Elevator and tab deflections, gurney flap

SERVICE BULLETIN BRISTELL B23

Office of Airworthiness release

Date:

Name: [Released by]

Signature: Lyssandre Rammos
Deputy HoA
2023.12.20

Verification Engineer

I hereby declare that the technical content of this document is correct and can be used to fulfil the obligations of the type design holder per 21.A.265(h)

Date:

Name: [Checked by]

Signature: 2023.11.27

Author

Date:

Name: Marcus Basien

Signature: Marcus Basien
2023.11.27

Amendments

Issue	Reason	Date
A	Initial issue	23.11.2023

Elevator and tab deflections, gurney flap

As production feedback it was requested to increase the tolerances for setting the elevator down deflection and trim tab (trim/ anti-servo tab) deflections. A design change is performed demonstrating larger acceptable tolerances which are published in respective maintenance manual.

In the course of further airplane development requiring an extended FWD CG, a gurney flap was installed at the trim tab to extend the trim range and allowing higher tolerances. This gurney flap may be added also to the standard B23 aircraft models if chosen by the owner/operator.

Note that this design change and SB does not approve the larger FWD CG range which is not required for any normal loading condition.

STANDARD

0 General

0.1 ATA Code

ATA 27 FLIGHT CONTROLS

0.2 Effectivity

All BRM Aero B23 models and serial numbers:

- without installed DC-074.
- TCDS: EASA.A.642

1 Planning information

1.1 Reason

Update of documentation

Optional improvement of low speed trim range

1.2 Safety Intent

The safety intent is N/A.

1.3 Configuration Description

If criteria in Section 0 met, change the aircraft AMM.

If the optional gurney flap installation is done, change AFM accordingly.

1.4 Compliance

If criteria in Section 0 is met

Service bulletin must be accomplished

☐ ☐ This SB could be made mandatory by an EASA AD.

☐ ☐ This SB is mandatory as per EASA AD no. xyxyx

☐ Service bulletin recommended to be accomplished to prevent significant operational disruptions

☐ Service bulletin to introduce improvements

☒ Service bulletin for convenience or option

1.5 Approval statement

The technical content of this document is approved under the authority of the DOA ref. EASA. 21J.411.

1.6 Concurrent publications

ADxC-73-AMM-001 Edition 2.2

ADxC-73-AFM-001 Issue B4

ADxC-73-AFM-003 Issue B2

ADxC-73-AFM-049 Issue B2

ADxC-73-AFM-070 Issue A3

1.7 Manpower

Approx. 1 hour is required to accomplish this SB.

1.8 Weight and Balance

The additional mass of the gurney flap is 12g (0.012kg) located 273mm aft of the hinge line resulting in an increase of static moment of 0.0032kgm aft of the elevator hinge line. Update control surface weight and balance records accordingly and check against limits according ADxC-73-AMM-001 section 51-60 after installation. If installation is performed simultaneous with any other repair or surface re-coating perform control surface weight and balance measurement in full.

1.9 Electrical load data

n/a

1.10 Software modification

n/a

1.11 Referenced documentation

55B240050N Issue A Gurney flap installation drawing

1.12 Other publications effected

n/a

2 Material information

2.1 Material- cost – availability

For gurney flap material cost contact BRM Aero

2.2 Company support information

Affected publications and parts can be ordered from

BRM AERO, s.r.o.

Address: Letecká 255 686 04 Kunovice Czech Republic

Phone: + 420 773 984 338

E-mail 1: info@brmaero.com

E-mail 2: aero.brm@gmail.com

Web: http://www.brmaero.com

Affected documentation can be downloaded from

https://www.bristell.com/technical-documentation/

For the latter login credentials must be ordered form BRM Aero, s.r.o.

2.3 Material requirements per aircraft

1 x 55B240051N Gurney flap

2 x 1031-2404 Rivet 2.4mm*4mm

PU50 Emfimastic adhesive

2.4 Rework parts

n/a

2.5 Special tooling

n/a

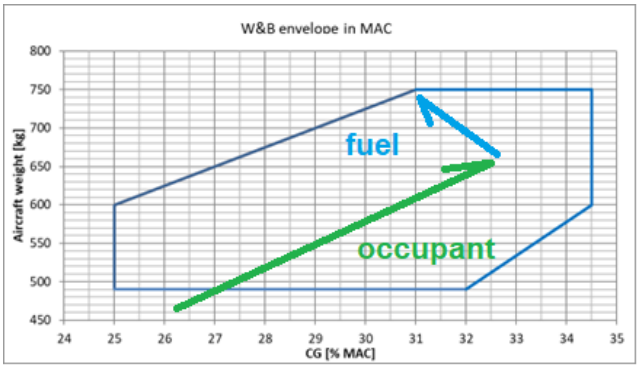
3 Accomplishment/Instructions

Explanations:

- Elevator:
  - DOWN deflection and tolerance originally was 15° +/-2° resulting in an acceptable range of -13° to -17°.
  - The changed range is -11° to -17°.
    - This is published in the ADxC-73-001-AMM Edition 2.2 section 20-50-01.
  - The UP deflection is not affected by the change.
    - Its correct setting features relative tight tolerance of 19°+/-1° which is bracketed on one side by control needs (min 18°) and post stall departure characteristics (max 20°).
- Tab
  - The tab on the elevator co-acts as trim and as anti-servo tab.
  - Its gearing relevant for the longitudinal stability.
    - Checking the gearing is described in ADxC-73-001-AMM Edition 2.2 20-60-01.
  - Its deflection range, with elevator not moving, is relevant for the trim range
    - Critical is the low speed, flap down, idle situation where nose UP trim is required.
    - Checking the elevator tab deflection range is described in ADxC-73-001-AMM Edition 2.2 section 20-50-01. This check is performed with the elevator held in neutral position.
- Gurney flap:
  - The optional gurney flap improves the low speed trim point on cost of high speed trim point.
  - Due to its detail location it has more influence on the (critical) power-off trim range than on the power-on trim.
  - The gurney flap mounts to the rearmost end of the tab and therefore is relevant with respect to tab and elevator static moment. The result of the addition must be checked against limits according ADxC-73-AMM-001 section 51-60. Update airplane life cycle documents accordingly.

1) Update airplane maintenance and flight manual to latest applicable edition.
2) If installation of gurney flap is wanted
   a) Check if control surface weight and balance (mass and static moment about hinge line) has enough reserve to add the gurney flap. The gurney adds 12g of mass and 0.0032kg/m of static moment. If simultaneous repair or top surface coat renewal is done perform elevator/tab weight and balance according ADxC-73-AMM-001 Section 51-60.
   b) If permissible install gurney flap per drawing 55B240050N Issue A
   c) After complete installation, perform deflection measuring of elevator and trim tab. See ADxC-73-AMM-001 Section 20-50-01 and 20-60-01.
   d) Perform check flight as close as practical possible to MTOW / FWD CG (full fuel, max permissible occupant mass, no luggage):
      i) Check take off trim setting correctness
      ii) Check minimum trim speed at engine idle, flap 25 at or below 57KIAS
      iii) Check maximum trim speed at max power, flap up minimum 122 KIAS
      iv) Check VNE behaviour (no buffeting)

