



AIRWORTHINESS APPROVAL NOTE NO: 26450 Issue 3

APPLICANT: The Spitfire Company (Biggin Hill) Ltd  
 AIRCRAFT TYPE: Vickers Armstrong Ltd Spitfire LF IX C  
 REGISTRATION NO: G-BRRA CONSTRUCTOR'S NO: CBAF IX 8185  
 Military Serial Number: MK912  
 OPERATOR: -  
 INSTALLER: -  
 DESIGN ORGANISATION: The Spitfire Company (Biggin Hill) Ltd (A8-25 Approved)  
 Acro Aeronautical Services (A8-21 Approved)  
 CERTIFICATE CATEGORY: UK (National) Permit to Fly  
 TITLE: **To Approve Vickers Armstrong Ltd Spitfire MK912  
 Registered G-BRRA for the Issue of a UK Permit to Fly**

## 1. Introduction

The aircraft was ordered in 1942, from Vickers as part of a mixed batch of Mk V & Mk IX aircraft. It was built as CBAF 8185 in 1944 at Castle Bromwich 'shadow' factory in Birmingham as part of the serial number batch MK881-926 and was fitted with a Merlin 66 engine as an LF IX C Spitfire. It was allocated RAF serial MK912. The aircraft was delivered to the RAF at No.8 M.U. Little Rissington in late March 1944, moving to No.84 Group support at RAF Aston in May 1944. Shortly after D-Day the aircraft was issued to No.312 (Czech) Squadron at Appledram & Tangmere, being moved back to 84 GSU Aston Down in June, prior to arriving at Air Service Training Ltd at Exeter for overhaul. This would indicate that the aircraft had some usage although this is not indicated in the records. In April 1945 it was allocated to RAF Lyneham for storage and a further overhaul took place.

MK912 stayed at Lyneham after the war and in July 1946 was sold to the Royal Netherlands Air Force. Movement to RAF Wroughton followed and by September was packed by RAF Sealand. This aircraft was dispatched for Java in May 1947 before being issued to No.322 Sqn of the Royal Netherlands Air Force, the unit having been specially formed in the East Indies. The aircraft initially retained its RAF identity but was soon to be re-serialised to H- 119 and later changed to H-59. Details of the aircraft's service in Java are unknown although it is thought that the most of its time in the Far East was spent as a reserve aircraft. The aircraft was shipped back to Holland in 1950 and was stored at Rotterdam Docks before the Belgian Air Force took ownership in 1953 where the aircraft was again overhauled. The aircraft was then issued with Fokker Test Serial B-1 with the serial number SM-29 which was given by the Belgians. MK912 entered service with the Ecole de Pilotage Avancé at Brustem, later passing to the Ecole de Chasse at Coxyde. In June 1953, SM-29 had a Category 3 accident and was withdrawn from service with a total flying time of 685.05 hours. It

was stored at the Brustem Air Base and in August 1955 was struck off charge and delivered to the Belgian Air Force Technical School at Saftraenberg, nr St Truiden for use as a display aircraft. MK912 with its Merlin engine still installed was repainted and erected onto a concrete plinth with 350 (Belgian) Sqn codes MN-P.

The aircraft was originally restored to flying condition by Propshop Ltd in September 2000. The aircraft however suffered an engine failure on 01 August 2015 at Biggin Hill airfield. There was significant damage to the fuselage, propeller and the right-hand wing also detached. Following this incident, the aircraft was dismantled into major subsections, and was placed into long term storage. Last year, The Spitfire Company (Biggin Hill) Ltd began restoring the aircraft back to an airworthy condition.

This AAN has been raised to Issue 3 to capture the repair work and modifications carried out to bring the aircraft back to an airworthy standard.

## **2. Aircraft Build Standard/Modification Definition**

The build standard is defined in the applicant's submission report for Vickers Armstrong Ltd Spitfire Mk LF IX C G-BRRA Ref: SCB 015 Issue 1, dated 19 December 2023. A detailed description of the aircraft and any restoration work carried out may be obtained by reference to the applicant's submission. The build standard and a summary of the work carried out is contained below.

