SERVICE BULLETIN

DMC:	342-49-040 – SERVICE BULLETIN
Title:	Washing and rinsing procedures for APU SN 1116, 1117, 1119, 1121 and 1122
Issue number:	001
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Responsible Partner Company:	A0126
Originator:	F1989
Category:	3 – Recommended
Applicability:	APU S/N 1116, 1117, 1119, 1121 and 1122
Related SB:	None
Related Documents:	None
Accomplishment:	☐ Once only ☒ Recurring

Planned to be incorporated in Technical Publications:
☐ Yes ☒ No

SERVICE BULLETIN 342-49-040

1. Revision information

Issue	Date	Reason for update
001	01/10/2021	Original

2. Planning information

2.1. Applicability

This Service Bulletin (SB) is applicable to APU SN 1116, 1117, 1119, 1121 and 1122 installed on the AW189 or AW149 Helicopter.
Other APU SNs are not affected by this SB.

2.2. Reason

The purpose of this Service Bulletin is to propose alternative washing and rinsing procedures due to non-conformity.

2.3. Description

The purpose of this Service Bulletin is to describe the procedure to be performed by the end user to wash and rinse the APU.
These alternative procedures are applicable until the non-conformity is solved.

2.4. Compliance

2.4.1. Compliance category

Comply with compliance category 3 – Recommended.

2.4.2. Time of compliance

This SB is recommended to be performed at each washing and rinsing operation. The periodicities remain identical to that indicated in the CMM, namely:

- APU washing every 150 flight hours,
- APU rinsing every 150 flight hours,
- In saline environment, the APU rinsing must be done after the last flight of the day.

These procedures must also be applied when performing the preservation procedure.

2.5. Approval

The technical content of this document is approved under the authority of DOA No. EASA 21J214.

2.6. Manpower

Manpower for washing: 1 man hour is necessary.
Manpower for rinsing: 1 man hour is necessary.

2.7. Material

Refer to paragraph 3.1.4 and 3.2.4.

2.8. Tooling

Refer to paragraph 3.1.3 and 3.2.3.

2.9. Weight and balance

The weight is not affected.
The centre of gravity is not affected.

2.10. Publication affected

Not applicable.

2.11. Previous modifications

Not applicable.

3. Accomplishment Instructions

3.1. Rinsing procedure

3.1.1. Required conditions

Required condition	*Data Module/Technical Publication*
The helicopter must be safe for maintenance. Refer to the helicopter maintenance manual if the APU is installed. Flush the tools to be used (spray manifold, piping and tank) with clean water.	n/a n/a n/a

3.1.2. Safety conditions

The helicopter must be safe for maintenance.

WARNING

• Be careful if you use hot water. Hot water can injure you.

• Before you use the consumable materials, you must know and obey the fire, safety and first aid instructions for them. They are dangerous materials. Refer to:

- **The label on the container in which it was supplied**
- **The material safety data sheet**
- **Your local safety regulation.**

• The cleaning agents used are poisonous and dangerous. Be very careful during handling. Prevent contact with skin. Do not swallow or breathe the fumes. Put on protective gloves, clothes and masks.

• Be careful when working at height. Respect the local regulations.

CAUTION

• The proportions of the wash mixture are in relation to the outside air temperature. If the temperature is less than 5 °C, you must add the correct quantity of anti-icing fluid to the wash mixture.

Note
You must do a desalination wash of the APU when you operate it in a salt laden and corrosive environment. A salt laden and corrosive environment is given for operation at sea or flights over the sea at heights less

than 150 meters. It is possible that the helicopter operates over land less than five kilometers from the sea. When this occurs, you can do a desalination wash if the local engineering authority thinks it necessary.

3.1.3. Support equipment

Nomenclature	*Identification no.*	*Qty*
Compressor wash rig	Local purchase	1 Ea
Quick coupling (internal diameter: 8mm / external diameter: 10mm)	10 320 1003 (FAM31) or equivalent	1 Ea
Multiflow air and fluid gun (flow: 5l/min maximum)	10 210 0400 (FAM31) or equivalent	1 Ea

3.1.4. Consumables, materials and expendables

Nomenclature	*Identification no.*	*Qty*	*Remarks*
Isopropyl alcohol Pure methanol (AIR 3651)	Cons.: C039	AR	
ARDROX 6367 cleaner	Local purchase	AR	
ZOK27 cleaner	Local purchase	AR	
Demineralized water	Local purchase	AR	The demineralized water must have the properties that follow: - Transparent colorless liquid free of deposits and/or particles in suspension. - Dry residue after evaporation at 130 °C: 10 ppm (parts per million). - Conductivity: less than 10 µS/cm (micro Siemens/cm). - Ph: between 5.0 and 7.
Tap water	Local purchase	AR	The demineralized water must have the properties that follow: - Transparent colorless liquid free of deposits and/or particles in suspension. - Dry residue after evaporation at 130 °C: 175 ppm (parts per million). - Conductivity: less than 400 µS/cm (micro Siemens/cm). - Ph: between 6.0 and 8.5. - Chloride: less than 100 ppm. - Sulphate: less than 20 ppm.

