RNSA

Rannsóknarnefnd samgönguslysa

LOKAÐ MEÐ BÓKUN

Case no.: **22-110F022**

Date: **22. December 2022**

Location: **Enroute to Ísafjörður (BIIS) from Akureyri (BIAR)**

Description: **Right nacelle fuel filter drain failure**

Aircraft TF-MYB (Textron B200GT) was close to the Westfjords in Iceland, enroute to Ísafjordur (BIIS) from Akureyri (BIAR), when the right engine shut down, due to loss of all fuel from the right-wing tanks during the flight.

The aircraft returned to BIAR with one engine operative.

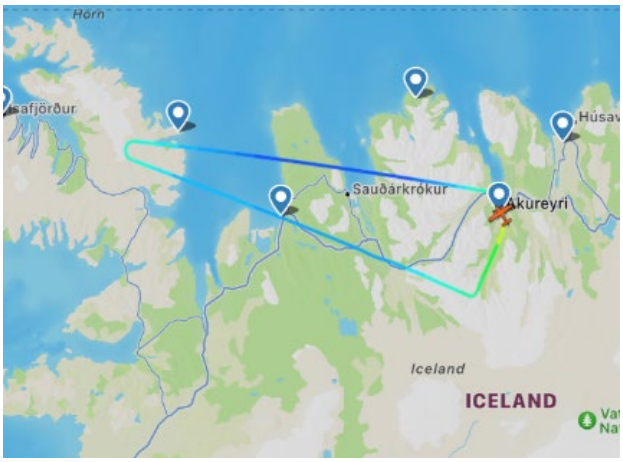
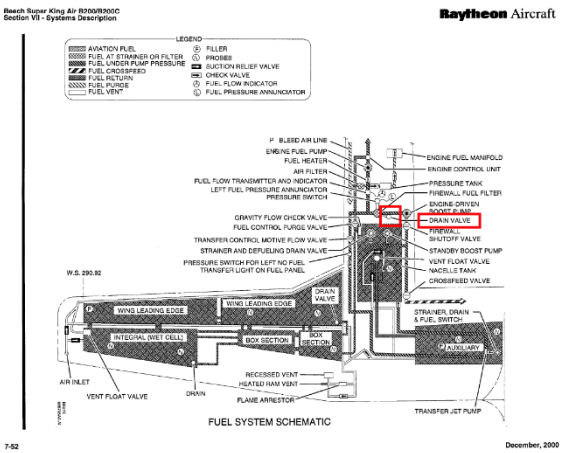


Figure 1: Flight path



After landing it was discovered that the right nacelle firewall fuel filter drain, on the lower side of the cowling forward of the firewall, had failed and was missing its core part. As a result, the right-wing fuel tank drained completely, and the right engine shut down due to fuel starvation (Figure 2-4).

Figure 2: Failed drain valve located just forward of the firewall on lower side nacelle cowling