The Spitfire Mk LF IX C is a single seat, retractable main undercarriage, single piston engine combat aircraft of aluminium construction with fabric covered empennage flying controls. It was manufactured by the Vickers Supermarine Company. The aircraft was armed with two 20-millimeter cannons and .5" guns and or .303 Browning machine guns. The cannon and machine gun mountings have been removed but all access panels and bays are as per the original OEM. The aircraft would have been equipped with a supplementary oxygen system for high altitude operation, this has been refitted to the aircraft but placarded inoperative (fitted for authenticity purposes only). All other systems for standard safe operation have been overhauled and fitted.

### **2.1 Fuselage**

The monocoque stressed skin fuselage comprising of four main longerons and one dorsal longeron extending from cockpit to the tail and interspaced with 16 frames ranging from frame 5 (firewall) to frame 19 (forward of empennage section).

The complete fuselage inspection and repair was carried out in house by The Spitfire Company Biggin Hill Ltd. The fuselage was inspected and stripped down in the assembly jig where needed. All original parts were inspected, and any new items were fabricated where required. Frame 5 was rebuilt, and new stub spars were supplied by Airframe Assemblies Ltd under Certificate No. 210436. The fuselage was fully re-protected and painted internally before final assembly. New fuselage skins have been made and fitted where required.

All material substitutions have been carried out in accordance with The Spitfire Company Biggin Hill Ltd.'s approved material substitutions manual AAS 5597. All work has been recorded in SCBH work pack No SCB/010888.

## 2.2 Tailplane

The tail section of the fuselage is a separate unit with an integral fin bolted to the fuselage at frame 19. The tail section also consists of four further frame sections from 19a, 20 fwd and 20 aft and frame 21. The tail is an original item which has been inspected in house by The Spitfire Company Biggin Hill Ltd. The tail unit and horizontal stabilizers have been inspected and repaired as required. The tail unit and horizontal stabilizers have been fully re-protected and painted internally before re-assembly. The tail unit has been reassembled with new hardware where required.

All material substitutions have been carried out in accordance with The Spitfire Company Biggin Hill Ltd.'s approved material substitutions manual AAS 5597. All work has been recorded in SCBH work pack No SCB/010888.

## 2.3 Elevators

The elevator and elevator trim tab construction consists of an aluminum frame assembly of nose/horn skins, nose ribs, ribs, rib cleats, spar formers, channels, bracing tubes and trailing edge tube assemblies covered in Irish linen spec 9F1. The elevator and its trim tabs were restored in house by the Spitfire Company Biggin Hill Ltd, using serviceable OEM parts and new parts made to drawing. The new fabric covering was applied by Vintage Fabrics Ltd. All material substitutions have been carried out in accordance with The Spitfire Company Biggin Hill Ltd.'s approved material substitutions manual AAS 5597. All work has been recorded in SCBH work pack No SCB/010888.

## 2.4 Rudder

The rudder and rudder trim tab construction consist of an aluminium frame assembly of nose skins, nose ribs, ribs, rib cleats, spar formers, standard formers, channels, bracing tubes and trailing edge tube assemblies covered in Irish linen 9F1 fabric. The rudder and trim tab were restored in house by the Spitfire Company Biggin Hill Ltd, using serviceable OEM parts and new parts made to drawing. The new fabric covering was applied by Vintage Fabrics Ltd. All material substitutions have been carried out in accordance with The Spitfire Company Biggin Hill Ltd.'s approved material substitutions manual AAS 5597. All work has been recorded in SCBH work pack No SCB/010888.

## 2.5 Wings

The aircraft wings are of the single spar stressed skin type construction with an auxiliary spar, they have been built in house by The Spitfire Company Biggin Hill Ltd and are of a standard 'C' wing configuration. The Port and Starboard wings have been repaired in house by The Spitfire Company. The main spars have been supplied by Airframe Assemblies Ltd under certificate No 210426. New manufacture wing attachment bolts have been fitted to both Port and Starboard main spars, these bolts have been manufactured in accordance with Acro Aeronautical Services Mod AAS 6138 and fitted in accordance with AP1565E, Vol 1, Sect 5. All material substitutions have been carried out in accordance with The Spitfire Company Biggin Hill Ltd.'s approved material substitutions manual AAS 5597. All work has been recorded in SCBH work pack No SCB/010888.

