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	Departamento Department FUEL & FIRE PROTECTION	Avión Aircraft	A330-200 MRTT

NT-FA-SGC-07029

A330-200 MRTT

GTR ATA 38 Production Functional Test

Water Disposal System

Palabras clave/Key words	Clasificación acceso Access class
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Resumen/Summary

This document describes the ground tests to be performed on the A330 MRTT in order to demonstrate proper function of the CASA modified ATA 38 Water Waste System.

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B. DT-FA-C00-05001 Rev C, A330-200 MRTT RAAF Certification Program Plan for Civil Configuration

C. RAAF A330 Aircraft Maintenance Manual (AMM), Rev No.10

D. 330-25.205261 Rev C, A330-200 MRTT Cabin Layout Drawing

E. F383A1000 Issue A, Waste Instl Drawing

1.2 LIST OF ABBREVIATIONS

A/C	Aircraft
AFT	Aft ward
AMM	Aircraft Maintenance Manual
IAW	In Accordance With
APU	Auxiliary Power Unit
CASA	Construcciones Aeronáuticas SA
CB	Circuit Breaker
CMC	Centralised Maintenance Computer
FAP	Flight Attendant Panel
FWD	Forward
GPU	Ground Power Unit
JAR	Joint Airworthiness Regulations
MoC	Means of Compliance
MRTT	Multi Role Tanker Transport
RAAF	Royal Australian Air Force
RFT	Request for Test
VAC	Volts Alternating Current

1.3 INTRODUCTION

This document describes the ground tests to be performed on the A330 MRTT in order to demonstrate proper function of the modified ATA 38 Water Waste System.

The ground tests defined herein have been developed IAW the original ATA 38 water and waste production tests.

These tests are required to be carried out on every converted aircraft, after completion of the conversion and before the first operative use of the Waste Water System.

1.4 TEST OBJECTIVE

The purpose of this ground test is to demonstrate that the system has been assembled correctly and functions as designed.

1.5 APPLICABILITY

The ground test defined herein is applicable to all A330 MRTT production aircraft.

2. TEST AIRCRAFT CONFIGURATION

Prior to the test, ensure that the aircraft is configured IAW with the following instructions:

- The ATA38 Water & Waste System must be completely assembled IAW Reference E.
- Ensure that lavatories are installed IAW A330-200 MRTT lavatory schematic detailed in Reference D.
- Ensure that ATA 30-71-00, Waste Water Ice Protection System is fully installed and functional.
- Ensure that ATA36 Pneumatic System is operative during the entire test; to keep potable water tanks pressurized.
- Ensure that all other ATA Systems are completely assembled or inhibited accordingly.
- Ensure that both 28VDC and 115VAC power supplies are available throughout test; regardless of whether they are provided by the A/C engines, APU or a GPU.
- Ensure that Flight Attendant Panel (FAP) is installed and operational (Reference C, Section 23-73-00).

3. SPECIFIC REQUIREMENTS FOR TESTING

3.1 GENERAL TEST CONDITIONS

The following test conditions will apply unless otherwise stated:

Ambient temperature: 23 ± 10°C (74 ± 18°F)

Relative Humidity: 60 ± 35%

Atmospheric pressure: local ambient

Aircraft attitude: Pitch: 0° approximately

Roll: 0° approximately

3.2 TEST EQUIPMENT

Table 1 below details the equipment required for the tests outlined in this document.

NOTE: Equivalent substitutes may be used instead of the following.

Equipment	Test Equipment Requirements	Qty	P/N
Air Evacuating Rig	Capable of providing a 'user defined' differential vacuum pressure of -12.0 psig min. (827 hPa)	1	-
Toilet Servicing Cart	To drain & flush A330 waste tanks Capable of providing a stable water pressure of 35 psig (2.4 bar) and a water flow rate of 38.0 L (10.0 USgal) per minute.	1	-
Potable Water Servicing Cart	To fill & drain A330 potable water tanks	1	-
Leak Tester	Standard adapter kit to leak test vacuum toilet system	1	9501501-4000
Thermometer	-15 to 50 ± 0.5°C	1	-
Access Platforms	10 ft high	1	-
Lint-Free Cotton Cloths	-	-	Material No. 19-003
Rubber Gloves	-	-	-
Potable Water Potable Water Tanks – 25% Full	-	175 L	-

Table 1 MTAD Provided ATA38 Waste Disposal System Testing and Handling Equipment

WARNING

The design of air supply adaptors shall be such that no abnormal loads shall be put on the system couplings, pipes or supports during connection.