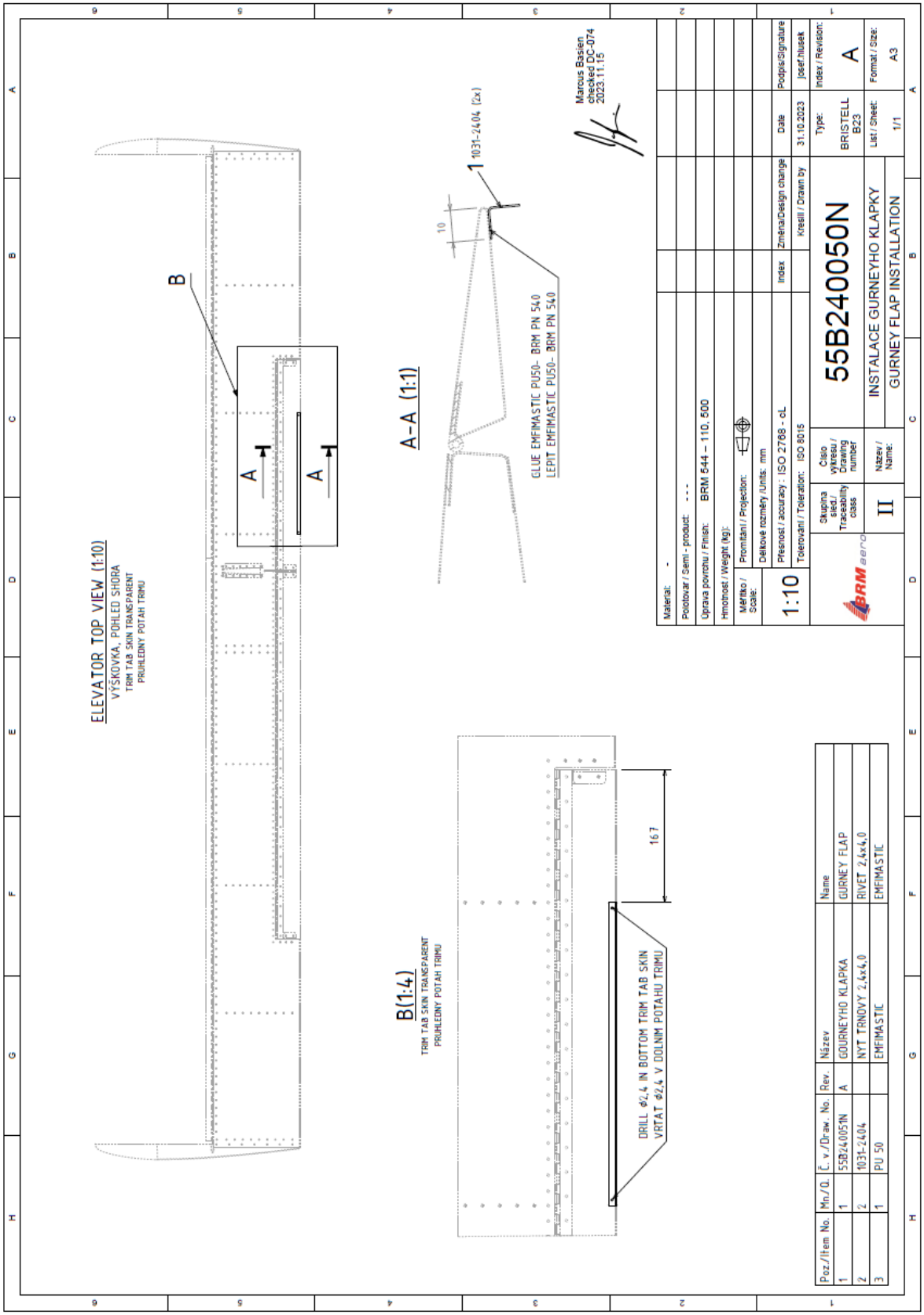
      Notes:
      - it is not necessary to reach trim travel stop in the tests
      - approach the limits with care
      - perform test in calm weather condition
      - perform test at practical FWG CG (full fuel, no luggage) and close to MTOW 750kg, do not exceed the approved envelope.



3) Make a log book entry and add note to aircraft CAW documentation that this Service bulletin has been incorporated.

4 Appendix

55B240050N Issue A Gurney flap installation drawing


ELEVATOR TOP VIEW (1:10)
VÝŠKOVKA, POHLED SHORA
TRIM TAB SKIN TRANSPARENT
PRŮHLEDNÝ POTAH TRIMU
A–A (1:1)
B(1:4)
TRIM TAB SKIN TRANSPARENT
PRŮHLEDNÝ POTAH TRIMU
DRILL Ø2,4 IN BOTTOM TRIM TAB SKIN
VRTAT Ø2,4 V DOLNÍM POTAHU TRIMU
16,7
GLUE EMFIMASTIC PU50- BRM PN 540
LEPIT EMFIMASTIC PU50- BRM PN 540
1031-2404 (2x)
Marcus Basien
checked DC-074
2023.11.15
55B240050N
INSTALACE GURNEYHO KLAPKY
GURNEY FLAP INSTALLATION
BRISTELL B23
1:10
Material: -
Polotovar / Semi - product: ---
Úprava povrchu / Finish: BRM 544 – 110, 500
Hmotnost / Weight (kg):
Měřítko / Scale:
Promítání / Projection:
Délkové rozměry / Units: mm
Přesnost / accuracy : ISO 2768 - cL
Tolerování / Toleration: ISO 8015
Skupina sled./ Traceability class
II
Číslo výkresu / Drawing number
Název / Name:
Index
Změna/Design change
Kreslil / Drawn by
Date
31.10.2023
Podpis/Signature
josef.hlusek
Type:
Index / Revision:
A
List / Sheet:
1/1
Format / Size:
A3
Poz./Item No. | Mn./Q. | Č. v./Draw. No. | Rev. | Název | Name
1 | 1 | 55B240050N | A | GOURNEYHO KLAPKA | GURNEY FLAP
2 | 2 | 1031-2404 | | NYT TRNOVÝ 2,4x4,0 | RIVET 2,4x4,0
3 | 1 | PU 50 | | EMFIMASTIC | EMFIMASTIC