3.1.5. Procedure

1. Purpose:

   The corrosion in the compressor section can cause a loss of performance of a gas generator.

   This Data Module gives the cleaning methods and materials that you must use for the desalination wash of the compressor. This operation removes deposits that could cause corrosion (operation in corrosive or saline environment).

2. **Note**

   If operating conditions are too bad, you can do the desalination wash at a better time. It is recommended to do it before a flight during a day or if not possible, after the last flight of the day.

   Daily desalination wash (before the first or after the last flight of the day) schedule is recommended. But, there is no a large effect on the APU (Auxiliary Power Unit) reliability if occasional omission of the desalination occurs if:

   - You did the desalination wash before the gas generator accumulated 12 flight hours in marine environment
   - You did the last industrial wash or desalination wash less than 7 days ago. The last flight was operated less than three years ago.

3. Equipment and Consumable Materials.

   3.1. Equipment: compressor wash rig, quick coupling and the multiflow air and fluid gun.

   3.2. Consumable Materials

	Cleaning product (CP)	Anti-icing Additive (AA)	Quality of the water (W)
Validated products (recommended)	ARDROX 6367 cleaner ZOK27 cleaner	Isopropyl alcohol	Distilled water Demineralized water / Deionized water
Approved products (substitute)	-	Pure methanol (AIR 3651)	Minimum-quality water / Tap water

4. Procedure

   You must spray the rinsing fluid into the APU air intake during the cranking mode (for 15 s).

   4.1. Prepare the desalination fluid for the ambient temperature specified below. Refer to Table 6 — Preparation of desalination and correctly mix before use.

Table 1 Preparation of desalination

Ambient temperature	Cleaner (CP) Not Ready-To-Use	Water (W)	Anti-icing Additive (AA)
t > + 5°C	2 %	98 %	0 %
+ 5°C ≥ t > - 8°C	2 %	80 %	18 %
- 8°C ≥ t > - 24°C	2 %	65 %	33 %

Note

It is recommended to use hot rinsing mixtures between 50 °C and 65 °C to get the best results from the rinsing procedure.

   4.2. Remove the connector at the end of the hose of compressor wash rig.

   4.3. Install the quick coupling and the multiflow air and fluid gun at the end of the hose of the compressor wash rig.

   4.4. Open the ECU compartment door on the left of the helicopter.

   4.5. Open the exhaust cowling by pulling it towards the rear of the helicopter.

   4.6. Open the left engine door.

   4.7. Climb on the helicopter to reach the APU top cowling using the steps formed by the ECU compartment door and the left engine cowling.

4.8. Remove the inlet barrier filter from the APU top cowling, refer to the helicopter maintenance manual.

4.9. **CAUTION**

The multiflow air and fluid gun must not go through the APU anti-icing grid.

Place the multiflow air and fluid gun to the APU anti-icing grid.

4.10. Close the exhaust cowling.

4.11. Hold the hose of the compressor wash rig in place.

4.12. **CAUTION**

Make sure that the gas turbine temperature is less than 70 °C before you start the compressor wash.

Spray the fluid into the air intake during the APU cranking phase observing the following parameters:

- Fluid quantity: 0.5 liters (0.11 galUS) approximately,
- Spraying duration: between 7 and 10 seconds,
- Pressure: 3.5 bar to 4 bar.

4.13. Open the exhaust cowling by pulling it towards the rear of the helicopter.

4.14. Remove the multiflow air and fluid gun and the hose of the compressor wash rig.

4.15. Install the inlet barrier filter on the APU top cowling, refer to the helicopter maintenance manual.

4.16. Step back by closing successively the left engine cowling and the exhaust cowling.

4.17. Close the ECU compartment door.

4.18. **CAUTION**

You must do the dry cycle less than one hour and ten minutes after the compressor wash.

Start the gas generator and operate it for approximately five minutes to remove the remaining fluid and dry the internal surfaces.