Adaptor Description	Adaptor Requirements	Qty
Adaptor to couple Air Evacuating Rig to Leak Tester	Couple to suit. Evacuate system to –12 psig min.	1

Table 2 Air Supply Adaptors

3.3 SAFETY CHECKS

All relevant Standing Work Orders concerning safety must be complied with.

This test does involve waste handling activities, however the waste that will be handled is sanitary waste only (in the form of potable water), however, for added safety, be sure to always use rubber gloves when working on the toilet waste system or parts that have contamination from the waste system.

The aircraft and test equipment must be properly bonded. System pressure is to be monitored at all times to ensure that pressure limits are not exceeded.

3.4 AUTHORITIES / SPECIALISTS PARTICIPATION

EADS-CASA Water Waste Specialists shall oversee the tests.

MTAD Shopfloor Personnel shall perform the tests.

3.5 PRESENTATION OF RESULTS

The following data corresponding to the tests shall be registered in a data sheet:

- Identification and build standard
- Site and date of test / Responsible organisation / Persons present
- General test conditions

Additionally, the data sheet shall register all the information required in this GTR.

Any deviation from this GTR shall be clearly indicated in the data sheet.

The data sheet shall be submitted to:

EADS-CASA Military Transport Aircraft Division

Fuel & Fire Protection Department

Avda. John Lennon s/n

28906 Getafe – Madrid (Spain)

4. TEST REQUIREMENTS

4.1 REAL-TIME MONITORING AND RECORD OF RESULTS

Throughout all test phases of the ATA38 Waste Disposal System, the following shall be monitored and noted (where required) in the attached data sheet (see Appendix A):

- Positive / Vacuum Pressure throughout all test phases; to ensure that test values are not exceeded (no notation required).

  NOTE: All pressure readings are to be taken at:

  - Leak Tester Pressure Manometer
  - Toilet / Potable Water Servicing Carts
  - Air Evacuating Rig
- Abnormal system behaviour and indications
- Failure messages displayed on FAP and CMC
- Potable water level (no notation required)
- LH & RH Waste tank level (no notation required)

4.2 FUNCTIONAL TEST OF TOILET SYSTEMS

4.2.1 TEST PREPERATION

Perform the following tasks prior to ground test:

WARNING:	**ALWAYS USE RUBBER GLOVES WHEN YOU DO WORK ON THE TOILET WASTE SYSTEM, OR ON PARTS THAT HAVE CONTAMINATION FROM THE WASTE SYSTEM.** **WHEN YOU COMPLETE THE WORK PRECEDURE, CLEAN YOUR HANDS WITH SOAP AND WATER.** **THIS WILL PREVENT INFECTION (TOILET WASTE IS DANGEROUS FOR HEALTH).**
WARNING:	**DO NOT WORK ON THE TOILET WASTE SYSTEM AND THE POTABLE WATER SYSTEM AT THE SAME TIME. THIS WILL PREVENT CONTAMINATION OF THE POTABLE WATER SYSTEM. SUCH CONTAMINATION CAN BE DANGEROUS TO HEALTH.**
WARNING:	**OBSERVE ALL ELECTRICAL SAFETY PRECAUTIONS.**

- Ensure that the Aircraft has been set up IAW those instructions in Section 2 of this document.
- Fence off test area and place warning signs accordingly to restrict unauthorised access.
- Energise the aircraft electrical circuits IAW Task 24-41-00-861-801 (Reference C).
- CLOSE the following CB's on panel 5005VE; get access to panel IAW Task 31-18-00-010-801 (Reference C).
  - WATER SYSTEM AIR COMPRESSOR (Fin. 1MD)
  - LAV PWR RH FWD (Fin. 1MG)
  - LAV PWR RH MID-AFT (Fin. 3MG)
  - LAV PWR RH AFT (Fin. 4MG)
  - RH VACUUM TOILET SYSTEM (Fin. 5MG)
  - RH VACUUM GENERATOR (Fin. 6MG)
  - LAV PWR LH FWD (Fin. 101MG)
  - LH VACUUM TOILET SYSTEM (Fin. 102MG)
  - LAV PWR LH AFT (Fin. 104MG)
  - LH VACUUM TOILET SYSTEM (Fin. 105MG)
  - LH VACUUM GENERATOR (Fin. 106MG)
- Make sure that the waste holding tanks are not full. If necessary, drain the waste holding tanks IAW Task 38-31-00-680-801 (Reference C).
- Fill Potable Water Tanks to 25% capacity IAW Task 12-15-38-613-801 (Reference C).
- Pressurise the Potable Water System IAW Task 38-10-00-614-801 (Reference C).
- Make sure that the waste service panel door (171AL) is closed.

