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SERVICE BULLETIN NUMBER SB 131
ISSUE 1 PAGE 1 of 3

TITLE	Fuel System, Rohacell dimpling and fuel leaks.
CLASSIFICATION	The CAA have classified this bulletin as Mandatory
COMPLIANCE	Read and ammend operations as directed, append to manual.
APPLICABILITY	All UK registered CT2K and CTSW aircraft.

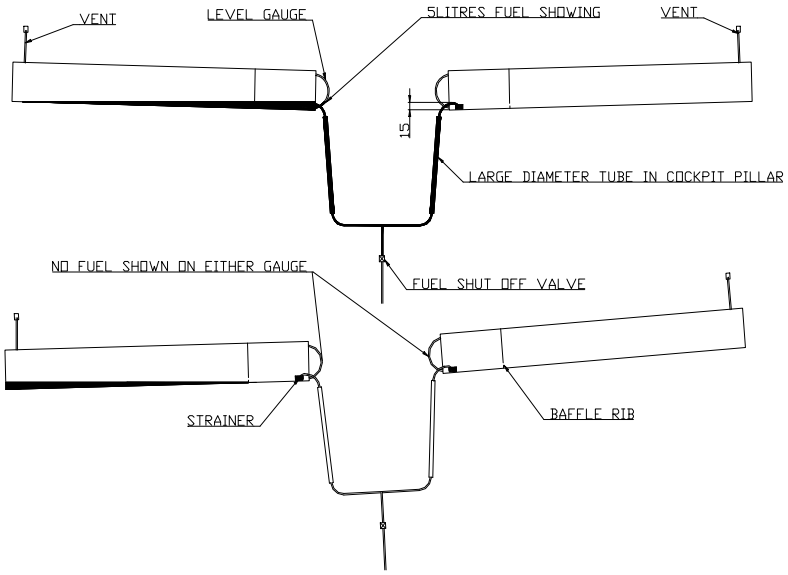
INTRODUCTION

A CTSW ran out of fuel when apparently 5 litres remained in one tank and no fuel indicated in the other. 5 L is marked in red on each level gauge and is the minimum that can be measured. The aircraft has integral tanks, one in each leading edge. There is a baffle rib near the wing root end of each tank. The tank pickups have coarse mesh strainers and a feed pipe with a goose neck 15mm high. The tanks are interconnected on all CTSW and also on the CT2K with modification M186. The tanks are vented by individual vents at the outboard end of each tank. See fig 1 below.

In normal operation, the tanks should feed equally, however slight geometry differences or flying with sideslip may result in one tank feeding faster than the other. The feed can be equalised by flying with opposite sideslip for a period. In level flight, both tanks will drain down to approximately 0.5 litres.

If one tank should empty before the other, in level flight the remaining fuel can still be used up as shown in the top view of fig 1.

However, if the aircraft is in turbulence and/or the aeroplane is flown with sideslip putting the outboard end of the feeding tank low, it is possible for the feed to be uncovered and air to be drawn into the system causing the engine to stop. A standard ground test by Flight Design requires that if 5L is in one tank only and the engine run till it stops with that tank low, a re-start should be obtained within 60 seconds of starter motor turning after the wings are returned to the level. However in flight, that time may not be available before a forced landing has to be set up. Therefore it is not recommended to continue flight unless fuel can be seen at BOTH sight gauges simultaneously.



ACTION:

1) Pre-flight planning must include contingency for fuel used when ground running, climbing and at least 30 minutes reserve.

2) The CTSW and CT2K are very economical when flown at moderate speeds, typically 14L/h at 110kt and 4800rpm. However at full throttle the fuel consumption rises rapidly to 24L/h at 125kts or when climbing. For flight planning purposes an average of 18L/h is sensible considering a 110kt cruise.

3) It is recommended that the aircraft is landed and refuelled whilst there is still some fuel showing on *both* sight gauges. Fuel levels must be monitored regularly in flight and more frequently as the levels diminish. If flight is continued with no fuel showing on one gauge, the aircraft should be flown in a sideslip with the remaining tank high so as to keep the feed running.

4) If one tank is very slow to feed or does not feed at all, there is a blockage or restriction in that tank vent or feed. In this case a landing must be made whilst there is still fuel showing in the lower tank level gauge and the blockage investigated. See 8 below.

5) Always park with the wings level to avoid cross feeding, assymetric fuel levels and possible loss of fuel through the low vent.

6) When the wings are removed according to the maintenance schedule it is recommended to replace discoloured sight gauges using the factory supplied urethene tubing.

