidance
2.4.4.2.1	Table 1: Limits of Human Tolerance

Direction (See Note 1)	Impulse Duration (ms)									Max Jerk (g/s) (see Note 2)
	1000	500	200	100	60	40	20	10	1	
Forward	12	17	25	33	40	45	50	60	60	500
Aft	20	23	30	36	38	40	45	47	47	500
Lateral	(4)	(5)	(10)	12	(13)	(14)	(15)	(16)	(16)	500
Down	5	7	10	15	20	25	25	25	25	500
Up	5	7	10	12	13	14	17	18	19	100

(1) Directions are those of the pilot's eyeball movement, during the impulse, relative to Air System axes.
(2) Jerk is also known as 'aggravation' and ‘onset rate'.
(3) Forward, aft, down and up values have been taken from USARTL-TR-79-22B
(4) For lateral accelerations the value 12 at 100 ms has been taken from USARTL-TR-79-22B. Other values have been derived by proportion using forward and aft values for comparison. These are bracketed.
(5) The times given are the plateau durations. Total times will in each case be longer because of the time required for the initial jerk.
(6) For design purposes acceleration factors given may be assumed to be whole-body tolerance limits for all seated, fully-restrained occupants

<table>
<tr><td>2.4.5</td><td>SUBPART E – POWERPLANT</td></tr>
<tr><td>2.4.6</td><td>SUBPART F – EQUIPMENT</td></tr>
<tr><td>2.4.6.1</td><td>UK23.1309c Guidance</td></tr>
<tr><td>2.4.6.1.1</td><td>Table 1: Guideline for Pilot Response Times
<table>
<tr><th>State of Alertness</th><th>Mode of Flight Control</th><th>Decision Time (sec)</th><th>Reaction Time (sec)</th><th>Pilot Response Time (sec)</th></tr>
<tr><td rowspan="2">Active</td><td>manual</td><td>see note</td><td>½</td><td>½ to 1½</td></tr>
<tr><td>automatic (‘hands on’)</td><td>1 to 1½</td><td>½</td><td>1½ to 2</td></tr>
<tr><td rowspan="2">Passive</td><td>manual</td><td>2</td><td>½</td><td>2½</td></tr>
<tr><td>automatic (‘hands off’)</td><td>3</td><td>1</td><td>4</td></tr>
<tr><td colspan="5">NOTE: Zero for instinctive action (fight path disturbances VMC only); 1 sec for considered action.</td></tr>
</table></td></tr>
<tr><td>2.4.6.2</td><td>UK23.1309e Guidance</td></tr>
<tr><td>2.4.6.2.1</td><td>Guidance for this requirement is provided in four sections mirroring those for compliance.
(a) Guidance for System-level Safety
(1) Civil system developers apply ARPs to ensure that the system design is failure-tolerant and that a catastrophic failure condition (e.g. loss of aircraft) does not result from the failure of a critical function implemented in a PE component. For some airworthiness-related systems, correct data is a necessary and an essential component.
(2) The associated Safety Assessment process defines the top-level Safety requirements and design objectives of the PE, as detailed in the guidance contained within Aerospace Recommended Practices (ARPs) 4761 and 4754A.
(3) Data integrity can be a key component of Safe system behaviour. Further guidance relating to risk assessment and treatment of data integrity can be found in the Data Safety Guidance published by the Data Safety Initiative Working Group.
Note: Data Safety is not further explicitly addressed in this clause. It would be expected that where data Safety risks are identified at this stage, they would be explicitly addressed by the applicant throughout the PE lifecycle. Use of the Data Safety Guidance is not a specific</td></tr>
</table>

	requirement of this clause; however, it can be used as guidance by the applicant to underpin the justification of their approach to data-related risk. (4) As required by Def Stan 00-056, the Safety Assessment Report provides a complete, evidence-based, robust, compelling, documented and auditable argument for all aspects of the safety-related PE, including providing evidence that the criticality of any previously developed PE remains valid, when used in the context of the Military Air Environment (MAE). (5) Both the Safety Assessment process and resulting Safety Assessment Report activities need to be cognizant of the security assessment requirement detailed below. (b) Guidance for Air System Safety-related Software (SRS) (1) The guidance in Def Stan 00-055 Issue 4 on the adoption of the DO-178 family identifies additional considerations relating to governance and shortfalls against the Def Stan 00-055 requirements. These need to be addressed along with any 'military delta' particular to the application. Note: Def Stan 00-055 permits the adoption of any Open Standards that meet Recognised Good Practice. If standards other than those detailed as AMC in this Clause are to be proposed, these would need to be discussed and agreed with the MAA in the form of an MCRI prior to adoption, in accordance with extant MAA regulatory policy. (2) For legacy software which is intended to be used in a new application, or as a significant development of an existing system, the acceptability of remaining with the legacy means of compliance is based on the principle that switching development activities to a different standard may inherently increase the risk of introducing errors into the software, due to applicants applying unfamiliar processes, methods or techniques. Should this not be an issue for the applicant, it is acceptable to switch to the current AMC (i.e. DO-178C), provided that a complete and coherent assurance argument can be maintained for all the SRS. (3) When considering the use of software previously developed for civilian applications using civil aviation standards, including RTCA DO-178C, the applicant should note that some SRS components applied in the MAE would require additional mitigation, e.g. additional functional, design or physical independence. Where the appropriate functional, design or physical independence cannot be obtained, an alternate military SRS system design should be sought with either a higher-level of assurance chosen or the civil standard applied, but with additional assurance methods, in order to gain the necessary level of confidence to meet the requirements of Def Stan 00-055 Issue 4. (4) The re-use of previously developed Def Stan 00-055 Issue 2 or DO-178B (and DO-178A) SRS within a new or existing military airborne system can only be considered to be acceptable to the authority on a case-by-case basis. The SRS should be supported by documented evidence and a have a full audit trail of its development history. (c) Guidance for Air System Safety-related Electronic Hardware (1) Electronic Hardware can be broken into two distinct complexity categories, Simple Electronic Hardware (SEH) and Complex Electronic Hardware (CEH) also known as complex custom micro-coded components. Defining differences in complexity is based on the feasibility and level of difficulty necessary to accomplish acceptable verification coverage by deterministic means.