  NOTE: Make sure that the latches are correctly locked and that the door makes a continuous surface with the skin of the aircraft.
- Check on FAP / CMC panels that no ATA38 related error/maintenance messages are shown.
- Check that there is no water flowing into any of the LH / RH lavatories.

4.2.2 TEST PROCEDURES

Perform a Functional Test of the LH Toilet Assembly IAW the following test procedures:

NOTE: The flush cycle starts when you push the flush switch in the lavatory. See Reference D for A/C Lavatory layout.

A. Flush all LH Lavatories one after the other. Verify that the following occurs in each lavatory:
   - i. In Zone 170: - LH vacuum generator 109MG starts / continues to operate
   - ii. In the lavatory: - Water valve opens (1) sec after flush switch operation. Potable water enters bowl
     - Flush valve opens (2) secs after flush switch operation. Waste water is evacuated
   - iii. In Zone 170: - LH vacuum generator 109MG stops operating 15 secs after final flush switch operation

B. Flush LH Lavatories L53 (fwd-most) and L73 (aft-most) at the same time. Verify that the following occurs in both lavatories:
   - i. In Zone 170: - LH vacuum generator 109MG starts to operate
   - ii. In the lavatory: - Water valve opens (1) sec after flush switch operation. Potable water enters bowl
     - Flush valve opens (2) secs after flush switch operation. Waste water is evacuated
   - iii. In Zone 170: - LH vacuum generator 109MG stops operating 15 secs after flush switch operation

C. Open Waste Service Panel access door (171AL).

D. Flush any LH lavatory. Verify that the following occurs:
   - i. In Zone 170: - LH vacuum generator 109MG does not operate
   - ii. In the lavatory: - The toilet does not flush

E. Close Waste Service Panel access door (171AL).

Perform a Functional Test of the RH Toilet Assembly IAW the following test procedures:

F. Flush all RH Lavatories one after the other. Verify that the following occurs in each lavatory:
   - i. In Zone 170: - RH vacuum generator 9MG starts / continues to operate
   - ii. In the lavatory: - Water valve opens (1) sec after flush switch operation. Potable water enters bowl
     - Flush valve opens (2) secs after flush switch operation. Waste water is evacuated
   - iii. In Zone 170: - RH vacuum generator 9MG stops operating 15 secs after final flush switch operation

G. Flush RH Lavatories L14 (fwd-most) and L74 (aft-most) at the same time. Verify that the following occurs in both lavatories:
   - i. In Zone 170: - RH vacuum generator 9MG starts to operate
   - ii. In the lavatory: - Water valve opens (1) sec after flush switch operation. Potable water enters bowl
     - Flush valve opens (2) secs after flush switch operation. Waste water is evacuated
   - iii. In Zone 170: - RH vacuum generator 9MG stops operating 15 secs after flush switch operation

H. Open Waste Service Panel access door (171AL).

I. Flush any RH lavatory. Verify that the following occurs:
   - i. In Zone 170: - RH vacuum generator 9MG does not operate
   - ii. In the lavatory: - The toilet does not flush

J. Close Waste Service Panel access door (171AL).

4.2.2.1 SUCCESS CRITERIA

The functional flush test shall be deemed a success if the following conditions are met:

- The toilet system shall behave as expected for each flush scenario listed above.
- All waste water shall be completely evacuated.
- There shall be no error messages flagged on the FAP / CMC panels.

4.2.2.2 TEST CLOSE-UP

Put the aircraft back to its initial configuration:

- Drain LH & RH waste holding tanks IAW Subtask 38-31-00-680-050 (Reference C, Task 38-31-00-680-801).
- If necessary, service the toilet system IAW Task 12-16-38-613-801 (Reference C). Skip draining & flushing subtasks.
- Drain the potable water system IAW Task 12-24-38-680-801 (Reference C).
- Disconnect all attached devices and equipment installed on the aircraft.
- Clean component interfaces and/or adjacent area.
- De-energise ground service network IAW Task 24-42-00-862-801 (Reference C).