## 2.6 Flaps

Split flaps are fitted between the inboard end of the ailerons and the root end of the wings. The flaps are controlled by a pneumatic valve that is positioned on the Port side of the cockpit instrument panel, with a pneumatic ram in each wing one being original, and inspected and pressure tested, the other supplied by Supermarine Aero Engineering Ltd. The pneumatic valve is original. The Port and Starboard flaps have been inspected and repaired in house by The Spitfire Company Biggin Hill Ltd, all material changes are in accordance with material substitutions manual AAS 5597. All work has been recorded in SCBH work pack No SCB/010888.

## 2.7 Ailerons

The ailerons are of light-alloy metal-covered construction and are built up as a channel-section spar flanged plate ribs. There are double ribs at the two hinge positions. Mass-balance is affected by lead weights riveted to the leading edge, one between each pair of ribs between the hinges. Mass balance checks were carried out on the ailerons and found to be within limits. Both ailerons have been fitted with all new attachment hardware (bushes, pins and bolts) from Supermarine Aero Engineering Ltd. All material substitutions have been carried out in accordance with The Spitfire Company Biggin Hill Ltd.'s approved material substitutions manual AAS 5597. All work has been recorded in SCBH work pack No SCB/010888.

## 2.8 Flying Controls

The flying controls are of conventional type. The rudder pedals are adjustable horizontally for leg reach. The rudder pedals are original new/old stock and have undergone inspection, by the Spitfire Company (BH) Ltd with reference to S/N-2020/005. The rudder and elevator bell crank levers are original and have been inspected. The spade grip type control column is conventional and operates the elevator and ailerons via interconnecting cables running through the fuselage and the wings. The control column and associated parts are original new/old stock and have also undergone full inspection and overhaul by the Spitfire Company (BH) Ltd with reference to S/N-2020/005. Trim tabs are fitted to the elevator and the rudder and are controlled by the pilot using trim control wheels operated from the cockpit. The flying control cables have been made new by Supermarine Aero Ltd and the trim system cables are original to the aircraft and have been inspected prior to re-fitting. All work has been recorded in SCBH work pack No SCB/010888.

## 2.9 Fuel System

The fuel used in this aircraft is 100LL, the engine is supplied fuel from two fuselage tanks mounted forward of the cockpit. The total fuel capacity for the aircraft is 85 imperial gallons, the fuselage lower tank holds 37 gallons and fuselage upper tank holds 48 gallons. The fuselage fuel tanks upper and lower were inspected and repaired as required. A priming pump is mounted on the Starboard side of frame 8 in the cockpit and is used to prime the induction pipes prior to starting the engine. The fuel system is made up of flexible fuel hoses connecting the two tanks, the main feed from the bottom tank to the fuel filter and the fuel filter to the engine, these were made by Pirtek UK Ltd Certificate of Conformity No. 2506213 and to Mod No. DR1008-002. All hoses were pressure tested to 1.5 times working pressure and found satisfactory. There is a rod operated fuel cock in the cockpit to turn fuel on and off. Fuel contents is acknowledged by means of a fuel gauge mounted in the instrument panel. The lower

tank has an internally mounted electric "booster pump" which is used for engine starting. The engine driven fuel pump was overhauled by Roush as part of the engine overhaul. Full details of the fuel system can be found in work pack No. SCB/010888.

## 2.10 Oil System

The oil tank has a capacity of 7.5 gallons of oil with 2.4 gallons of air space. The tank is an original item, it has been inspected and pressure tested to 5psi by The Spitfire Company (BH) Ltd and found to be serviceable. A single oil cooler is fitted to the underside of the left wing. The oil cooler is a new item supplied by Anglia Radiators. The oil system itself is made up of rigid pipe work all joined with avimo fittings. The complete system pipe work has been supplied new by Supermarine Aero Engineering Ltd. As these components have been released with certification from an approved supplier, CAA Approval No. A1/9599/97, The Spitfire Company (BH) Ltd. are satisfied that these components have been fabricated to the required standard. Full details of the oil system can be found in workpack No. SCB/010888.