	i. SEH is identified as hardware only if a comprehensive combination of deterministic tests and analyses appropriate to the design assurance level can ensure correct functional performance under all foreseeable operating conditions with no anomalous behaviour. For SEH items, extensive documentation of the design process is unnecessary. The supporting processes of verification and configuration management are however required. ii. When an item cannot be classified as simple, it should be classified as CEH. Noting that an item completely constructed entirely from simple items may be itself CEH. This means that, if the item is so complex that it is impossible or impractical to test and analyse it completely, one must rely on design assurance to give confidence in its correct operation. (2) Any contractor using Safety-Related Electronic Hardware that has been previously developed and does not use DO-254/ED-80 or are proposing Alternative AMC as its means of compliance are required to justify the alternative means to the authority. Justification for the use of the alternative means of compliance must show that those means meet the safety objectives of the regulations and are supported by documented evidence, including a full audit trail of the development history of the Safety-related Electronic Hardware. (d) Guidance for Safety-related MCPs (1) For systems operating on Multicore Processors (MCPS) the objectives provided in DO-178C and DO-254 are deemed insufficient in providing assurance of correct behaviour. Until such time that AMC has been developed for their development, the applicant may produce an MCRI, for agreement by the authority, detailing their approach to MCP assurance. Useful guidance has been provided in CAST-32A . Note: although CAST-32A only applies to MCPs utilising more than one core, the applicant is guided to presenting an MCRI for MCP assurance regardless of the number of cores in use.
2.4.6.2.2	Guidance for Cyber Security Airworthiness:
2.4.6.2.2.1	Guidance for Cyber Security Airworthiness: (a) It is necessary to ensure that platform cyber security vulnerabilities do not purposefully or accidentally threaten airworthiness. (b) In keeping with threats to the continued Safe operation of SRS and Electronic Hardware, Def Stan 00-055 (Issue 3 and later) places a requirement to demonstrate that potential cyber security threats to safe operation are mitigated. Def Stan 00-055 highlights that JSP 440 provides guidance on security policy, but the latter does not specifically provide AMC for design assurance of the security aspects of airworthiness, therefore a combined approach is required. (c) It is recognised that DO-326A/ED-202A has been developed for use on large civil aircraft. As such, some tailoring of the guidance provided therein may be required for military Air Systems and the MAE. (d) As is the case for conventional software assurance, the level of airworthiness-related security assurance needs to be commensurate with the risk associated with failure. Usefully, some of the activities associated with safety assurance and airworthiness-related security overlap. It is therefore recommended that an integrated and coherent approach is taken to reduce unnecessary overheads. (e) As cyber security threats are dynamic by nature, it is now paramount to determine how cyber security is considered throughout the life-cycle of the Air System.
2.4.7	**SUBPART G – OPERATING LIMITATIONS AND INFORMATION**

Section 3

Please refer to Def Stan 00-970 Part 0 issue 23 for the master list of Normative and Informative references, Definitions and Acronyms.

Defence Standards are published by and obtainable from:

Defence Equipment and Support

UK Defence Standardization

Kentigern House

65 Brown Street

GLASGOW

G2 8EX

DStan Helpdesk

Internet email: enquiries@dstan.mod.uk

File Reference

The DStan file reference relating to work on this standard is 01372/2020.

Contract Requirements

When Defence Standards are incorporated into contracts, users are responsible for their correct application and for complying with contractual and statutory requirements. Compliance with a Defence Standard does not in itself confer immunity from legal obligations.

Revision of Defence Standards

Defence Standards are revised as necessary by an up-issue or amendment. It is important that users of Defence Standards ensure that they are in possession of the latest issue or amendment. Information on all Defence Standards can be found on the DStan Websites https://www.dstan.mod.uk and http://dstan.uwh.diif.r.mil.uk/, updated weekly. Any person who, when making use of a Defence Standard, encounters an inaccuracy or ambiguity is encouraged to notify UK Defence Standardization (DStan) without delay in order that the matter may be investigated and appropriate action taken.