4.3 LEAK CHECK OF TOILET SYSTEM

4.3.1 TEST PREPARATION

Perform the following tasks prior to ground test:

- Ensure caps of the waste drain live valve and tank flush connections are CLOSED.
- Ensure drain valve control levers are in the CLOSED position.
- Ensure Waste Service Panel access door (171AL) is CLOSED.
- No aircraft power is required.

4.3.2 TEST PROCEDURE

Leak test the LH & RH toilet systems IAW the following procedure:

A. Clean Leak Tester interface and adjacent area of vacuum system overboard vents.

B. Install Leak Tester to test the LH toilet system IAW the following instructions. See Figure 1 in Appendix B for installation layout.

   i. Install measuring part of Leak Tester (indication unit Pno. 9501501-4100 and test plug Pno. 9501501-4200) in FWD overboard vent (AFT vent for RH system test).

   ii. Hand tighten serrated nut of test plug to lock in place.

   iii. OPEN manual ventilation valve of the measuring tool.

   iv. Install plug part of Leak Tester (Pno. 9501501-4300) in AFT overboard vent (FWD vent for RH system test).

   v. Hand tighten serrated nut of plug to lock in place.

   vi. CLOSE manual ventilation valve of the plug.

C. Connect Air Evacuating Rig to Leak Tester.

D. Evacuate the system slowly to –8.5 psig (586 mbar). Wait at least 1 min until pressure is stable before progressing with test.

E. CLOSE manual ventilation valve of the measuring tool, and turn off vacuum supply.

F. Record initial vacuum pressure.

G. Retain vacuum in system for 5 minutes.

H. Record final vacuum pressure.

I. OPEN manual ventilation valve of the measuring tool to release pressure.

J. Repeat steps A – I for the RH toilet system.

4.3.2.1 PASS CRITERIA

The leak test shall be deemed a success if the following condition is met:

- Pressure difference between initial & final system pressures ≤ 0.50 psig (34.5 mbar).

4.3.2.2 TEST CLOSE-UP

Perform the following tasks after leak test:

- Disconnect Leak Tester, air evacuating rig and associated attachments from aircraft.
- Clean interface / adjacent area of vacuum system overboard vents.
- Make sure that the work area is clean and clear of tools and other items.

5. TEST RESULTS

The test report must include the following:

A. Location of any leakage, along with the corresponding drop in pressure, and an engineering assessment of the expected cause of the leakage. E.g. bad install, component failure or design fault.

B. Description of any abnormality during / after each toilet flush sequence. E.g. water remaining in the bowl.

Any of the previous descriptions may be complemented with images /diagrams if this is considered to give a better description. Images shall be captured in colour.

5.1 PASS CRITERIA

No abnormal behaviour of the vacuum system shall be observed during the testing. Subsequently, there shall be no error messages flagged on the FAP / CMC panels.

The vacuum toilet system shall evacuate all waste water during each toilet flush sequence.

There shall be no system leakage greater than 0.50 psig (34.5 mbar).

5.2 REPORT SHEET

A report sheet capturing all of the ATA38 test activities detailed in Section 4 has been included in Appendix A.

6. APPENDIX A – REPORT SHEET

A330 MRTT ATA 38 WATER & WASTE MODIFICATION TESTING RESULTS DATA SHEET		SHEET 1 of 2
Aircraft S/N:	**MTAD Representative:**	**Ambient Temperature:**
Company:	**CAP Representative:**	**Relative Humidity:**
Place:		**Atmospheric Pressure:**
Test Responsible Supervisor:	**Signature:**	**Date:**

Test Requirement	GTR Para	Activity	Observations	Pass / Fail
FUNCTIONAL TEST - LH TOILET SYSTEM	4.2	**Sequential flush of all LH toilets** - Vac generator 109MG operates		
		- Toilets flush correctly		
		Joint flush of (2) LH toilets - Vac generator 109MG operates		
		- Toilets flush correctly		
		Waste service panel door open - Vac generator 109MG does not operate		
		- Toilet does not flush		
		Waste Tank Drain		

A330 MRTT ATA 38 WATER & WASTE MODIFICATION TESTING RESULTS DATA SHEET		SHEET 2 of 2
Test Responsible Supervisor:	**Signature:**	**Date:**

Test Requirement	GTR Para	Activity	Observations	Pass / Fail
FUNCTIONAL TEST - RH TOILET SYSTEM	4.2	**Sequential flush of all RH toilets** - Vac generator 9MG operates		
		- Toilets flush correctly		
		Joint flush of (2) RH toilets - Vac generator 9MG operates		
		- Toilets flush correctly		
		Waste service panel door open - Vac generator 9MG does not operate		
		- Toilet does not flush		
		Waste Tank Drain		