7) A placard must be attached to the instrument panel as follows**:**

MONITOR FUEL SIGHT GAUGES REGULARLY.
BOTH GAUGES MUST SHOW SOME FUEL.
LAND IF NO FUEL IS SEEN IN EITHER SIGHT GAUGE.

8) A fuel flow rate check is required at least annually as follows:

With approximately 10L fuel in each tank:

1.1) Turn the fuel selector OFF. Open the gascolator drain. After a few initial drops, the flow must stop. If any fuel flow continues, the selector valve is faulty and must be replaced.
1.2) Blank off the feed from the RH tank using a clamp over the rubber feed pipe where it exits the bottom of the cockpit pillar.
1.3) Remove the gascolator drain valve. Open the fuel tap. Check the fuel flow exceeds 36 litres per hour (600 cc/minute).
1.4) Repeat for the LH tank.

Be sure to remove the pipe clamp before return to service.

If the fuel flow from either tank is under 36L per hour, the system must be investigated and the cause found. It could be a fault with the shut off valve, piping, fuel feed tank strainer, filter, flowmeter or fuel cap vents.

Continued Airworthiness:

Every 100 hours or at Permit revalidation, whichever is earlier, check fuel system as in action 8 above.

Be sure to remove the pipe clamp before return to service.

2) FUEL TANK LEAKS

Occasionally the integral fuel tanks of the CT2K have been known to develop leaks. The early CT2K tank was sealed with a 3M sealant type EC766 which is a cream colour and not very tolerant of alcohol. From the CTSW onwards Kreem Weiss has been used, which is an alcohol-tolerant sloshing sealer which is white in colour. If a leak should develop, then the tank can be sealed with Kreem Weiss. The wing must be removed and drained of fuel. The tank should be sloshed and supported in all attitudes according to Flight Design process sheet 02010, by a P&M approved repair facility.

If the leak is visible externally, an external patch repair can be carried out. This is only possible on the leading edge, root rib and outboard side of the outboard tank rib. Where necessary it is possible to cut out a panel of underside wing skin to make an inspection/access panel. These works must be carried out by a P&M approved repair facility according to general repair scheme manual R191. Care must be taken to minimise added weight due to repairs.

After tank repair, it is necessary to test the result by connecting a water manometer and pressurising the tank with air up to 1psi. The manometer level must not move noticeably over a period of 1 hour at constant temperature. If the manometer level should drop, investigate using soap suds over the whole tank area and all joints, wing root rib and sealing plate, fuel filler connections. Also check valves in the manometer system. If leaks are not disclosed by this method, then the tank may be leaking internally around the spar web or at the outboard fuel tank closing rib.

3) DIMPLING OF ROHACELL CORE

The Flight Design CT2K was built with Rohacell core in all sandwich construction parts including the wing, empenage, flap aand aileron skins. Airex has always been used in the fuselage. The CTSW uses Airex everywhere except the fuel tank areas.

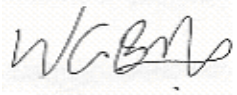
With either type, especially the CT2K, it is false economy to keep the aircraft outdoors. Ventilated hangarage is recommended. A neutral Ph cleaner should be used such as Autoglym car shampoo.

Rohacell is subject to degradation by alkaline solutions. The paint finish on the UK CT2K is very thin to save weight and there may be some pinholes in the surface. If the aircraft has been washed at any time with an alkaline detergent, there is the possibility of alkaline solution being pulled into the pinhole by pressure/temperature changes and a dimple will form around the pinhole. Any other area where moisture can track inside the core also invites the possibility of shrinkage. Typical areas include joints in the Rohacell foam panels. Aramid skinned panels tend to be affected worst because the aramid itself is hygrosopic and tends to lose rigidity with moisture.

Mostly Rohacell foam shrinkage is localised and cosmetic. The trim tab on the stabilator is vulnerable having very light aramid skins located where moisture may collect. If shrinkage is apparent and the tab skins can be easily bent between finger and thumb, replacement of the tab is necessary. Localised dimpling smaller than 25mm diameter may be repaired by use of a low density epoxy/microballoon filler. Larger areas must be inspected by a P&M approved repair agent. After any such work on the control surfaces, the mass balance factor must be checked.

Shrinkage along a spar is more serious and a repair scheme must be approved by P&M Aviation for areas of shrinkage more than 500mm long and 25mm wide.

Documentation:
This service letter must be attached to the operator's manual.

ISSUED BY	**W.G.Brooks**			**DATE**	
Approved		Date 28/05/12	Checked		Date 18/06/12