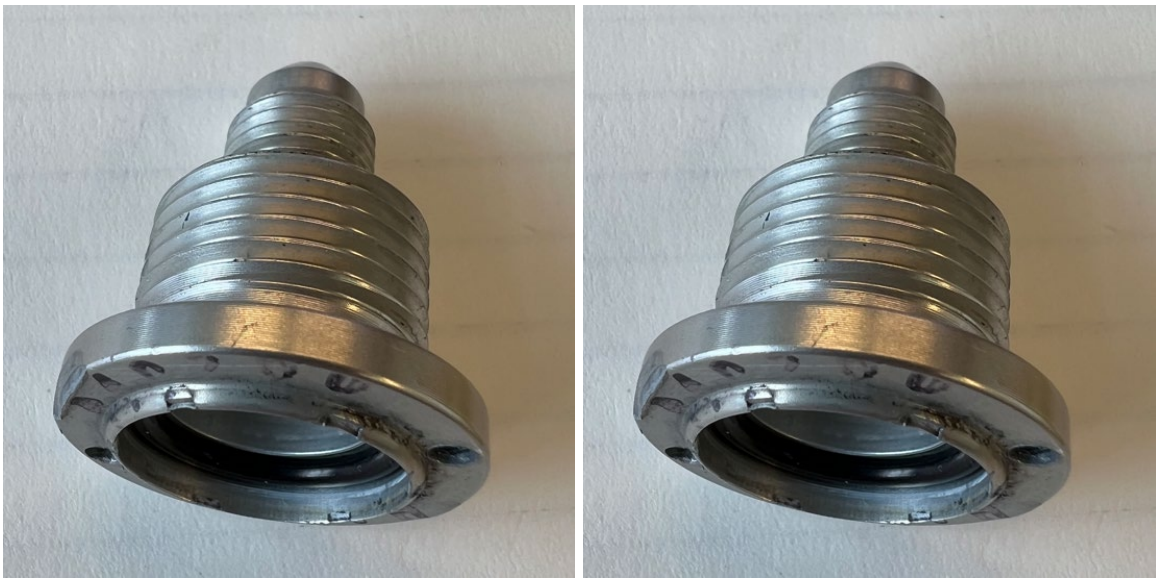


Figure 3: Right nacelle firewall fuel filter drain

The left nacelle firewall fuel filter drain was also inspected after the serious incident. The inspection revealed that the core part of the fuel filter drain had partially migrated out and was likely very close to failure. If the migration would have continued to such failure, that would also have caused loss of fuel in the left wing with fuel starvation of the left engine. See Figure 4.