## 2.11 Electrical and Avionics Systems

The Electrical system installed is as close to the original factory fitment with reference to AP1565J, Vol.1, Sect.6. The 12-volt charging system has been replaced by the 24-volt system in accordance with Acro Aeronautical Services Modification No. AAS 6141. The original generator has been replaced with an HX2 29-volt 50-amp unit fitted to other Rolls Royce Merlin powered aircraft and wiring replaced with modern MIL spec. wire (MIL-W-M22759/34) and techniques. The original 12-volt carbon pile voltage regulator has been replaced by a 28-volt dc regulator. The original two-pole electrical system is retained but the negative side is grounded with airframe and battery grounds. The charging system output is displayed on the original gauge on the instrument panel and battery endurance is adequate in the event of generator failure. Evidence of this can be found on G-BRRA Electrical Load Analysis incorporated into AAS 6141.

The starting circuit has been installed with reference to AP1565J, Vol.1, Section 6 however the starter has been replaced with a 24-volt 840/W unit as fitted to other 24-volt Merlin powered aircraft. The starter relay has also been replaced with a 24-volt 5C/897 Type H unit. All work has been recorded in work pack No SCB/010888.

## 2.12 Undercarriage

The undercarriage consists of two separate retractable main wheel units and a non-retractable tail wheel unit. The main wheels retract upwards and outwards into recesses in the under surface of the main planes. Pneumatic wheel brakes and oleo-pneumatic shock absorbers are fitted. The oleo-pneumatic shock absorbers are of the torque link type and are damped by MIL-DTD-5606 hydraulic oil. The original undercarriage legs have been stripped, inspected/NDT'd, resealed and reassembled by The Spitfire Company (BH) Ltd, new seals have been supplied by Supermarine Aero Ltd. The undercarriage cables are new items from Supermarine Aero Ltd. The aircraft is equipped with original 10 ¼ -inch wheel brake units.

The undercarriage retraction/extension system consists of two hydraulically operated actuators and normally supplied by an engine driven pump on selection of the undercarriage position lever. In the event of a hydraulic system failure the undercarriage can be lowered by means of an emergency system. With the undercarriage selected in the down position a second lever mounted on the right side

of the cockpit can be pushed forward porting 700psi of compressed air into the hydraulic system to force the undercarriage to lock down. The position of this emergency supply bottle is not original and has been installed in accordance with Acro Aeronautical Services Mod AAS 6137. The reason for this modification is to fit a modern bottle with a gauge, so the pressure can be checked on pre-flights. As the original bottle is a sealed unit it could potentially leak without the knowledge of the ground crew causing the emergency system to also fail in flight. The more modern AH8512 Dunlop manufactured bottle is operated by a lever on the valve head. The compressed air is ported via a Non-Return Valve and then into the standard system. The undercarriage hydraulic actuators are original to the aircraft and have been inspected and refurbished with new seals supplied by Supermarine Aero Ltd. All work has been recorded in work pack No. SCB/010888.

### 2.13 Pneumatic System

The pneumatic system employs a Hymatic SH6/2A type engine driven compressor, regulated by a remote firewall mounted Hymatic A.R.5/300 regulating valve to supply controlled air via an OWT46 oil/water separator mounted on the firewall to two storage bottles mounted in the left midsection of the fuselage. The pneumatic system operates the following systems via a 220psi pressure reducing valve; wing flaps, Port and Starboard, radiator fairing flaps, guns (INOP) and wheel brakes. The compressor is a new/old stock item and has been inspected and bench tested for serviceability and recertified by The Spitfire Company (BH) Ltd in accordance with S/N-2020/005. The compressor drive case has been inspected for cracking in light of BBMF findings, this was satisfactory using die penetrant inspection. The storage tanks have been inspected for porosity in welds, cracks and corrosion and pressure tested to 1.5x normal system operating pressure. The pneumatic actuators employed in the flap system consist of one original and one new manufacture supplied by Supermarine Aero Ltd. The radiator flap ram is original and has been inspected by The Spitfire Company (BH) Ltd. All work has been recorded in work pack No. SCB/010888.