Test Requirement	GTR Para	Pressure (psig)			Observations	Pass / Fail
		Start	*End*	Δ		
LEAK CHECK - LH TOILET SYSTEM	4.3					
LEAK CHECK - RH TOILET SYSTEM	4.3					

7. APPENDIX B – INSTALLATION OF LEAK TESTER

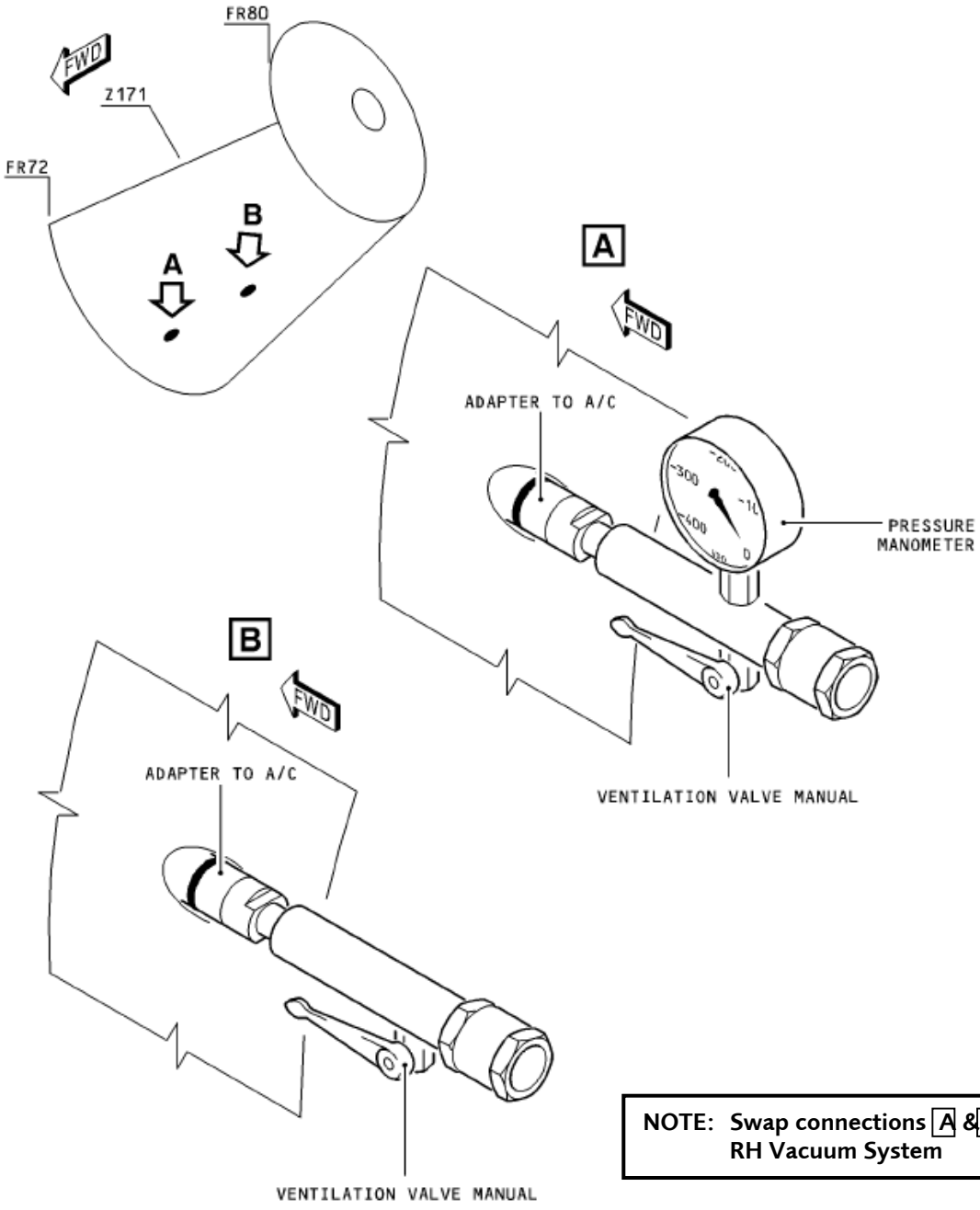

Figure 1 Installation of Leak Tester for Testing LH Toilet System (Reference C, 38-31-00, pg.513)