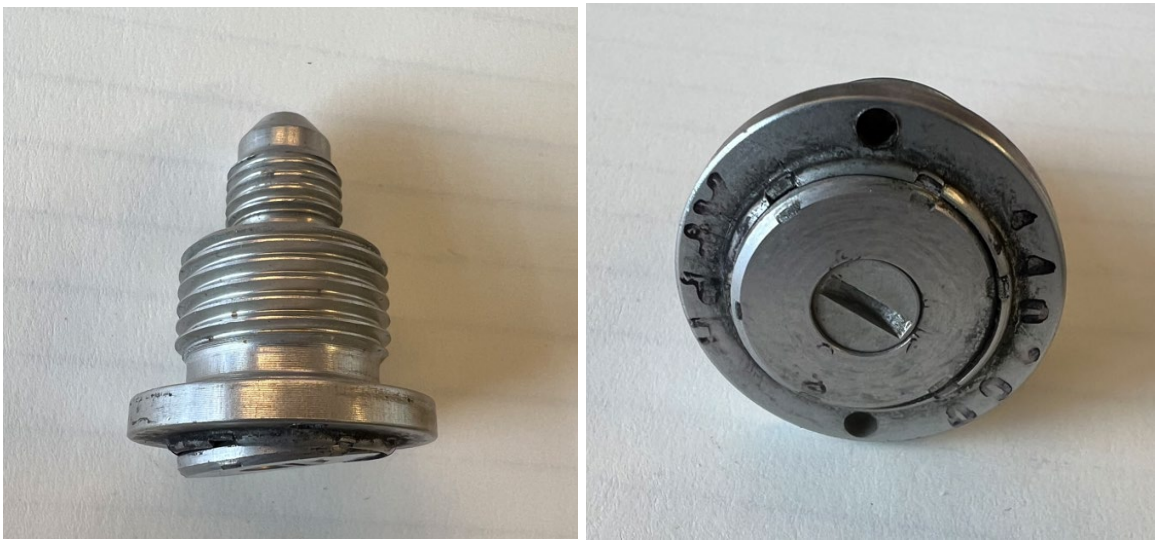
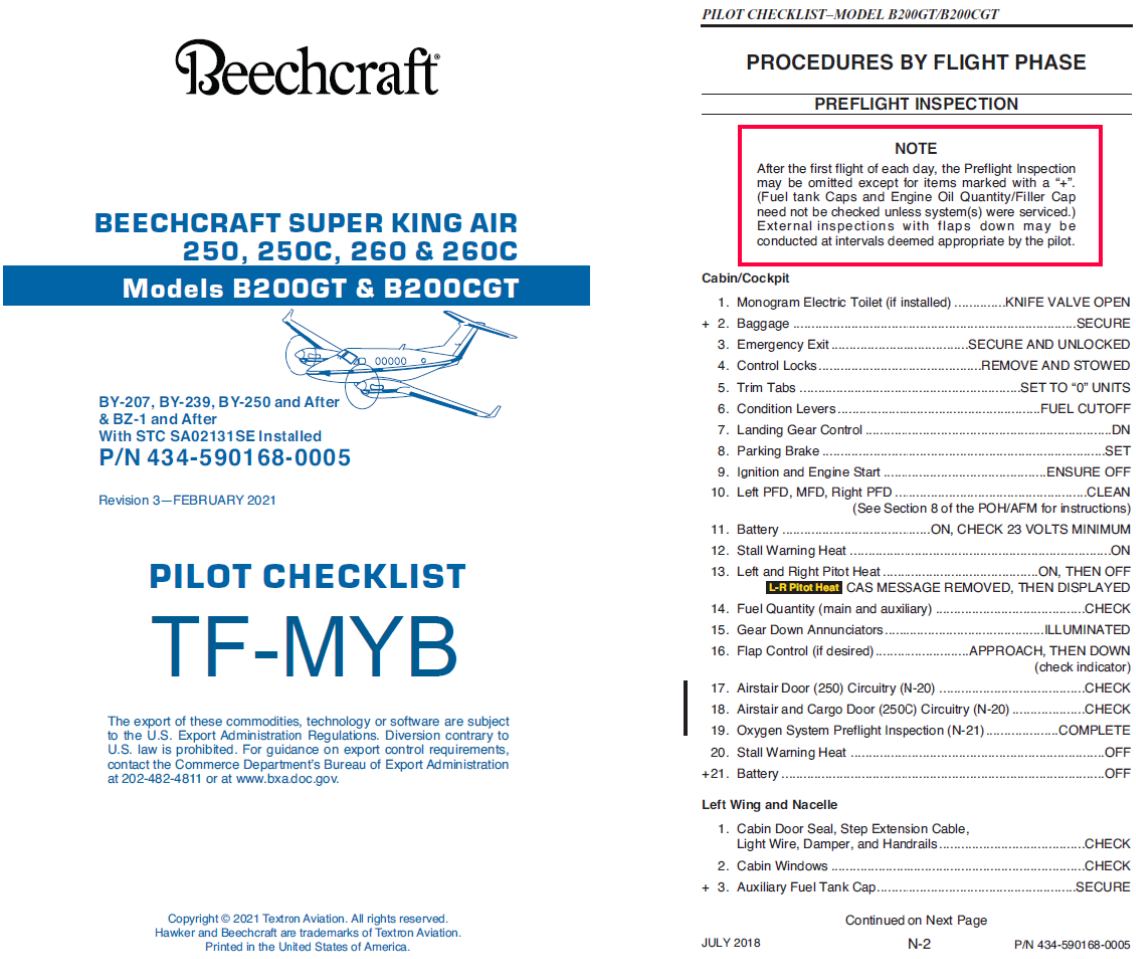


Figure 4: Left nacelle firewall fuel filter drain

After the incident, the partially failed left nacelle firewall fuel filter drain was removed and the left-wing fuel tanks were drained. When draining the fuel from the left-wing fuel tanks, some water was discovered in the fuel.

According to the Beechcraft Super King Air Models B200GT & B200CGT Pilot Checklist for aircraft TF-MYB, the fuel filter drain should have been drained prior to the first flight of the day (Figure 5 and Figure 6).