### 2.14 Hydraulic System

The hydraulic system installed is of standard configuration for the type. The hydraulic system is used for raising and lowering the undercarriage. It is operated by an engine driven pump; this has been bench tested by The Spitfire Company (BH) Ltd in accordance with A.P. 1803J Vol 2 Part 3 Sect. 2 and with reference to S/N-2020/005. In the event of a failure of the hydraulic system an emergency system employing compressed air can be operated to lower the undercarriage. Although the emergency system theory is original the orchestration of the system does however differ from the original. The rigid hydraulic pipe has been re-installed. Where required due to damage resulting from the accident, new made 3/8" and 1/2" Tungum pipes have been installed. The undercarriage selector is inspected for damage or wear, reassembled and pressure tested to full working pressure (1800psi) with reference to AP1565J Vol 1. The selector has been flushed and inspected for compliance with MPD 1998-008 and returned to service. All flexible pipe work has been renewed with hose of MIL-H-8794 303-10 spec. All work has been recorded in work pack No. SCB/010888.

### 2.15 Instruments

The instrument panel is of standard configuration for a single seat aircraft, with original analogue and mercury sense flight instruments. All instruments have been inspected and tested for serviceability with reference to S/N-2020/005 by The Spitfire Company

(BH) Ltd. The compass has been checked for calibration and steer card annotated as appropriate. The altimeter, airspeed indicator and vertical speed indicator, artificial horizon, turn and slip gauge have been and tested by Skysmart Ltd under Certificate of Conformity ARC22916 and ARC23706.

#### 2.16 Safety Harness

The aircraft is fitted with a 4-Point safety harness. It was manufactured by Hooker Harnesses Inc in the USA; this is covered under Acro Aeronautical Services Modification AAS 6140. The harness has been fitted to the specific anchorage points on the pilot's seat. The shoulder straps are fitted to the original type of emergency release mechanism mounted in the rear fuselage.

#### 2.17 Engine Cooling System

Engine temperature is controlled by two radiators situated under the Port and Starboard mainplane. These are newly made items supplied by Vintage Aircraft Radiators S/N 020 and 021 under the cert number of 2023/115. A pneumatically operated flap regulates the flow of air through the radiator. The coolant mixture is contained in a pressure-controlled header tank, which has been built by Aero Restorations New Zealand to Acro Aeronautical Services Modification AAS 6138. The tank has been fully inspected and pressure tested and found serviceable. The tank is mounted on the front of the engine. Coolant mixture is pumped around the system by a pump driven from the base the engine via interconnecting rigid pipes. The system was installed, and pressure tested to 30psi in accordance with AP1565J Vol 2 prior to engine ground running. The intercooler radiator is mounted under the Starboard wing and is a newly made item supplied by Vintage Aircraft Radiators S/N VAR 008. The coolant and intercooler pipes have been supplied by Supermarine Aero Engineering Ltd. Coolant temperature is indicated by a gauge on the instrument panel, that is transmitted by a temperature probe within the coolant pipes. All work has been recorded in work pack No. SCB/010888.

#### 2.18 Engine

The original engine fitted to this aircraft was a Rolls Royce Merlin 70, S/N: 185313. However, following the damage sustained to the aircraft in 2015 the engine has been replaced with a Packard Merlin 266 S/N V-334090 overhauled Roush Aviation and supplied with an FAA 8130-3 Certificate No. AP27904351A. The tubular four-point engine frame has been rebuilt in house to drawing by The Spitfire Company Biggin Hill Ltd, all material changes are in accordance with material substitutions manual AAS 5597. All work has been recorded in work pack No. SCB/010888.

#### 2.19 Propeller

The propeller is a four-blade constant speed Dowty Rotol R12/4F5/4 S/N: VA8454 which has been overhauled by Hercules Propellers Ltd in accordance with Rotol Component Maintenance Manual Publication Number 504, Dowty Service Bulletins 61-1061 and 61-1113. The propeller blades were manufactured by Hercules Propellers to a Dowty Rotol design. There are no release limitations to RPM or BHP on the Hercules Propeller blades, this is applicable to Hoffman blades only. This allows the engine to run to the engine limitation of 3000 RPM at +18 Boost. The blades have been indexed to suit the reduction gear ratio installed of the Rolls Royce Merlin 266. The propeller is released with Certificate of Conformity AC0256.

## 2.20 Oxygen System

With the aircraft being limited to a 10,000-foot operating ceiling, the original oxygen system is not required. The system components and pipe work have been fitted for historical accuracy. The system has been placarded as 'Inoperative' and annotated in the Pilots Notes.

## 2.21 Armament

The wings of the aircraft have been rebuilt without mounting bracketry for the two 20-millimeter cannons and two .5" calibre machine guns and .303 guns that would have been fitted. All original access panels for ammunition and gun/cannon mounting have been fitted although the aircraft does not have any armament fitted.