3.1.6. Requirements after job completion

3.1.6.1. Close up procedure

Required condition	*Data Module/Technical Publication*
Remove all the tools and the other items from the work area. Make sure that the work area is clean. Discard the mixture that you did not use. Flush the tools (spray manifold, piping and tank) with clean water.	n/a n/a n/a

3.1.7. Record

Not applicable.

3.1.8. Compliance certificate

Not applicable.

3.2. Washing procedure

3.2.1. Required conditions

Required condition	*Data Module/Technical Publication*
The helicopter must be safe for maintenance. Refer to the helicopter maintenance manual if the APU is installed. Flush the tools to be used (spray manifold, piping and tank) with clean water.	n/a n/a n/a

3.2.2. Safety conditions

The helicopter must be safe for maintenance.

WARNING

• Be careful if you use hot water. Hot water can injure you.

• Before you use the consumable materials, you must know and obey the fire, safety and first aid instructions for them. They are dangerous materials. Refer to:

- **The label on the container in which it was supplied**
- **The material safety data sheet**
- **Your local safety regulation.**

• The cleaning agents used are poisonous and dangerous. Be very careful during handling. Prevent contact with skin. Do not swallow or breathe the fumes. Put on protective gloves, clothes and masks.

• Do not breathe the solvent fumes. Make sure the area where you work is open to the air. Do not get the solvent on your skin or your eyes. Use rubber gloves and face shield or safety goggles. The solvent can be poisonous.

• Be careful when working at height. Respect the local regulations.

CAUTION

• The outside air temperature controls the proportions of the necessary wash mixture. If the temperature is less than 5 °C, you must add the correct quantity of anti-icing fluid to the wash mixture.

Note
You must spray the washing fluid into the APU air intake during the cranking mode (for 15 s).

3.2.3. Support equipment

Nomenclature	*Identification no.*	*Qty*
Compressor wash rig	Local purchase	1 Ea
Quick coupling (internal diameter: 8mm / external diameter: 10mm)	P/N 10 320 1003 (FAM31) or equivalent	1 Ea

Multiflow air and fluid gun (flow: 5l/min maximum)	P/N 10 210 0400 (FAM31) or equivalent	1 Ea

3.2.4. Consumables, materials and expendables

Nomenclature	*Identification no.*	*Qty*	*Remarks*
Isopropyl alcohol Pure methanol (AIR 3651)	Cons.: C039	AR	
ARDROX 6367 cleaner	Local purchase	AR	
ZOK27 cleaner	Local purchase	AR	
Demineralized water	Local purchase	AR	The demineralized water must have the properties that follow: - Transparent colorless liquid free of deposits and/or particles in suspension. - Dry residue after evaporation at 130 °C: 10 ppm (parts per million). - Conductivity: less than 10 µS/cm (micro Siemens/cm). - Ph: between 5.0 and 7.
Tap water	Local purchase	AR	The demineralized water must have the properties that follow: - Transparent colorless liquid free of deposits and/or particles in suspension. - Dry residue after evaporation at 130 °C: 175 ppm (parts per million). - Conductivity: less than 400 µS/cm (micro Siemens/cm). - Ph: between 6.0 and 8.5. - Chloride: less than 100 ppm. - Sulphate: less than 20 ppm.

3.2.5. Procedure

1. Purpose:

   The corrosion in the compressor section can cause a loss of performance of a gas generator.

   This Data Module gives the cleaning methods and materials that you must use for the industrial wash of the compressor when it has some contamination.

2. **Note**

   If operating conditions are too bad, you can do the industrial wash at a better time. It is recommended to do it before a flight during a day or if not possible, after the last flight of the day.

The recommended schedule for industrial wash is:

- You did the desalination wash before the gas generator accumulated 12 flight hours in marine environment
- You did the last industrial wash or desalination wash less than 7 days ago. The last flight was operated less than three years ago.

3. Equipment and Consumable Materials.

3.1. Equipment: compressor wash rig, quick coupling and the multiflow air and fluid gun.

3.2. Consumable Materials

	Cleaning product (CP)	Anti-icing Additive (AA)	Quality of the water (W)
Validated products (recommended)	ARDROX 6367 cleaner ZOK27 cleaner	Isopropyl alcohol	Distilled water Demineralized water / Deionized water
Approved products (substitute)	-	Pure methanol (AIR 3651)	Minimum-quality water / Tap water

4. Procedure

You must spray the washing fluid into the APU air intake during the cranking mode (for 15 s).

4.1. Prepare the washing fluid for the ambient temperature specified below. Refer to Table 2 — Preparation of the wash mixture and correctly mix before use.

4.1.1. Ready-to-use cleaning products

Note

Some products are Ready-To-Use (RTU) products for which distilled or Demineralized water is not necessary. ZOK27 cleaner that also exists as RTU product: ZOK27 cleaner RTU is one of them.