Beechcraft

BEECHCRAFT SUPER KING AIR
250, 250C, 260 & 260C
Models B200GT & B200CGT

BY-207, BY-239, BY-250 and After
& BZ-1 and After
With STC SA02131SE Installed
P/N 434-590168-0005

Revision 3—FEBRUARY 2021

PILOT CHECKLIST
TF-MYB

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PROCEDURES BY FLIGHT PHASE

PREFLIGHT INSPECTION

NOTE
After the first flight of each day, the Preflight Inspection may be omitted except for items marked with a "+". (Fuel tank Caps and Engine Oil Quantity/Filler Cap need not be checked unless system(s) were serviced.) External inspections with flaps down may be conducted at intervals deemed appropriate by the pilot.

Cabin/Cockpit

1. Monogram Electric Toilet (if installed) ..... KNIFE VALVE OPEN
+ 2. Baggage ..... SECURE
3. Emergency Exit ..... SECURE AND UNLOCKED
4. Control Locks ..... REMOVE AND STOWED
5. Trim Tabs ..... SET TO "0" UNITS
6. Condition Levers ..... FUEL CUTOFF
7. Landing Gear Control ..... DN
8. Parking Brake ..... SET
9. Ignition and Engine Start ..... ENSURE OFF
10. Left PFD, MFD, Right PFD ..... CLEAN
(See Section 8 of the POH/AFM for instructions)
11. Battery ..... ON, CHECK 23 VOLTS MINIMUM
12. Stall Warning Heat ..... ON
13. Left and Right Pitot Heat ..... ON, THEN OFF
L-R Pitot Heat CAS MESSAGE REMOVED, THEN DISPLAYED
14. Fuel Quantity (main and auxiliary) ..... CHECK
15. Gear Down Annunciators ..... ILLUMINATED
16. Flap Control (if desired) ..... APPROACH, THEN DOWN
(check indicator)
17. Airstair Door (250) Circuitry (N-20) ..... CHECK
18. Airstair and Cargo Door (250C) Circuitry (N-20) ..... CHECK
19. Oxygen System Preflight Inspection (N-21) ..... COMPLETE
20. Stall Warning Heat ..... OFF
+21. Battery ..... OFF

Left Wing and Nacelle

1. Cabin Door Seal, Step Extension Cable, Light Wire, Damper, and Handrails ..... CHECK
2. Cabin Windows ..... CHECK
+ 3. Auxiliary Fuel Tank Cap ..... SECURE

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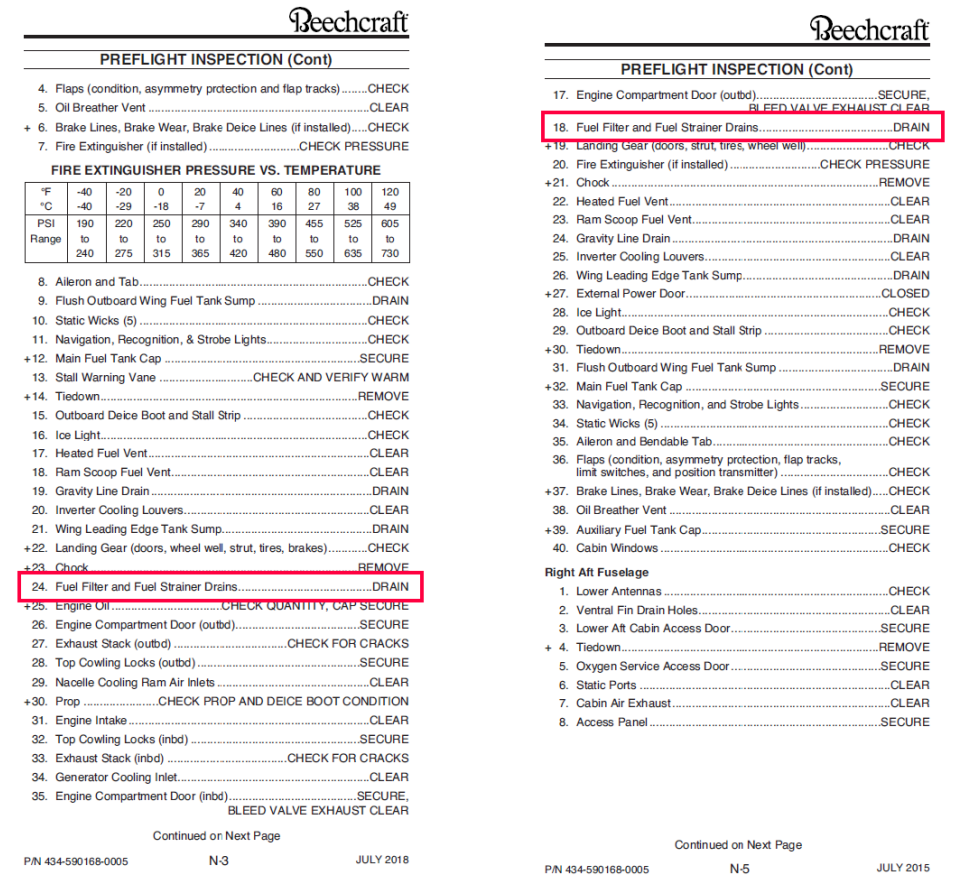
Figure 5: Beechcraft Pilot Checklist – Preflight inspection