## 3. Approval Procedures

This aircraft approval has been carried out in accordance with BCAR Section A, Chapter A3-7.

## 4. Basis Of Approval

### 4.1 CAA Approval Basis for the Aircraft

The aircraft is classified as a 'Simple' type within the definition of BCAR A8-25 Supplement 2 Para. 1.2(a). Approval of this aircraft for the issue of a Permit to Fly is based upon an investigation of the modification state and build standard in accordance with BCAR A3-7.

New modifications have been assessed against the requirements of BCAR Section K.

### 4.2 CAA Design Requirements For The Issue Of A Permit to Fly

CAA CAP 661 MPDs and CAP 747 Airworthiness Directives and Generic Requirements as applicable.

Any installed equipment for which the Air Navigation Order requires approval must be approved by the CAA.

### 4.3 Environmental Requirements

Air Navigation (Noise Order)

### 4.4 Design Requirements Associated with Operational Approvals

CAP 632 as applicable.

### 4.5 Equipment Requirements

For compliance with the Air Navigation Order CAP 393 schedules of equipment see Applicants Submission para 5.2.8.

## 5. Compliance With The Basis Of Certification/Validation/Approval

### 5.1 Compliance With The Certification/Validation Basis For The Aircraft/Modification

The applicant's submission report for G-BRRA reference SCB 015 Issue 1, dated 19 December 2023 summarises the work carried out during the restoration/repair and subsequent operation of the aircraft. The modification state of the aircraft has been addressed in three parts as follows:

#### 5.1.1 Manufacturer's/Military Modifications

A list of Air Ministry / Manufacturer modifications has been surveyed by the applicant and all Class 2 Modifications have been checked for applicability and compliance to this Mark and equipment fit.

The applicant has identified that not all Class 2 Modifications are required to be embodied due to the nature of the equipment fit and non-effectiveness on the airworthiness of the aircraft. For example, AM. Mod. 510. "To pressurize fixed fuel tanks" there is no requirement to embody this modification as this aircraft is restricted to an operating ceiling of 10,000 feet.

Further detail can be found in section 5.2.1 of the applicant's submission.

#### 5.1.2 Service Technical Instructions and Military Inspections

A number of Service Instructions (SI's) and Service Technical Instructions (STI's) have historically been issued by HQ Home Command, Royal Air Force and more recently some inspections have been recommended by the Battle of Britain Memorial Flight in the course of their operation of Spitfire aircraft. The design report features statements of compliance with applicable SIs, STIs and inspections and these have been accepted by the CAA.

For Service Technical Instructions (STI) see Section 5.2.2 of applicant's submission.

For Battle of Britain Memorial Flight Inspections see Section 5.2.3 of applicant's submission. For Letters to Operators see Section 5.2.5 of applicant's submission. For CAA Safety Notices see Section 5.2.6 of applicant's submission.

#### 5.1.3 Applicant's Modifications

The following modifications have been incorporated by the applicant, reference applicant's submission section 5.2.7.

Ref	Title
AAS 5597	Material Specification Changes (Material)
AAS 6141	Upgrade the Original 12 Volt to 24 Volt Electrical System and Upgrading of the Avionics System
AAS 6137	Installation of Alternative Emergency Undercarriage Blow Down Reservoir
AAS 6138	Material Substitution – Wing Attachment Bolts Upper and Lower
AAS 6139	Replacement Engine Coolant Header Tank

AAS 6140	Installation of Hooker 4-Point Harness
AAS 5689	Manufacture of Replacement Spitfire Mk 9 and Mk 16 Landing Gear Leg Stubs Axles
RM043.CB	Material Substitution - Installation of Supermarine Spitfire Exhaust Stubs
DR1008-002	Installation of Modern PTFE Steel Braided Hoses

5.2 Compliance With Design Requirements For The Issue Of A Permit to Fly

The applicant's submission details the compliance with the following mandatory airworthiness publications:

Publication	Reference	Description
Mandatory Permit Directives CAP 661	1995-092	Spar Booms Manufactured from L105
Mandatory Permit Directives CAP 661	1998-008	U/C Selector Cable Guide Block
Mandatory Permit Directives CAP 661	2010-004	Merlin Fingers on Camshaft
Mandatory Permit Directives CAP 661	2019-003	Approved Maintenance Program
Mandatory Permit Directives CAP 661	2020-002-R1	Merlin Camshaft Bracket / Retaining Stud
Mandatory Permit Directives CAP 661	2020-004	Chassis Pintles NDT Requirement
Mandatory Permit Directives CAP 661	2020-005	Inboard Support Stay Eye Bolts NDT Requirement
Mandatory Permit Directives CAP 661	2020-006	Main Landing Gear Pintle Stud NDT Requirement
Mandatory Requirements for Airworthiness CAP 747	GR No 6	Electrical Generation System
Mandatory Requirements for Airworthiness CAP 747	GR No 8	Cotton, Linen and Fabric Covered Aircraft
Mandatory Requirements for Airworthiness CAP 747	GR No 10	Painting of Aircraft
Mandatory Requirements for Airworthiness CAP 747	GR No 16	Tire Bursts in Flight, Inflation Methods

For Mandatory Permit Directives (MPD's) see Section 5.2.4 of Applicants submission.

The original military communication radio equipment has been replaced by modern VHF Transceiver and Mode 'S' Transponder suite reference Acro Aeronautical Services Modification AAS 6141.

- Trig TY91 VHF Comm – ETSO 2C169a, 2C128a
- Trig TT22 & TC20 - Mode 'S' Transponder – ETSO 2C2112b, C166a
- Comant CI101 – Antenna – TSO C74c

### 5.3 Compliance With Environmental Requirements

As this aircraft operates on a Permit to Fly, it is exempt from the requirements of the noise order.

### 5.4 Compliance With Design Requirements Associated With Operational Approvals

The elected build standard and the maintenance programme associated with usage of the aircraft are acceptable to the CAA.

### 5.5 Required (Amendments To) Manuals and other Documents Including Mandatory Placards

#### 5.5.1 Pilots Notes

The aircraft is to be operated in accordance with Air Publication AP1565J P&L-P.N. Issue 1. Pilots Notes amended by The Spitfire Company Biggin Hill Ltd where required for Spitfire IXc AP 1565J P&L P.N Issue 1, dated 04 May 2024 for MK912's equipment fit.

#### 5.5.2 Placards

The following placards are fitted in clear view from each pilot seat in the aircraft (\* denotes that the item is to be placarded or otherwise marked on gauges): -

“Day VMC Only”\*

“No Smoking”\*

“Altitude Limit: 10,000ft”\*

“Intentional Spinning Prohibited”\*

“Occupant Warning: This aircraft has not been certificated to an international standard”\*

“Oxygen System Inoperative”

“Sustained flight of less than 1G is prohibited”

The following conditions must be highlighted in the crew compartment by means of placarding or instrument markings:

- Aerobatic Limitations. See Section 6.2 below.
- Engine Limitations. See Section 6.3 below.
- Airspeed Limitations. See Section 6.4 below.
- Loading Limitations. See Section 6.5 below.

### 5.5.3 Weight and Balance

The aircraft was weighed on 04 July 2024, and the weight and balance for continued operation was determined and presented in the weight report (ref. 24JY16325).

The CG range +3.5 in to +7.0 in (aft of datum). The CG datum point is placarded on the exterior of the aircraft in line with frame 5.

### 5.5.4 Maintenance Programme

The aircraft shall be maintained in accordance with an aircraft maintenance programme in accordance with BCAR Section A, Chapter A3-7, Paragraph 15. This shall include relevant instructions from:

- 1) Airframe manuals:
  - a) Spitfire Mk IX Maintenance manual - AP1565J Vol 1: (2nd Edition May 1942)
  - b) Spitfire Mk IX Repair Manual - AP1565J Vol 2: (June 1945)
  - c) Spitfire Mk IX Parts Catalogue - AP1565J Vol 3: (2nd Edition April 1943)
  - d) Pilots Notes: Spitfire IXc MK912 AP 1565J P&L P.N Issue 1 (dated 04 May 2024)
- 2) Engine Manuals:
  - a) TSD 94 Maintenance Manual dated December 1946 and Roush Aviation Maintenance Schedule dated 02 September 2021.
- 3) Propeller Manual:
  - a) Publication 504 Repair and Service Manual dated 15 August 1950

## 6. Conditions Affecting This Approval

In the absence of more complete manufacturers test data, a safety factor of 0.9 (in accordance with BCAR K7.2) has been applied to the maximum demonstrated flight speed to arrive at Vne = 348MPH (302kts).