Table 2 Preparation of the wash mixture (Ready-to-use cleaning products)

Ambient temperature	Cleaner (CP) Ready-To-Use	Water (W)	Anti-icing Additive (AA)
t > + 5°C	100 %	0 %	0 %
+ 5°C ≥ t > - 8°C	85 %	0 %	15 %
- 8°C ≥ t > - 24°C	70 %	0 %	30 %

Note

It is recommended to use hot rinsing mixtures between 50 °C and 65 °C to get the best results from the washing procedure.

4.1.2. Cleaning products not ready-to-use

Table 3 Preparation of the wash mixture (Cleaning products not ready-to-use)

Ambient temperature	Cleaner (CP) Not Ready-To-Use	Water (W)	Anti-icing Additive (AA)
t > + 5°C	20 %	80 %	0 %
+ 5°C ≥ t > - 8°C	20 %	65 %	15 %
- 8°C ≥ t > - 24°C	20 %	50 %	30 %

4.2. Remove the connector at the end of the hose of compressor wash rig.

4.3. Install the quick coupling and the multiflow air and fluid gun at the end of the hose of the compressor wash rig.

4.4. Open the ECU compartment door on the left of the helicopter.

4.5. Open the exhaust cowling by pulling it towards the rear of the helicopter.

4.6. Open the left engine door.

4.7. Climb on the helicopter to reach the APU top cowling using the steps formed by the ECU compartment door and the left engine cowling.

4.8. Remove the inlet barrier filter from the APU top cowling, refer to the helicopter maintenance manual.

4.9. **CAUTION**

The multiflow air and fluid gun must not go through the APU anti-icing grid.

Place the multiflow air and fluid gun to the APU anti-icing grid.

4.10. Close the exhaust cowling.

4.11. Hold the hose of the compressor wash rig in place.

4.12. **CAUTION**

Make sure that the gas turbine temperature is less than 70 °C before you start the compressor wash.

Spray the fluid into the air intake during the APU cranking phase observing the following parameters:

- Fluid quantity: 0.5 liters (0.11 galUS) approximately,
- Spraying duration: between 7 and 10 seconds,
- Pressure: 3.5 bar to 4 bar.

4.13. Let the mixture soak for 15 minutes approximately.

4.14. Do the rinsing procedure as follow:

4.14.1. Fill the tank of the compressor wash rig with 0.5 liters of the correct mixture as follows:

- Spraying duration: between 7 and 10 seconds,
- Pressure: 3.5 bar to 4 bar.

4.14.2. Use the rinsing proportions

Product mixture ratios in relation to temperatures

Table 4 Product mixture ratios in relation to temperatures

Ambient temperature	Water (W)	Anti-icing Additive (AA)
t > + 5°C	100 %	0 %
+ 5°C ≥ t > - 8°C	82 %	18 %
- 8°C ≥ t > - 24°C	67 %	33 %

4.14.3. Put 0.5 liters of the mixture during one or several crankings (three max.) at a pressure from 3.5 bar to 4.0 bar.

4.15. Open the exhaust cowling by pulling it towards the rear of the helicopter.

4.16. Remove the multiflow air and fluid gun and the hose of the compressor wash rig.

4.17. Install the inlet barrier filter on the APU top cowling, refer to the helicopter maintenance manual.

4.18. Step back by closing successively the left engine cowling and the exhaust cowling.

4.19. Close the ECU compartment door.

4.20. **CAUTION**

You must do the dry cycle less than one hour and ten minutes after the compressor wash.

Start the gas generator and operate it for approximately five minutes to remove the remaining fluid and dry the internal surfaces.

3.2.6. Requirements after job completion

3.2.6.1. Close up procedure

Required condition	*Data Module/Technical Publication*
Remove all the tools and the other items from the work area. Make sure that the work area is clean. Discard the mixture that you did not use. Flush the tools (spray manifold, piping and tank) with clean water.	n/a n/a n/a

3.2.7. Record

Not applicable.

3.2.8. Compliance certificate

Not applicable.

4. Material information

4.1. Material requirements

Refer to para. 3.1.4 and 3.2.4 for the consumables and to para. 3.1.3 and 3.2.3 for support equipment.

4.2. List of components

Not applicable.

4.3. Interchangeability

Physical interchangeability: ..... Not affected
Functional interchangeability: ..... Not affected
Restriction of mixability: ..... No restriction

4.4. Parts disposition

Not applicable.

4.5. Procurement conditions

Not applicable.

END OF SERVICE BULLETIN