The Fuel Filter on the left nacelle is to be drained per item 24 on page N-3, prior to the first flight of the day. See Figure 6.

The Fuel Filter on the right nacelle is to be drained per item 18 on page N-5, prior to the first flight of the day. See Figure 6.



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PREFLIGHT INSPECTION (Cont)

4. Flaps (condition, asymmetry prctection and flap tracks).....CHECK
5. Oil Breather Vent .....CLEAR
+ 6. Brake Lines, Brake Wear, Brake Deice Lines (if installed).....CHECK
7. Fire Extinguisher (if installed) .....CHECK PRESSURE

FIRE EXTINGUISHER PRESSURE VS. TEMPERATURE

°F	-40	-20	0	20	40	60	80	100	120
°C	-40	-29	-18	-7	4	16	27	38	49
PSI Range	190 to 240	220 to 275	250 to 315	290 to 365	340 to 420	390 to 480	455 to 550	525 to 635	605 to 730

8. Aileron and Tab.....CHECK
9. Flush Outboard Wing Fuel Tank Sump .....DRAIN
10. Static Wicks (5) .....CHECK
11. Navigation, Recognition, & Strobe Lights.....CHECK
+12. Main Fuel Tank Cap .....SECURE
13. Stall Warning Vane .....CHECK AND VERIFY WARM
+14. Tiedown.....REMOVE
15. Outboard Deice Boot and Stall Strip .....CHECK
16. Ice Light.....CHECK
17. Heated Fuel Vent.....CLEAR
18. Ram Scoop Fuel Vent.....CLEAR
19. Gravity Line Drain .....DRAIN
20. Inverter Cooling Louvers.....CLEAR
21. Wing Leading Edge Tank Sump.....DRAIN
+22. Landing Gear (doors, wheel well, strut, tires, brakes).....CHECK
+23. Chock.....REMOVE
24. Fuel Filter and Fuel Strainer Drains.....DRAIN
+25. Engine Oil .....CHECK QUANTITY, CAP SECURE
26. Engine Compartment Door (outbd).....SECURE
27. Exhaust Stack (outbd) .....CHECK FOR CRACKS
28. Top Cowling Locks (outbd) .....SECURE
29. Nacelle Cooling Ram Air Inlets .....CLEAR
+30. Prop .....CHECK PROP AND DEICE BOOT CONDITION
31. Engine Intake.....CLEAR
32. Top Cowling Locks (inbd) .....SECURE
33. Exhaust Stack (inbd) .....CHECK FOR CRACKS
34. Generator Cooling Inlet.....CLEAR
35. Engine Compartment Door (inbd).....SECURE, BLEED VALVE EXHAUST CLEAR

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PREFLIGHT INSPECTION (Cont)