Attention is drawn to the conditions stated in referenced modifications. The compatibility of modifications with other previously approved modifications must be verified by the installer.

Where the potential for interactions between the modifications exist, the advice of the CAA shall be sought.

6.1 Maximum Number of Occupants

Maximum number of occupants: 1 occupant.

The minimum flight crew is: 1 pilot.

6.2 Aerobatic Limitations

Aerobatic manoeuvres are permitted in accordance with the Pilots Notes with the exception of flick manoeuvres and the following prohibited manoeuvres:

- a) Flick rolls
- b) Spinning
- c) Outside Loop
- d) Sustained Inverted Flight
- e) Sustained Flight of Less Than 1G

Entry speeds to be in accordance with Pilots Notes.

6.3 Engine Limitations\*

	Duration	RPM	Boost (PSI)	Coolant Temp (°C)	Oil Temp (°C)
<b>Max. Take-off</b>	To 1000ft	3000	+18	40°c min 135°c max	15°c min 105°c max
<b>Max. Climb (MS)</b>	60 Mins	2850	+12	125°c	90°c
<b>Max. Cont. MS</b>	-	2650	+7	105°c (115°c)	90°c
<b>Operational Necessity</b>	5 mins	3000	+18	135°c	105°c

(Figures in brackets are permissible for short periods).

Oil pressure- minimum in flight 30 psi  
 Oil pressure normal: 60-90 psi  
 Fuel pressure max cruise: 14-16 psi  
 Min temps for take-off- Oil 15°C / coolant 60°C

6.4 Air speed Limitations\*

Maximum Dive IAS (Vne)	348 mph / (302 kts)
Maximum IAS Flaps extended (VFE)	160 mph / (139 kts)
Gear Down	160 mph / (139 kts)

6.5 Loading Limitations

Maximum total weight authorised: 3250kg (7165 lbs)\*  
 CG range +3.5 in to +7.0 in (aft of datum) for all forms of flying  
 The Datum point is placarded on the exterior of the aircraft in line with frame 5.  
 No baggage is permitted.

6.6 Other Limitations

The aircraft shall be flown by day in visual meteorological conditions only.

No smoking.

Altitude limit 10,000ft.

7. Continued Airworthiness

The maintenance programme for the aircraft must include reference to material that is as detailed in para 5.5.4. These should be complied with to ensure continuing airworthiness.

Inspection in accordance with The Spitfire Company (BH) Ltd Approved Maintenance Program MP/04187/P.

The propeller will be maintained IAW Dowty Rotol SB61-1061 Revision 4 or later approved revision.

Mandatory Permit Directives, Service Bulletins and other data must be considered, and the publications monitored accordingly. The maintenance programme for the aircraft should include reference to any material additional to the original design.

8. Survey

This aircraft G-BRRA has been surveyed by the CAA.

In the particular areas examined during the survey the aircraft was found to conform with the standard recorded by this AAN.

**9. Issue of Authorisation of Release to Service**

The following actions must be completed prior to initial issue of the Permit to Fly:

- a) All actions and ground test procedures specified by the aircraft manufacturer must be completed satisfactorily.
- b) It must be verified that the documents or amendments to documents, and the placards defined under Section 5.5 above are as specified, including any changes specified under Section 8 above.
- c) For G-BRRA, a test flight to AFTS 233 was carried out by P. Kynsey, a pilot acceptable to the CAA, on 01 August 2024, and the results were accepted by the CAA on 08 August.

**10. Approval**

Subject to the conditions of Section 6 above, this aircraft is approved for the issue of a National Permit to Fly, provided that it conforms to the contents of this AAN, is operated in accordance with the limitations/conditions specified/referenced and is maintained in accordance with a maintenance programme approved by the CAA.



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Kirsty Frampton-Scrase  
Design  
For the Civil Aviation Authority

Date: 12 August 2024

**Part 21 Approval not required – UK Reg (EU) 2018/1139 Annex I**  
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