17. Engine Compartment Door (outbd).....SECURE, BLEED VALVE EXHAUST CLEAR
18. Fuel Filter and Fuel Strainer Drains.....DRAIN
+19. Landing Gear (doors, strut, tires, wheel well).....CHECK
20. Fire Extinguisher (if installed) .....CHECK PRESSURE
+21. Chock .....REMOVE
22. Heated Fuel Vent.....CLEAR
23. Ram Scoop Fuel Vent.....CLEAR
24. Gravity Line Drain .....DRAIN
25. Inverter Cooling Louvers.....CLEAR
26. Wing Leading Edge Tank Sump.....DRAIN
+27. External Power Door.....CLOSED
28. Ice Light.....CHECK
29. Outboard Deice Boot and Stall Strip .....CHECK
+30. Tiedown.....REMOVE
31. Flush Outboard Wing Fuel Tank Sump .....DRAIN
+32. Main Fuel Tank Cap .....SECURE
33. Navigation, Recognition, and Strobe Lights.....CHECK
34. Static Wicks (5) .....CHECK
35. Aileron and Bendable Tab.....CHECK
36. Flaps (condition, asymmetry prctection, flap tracks, limit switches, and position transmitter) .....CHECK
+37. Brake Lines, Brake Wear, Brake Deice Lines (if installed).....CHECK
38. Oil Breather Vent .....CLEAR
+39. Auxiliary Fuel Tank Cap.....SECURE
40. Cabin Windows .....CHECK

Right Aft Fuselage

1. Lower Antennas .....CHECK
2. Ventral Fin Drain Holes.....CLEAR
3. Lower Aft Cabin Access Door.....SECURE
+ 4. Tiedown.....REMOVE
5. Oxygen Service Access Door.....SECURE
6. Static Ports .....CLEAR
7. Cabin Air Exhaust.....CLEAR
8. Access Panel .....SECURE

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Figure 6: Drain the Fuel Filter both on the left nacelle and on the right nacelle

The investigation revealed that normally the flight operator only drained these two drains during a maintenance inspection every two weeks, instead of daily as required per the Pilot checklist.

This was only the case for the two Firewall Fuel Filter Drains, but other drains were being drained daily as required.

According to the flight operator, the reason for not following the Pilot checklist and perform this drain before the first flight every day was the following:

1) These drains were hard to reach for the flight crew.
2) The type of the drain was such, different from other drains on the aircraft, that it required a different tool that was not available onboard the aircraft.
3) The flight operator considered draining this type of a drain a maintenance task, rather than a flight crew task.

4) The flight operator decided to have these two drains, drained during maintenance checks instead of by the pilots during the daily checks.
5) The aircraft was often operated at airports where mechanics were not available, therefore it was hard to schedule it as a maintenance task during daily inspection and was moved to a maintenance inspection performed at a two-week interval.

SIA-Iceland believes that water accumulated in the fuel system, at its lowest point at the Firewall Fuel Filter Drain, as the flight operator was only draining these two drains at two-week intervals instead of during daily preflight inspection.

This allowed accumulated water at the fuel filter drain to freeze, slowly migrating out the core part of the Firewall Fuel Filter Drain.

As a result, the core part of the Firewall Fuel Filter Drain on the right nacelle migrated completely out, allowing the fuel in the right wing to drain out of the aircraft during the serious incident flight (Figure 3).

This also allowed the core part of the Firewall Fuel Filter Drain on the left nacelle to partially migrate out (Figure 4).

Since the serious incident, the flight operator has changed its procedures, draining the Firewall Fuel Filter Drains daily.

SIA-Iceland informed NTSB of the case and requested that the manufacturer (Textron Beechcraft) would be notified of this incident and asked to evaluate if a “Communique” or a Service Letter to flight operators was needed. The NTSB notified the FAA, the aircraft manufacturer (Textron) and the engine manufacturer (Pratt & Whitney) as a result of this request.

SIA-Iceland closed this case with a booking on 23. Nóvember 2023.