

UNCLASSIFIED

MSG DTG 081110Z AUG 05

FROM CDRAMCOM, REDSTONE ARSENAL, AL //AMSAM-SF-A//

SUBJECT - AVIATION SAFETY ACTION MESSAGE (ASAM), MAINTENANCE MANDATORY, RCS CSGLD-1860(R1), ALL H-47 AIRCRAFT, HYDRAULIC CHECK VALVES AND FLUID PARTS, CH-47-05-ASAM-05.

NOTE  
This message is effective until rescinded or superseded.

NOTE  
This message is issued IAW AR 95-1 and has not been transmitted to units subordinate to addressees. Addressees will immediately retransmit this message to all subordinate units, activities or elements affected or concerned. MACOMs will immediately verify this transmission to the AMCOM SOF Compliance Officer (AMSAM-SF-A, safeadm@redstone.army.mil).

NOTE  
MACOM commanders may authorize temporary exception from message requirements IAW AR 95-1, Ch 6. Exception may only occur when combat operations or matter of life or death in civil disasters or other emergencies are so urgent that they override the consequences of continued aircraft operation.

NOTE  
Commanders unable to comply with the requirements of this message within the time frame specified will change the affected aircraft status symbol to a Red //X//.

1. SUMMARY -

1.1. Background - Over the service life of H-47 aircraft, Category I Quality Discrepancy Reports (QDR) have documented the failure of hydraulic check valves (PN 4C3074) manufactured by Crissair Company. Some of these failures have exposed hydraulic pumps to excess heat from hot hydraulic return fluid or caused reverse rotation of pump rotor blades, either of which can cause premature wear and possible failure of the pumps. The vendor has designed a new check valve (PN 4C5202) to replace the PN 4C3074 valve. Additionally, several discrepancies were found in the CH-47D parts manual (TM 55-1520-240-23P), two of which could lead to degraded hydraulic system performance or premature failure of the Power Transfer Unit (PTU) pump. It has also been determined that some premature pump failures were caused by cavitation (air in the system).

1.2. Message Purpose -

1.2.1. Replace the Crissair PN 4C3074 check valve with the Crissair PN 4C5202 check valve.

1.2.2. Correct errors in the Technical Manuals.

1.2.3. Inspect hydraulic power control module ports for installation of correct parts.

1.2.4. Provide general instructions for follow-up tasks after hydraulic system maintenance tasks have been performed.

2. END ITEMS AFFECTED - All H-47 series aircraft.

3. ASSEMBLIES/COMPONENTS/PARTS AFFECTED -

3.1. Suspect/discrepant assemblies/components/parts -

.. Nomenclature	PN	NSN
.. Check valve	4C3074 (or 4C2868-2)	4820-01-118-3009

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.. Check valve	4C2866-2	4820-01-130-7267
.. Straight adapter	RF9910-13	4730-00-475-4815
3.2. Additional assemblies/components/parts to be inspected -		
.. Nomenclature	PN	NSN
.. Power control module	145H1201-6 (2 PLCS)	1650-01-480-3875
.....	or AE-A620-15	
.. Return module	145H1601-4	1650-01-510-3920
.....	or AE-A620-23	
.. Pressure module	AE-A620-34	5895-01-517-9188

.....  
..... NOTE.....  
..... When complying with the requirements of this message,  
..... complete forms and records entries IAW DA PAM 738-751.  
..... ULLS-A units will use appropriate "E" forms.

4. INITIAL TAMMS (THE ARMY MAINTENANCE MANAGEMENT SYSTEM) COMPLIANCE REQUIREMENTS -

4.1. Upon receipt of this message, make the following entry on the DA Form 2408-13-1. Enter a Red Horizontal Dash //-// status symbol with one of the following statements:

- 4.1.1. For aircraft maintained under the 200-hour or 300-hour phase maintenance schedules - "Comply with CH-47-05-ASAM-05 before [####.#] aircraft hours." Calculate [####.#] as the aircraft's next scheduled Phase Maintenance (PM) inspection."
- 4.1.2. For aircraft maintained under the 400-hour cycle service maintenance program - "Comply with CH-47-05-ASAM-05 before [####.#] aircraft hours." Calculate [####.#] as the aircraft's next 400-hour cycle service maintenance checklist."

.....  
..... NOTE.....  
..... The TAMMS compliance reporting form is available at  
..... "www.redstone.army.mil/sof/tamms.xls" (use lower case  
..... letters only) or may be obtained from the units  
..... servicing LAR. Alternate forms may be approved by  
..... the AMCOM SOF Compliance Officer.

.....  
..... NOTE.....  
..... The TAMMS Compliance Report only confirms the unit has  
..... made the initial logbook entry for assigned aircraft.  
..... TAMMS Compliance Reports will include aircraft serial  
..... numbers (in numerical order), date of entry on DA Form  
..... 2408-13-1, unit address, local POC name and phone number.

4.2. TAMMS Compliance Report - Submit TAMMS Compliance Report via priority email to "safeadm@redstone.army.mil" NLT 15 Aug 05 IAW AR 95-1. If email is not available, the report may be faxed to: SOF Compliance Officer at DSN 897-2111 or (256) 313-2111.

5. TASK/INSPECTION COMPLIANCE REPORTING REQUIREMENTS - N/A.

6. SPECIAL PROVISIONS TO MESSAGE REQUIREMENTS (AIRCRAFT) -

- 6.1. Aircraft in AVIM or Depot level maintenance - Commanders, facility managers and contractors will not issue aircraft until they are in compliance with this message.
- 6.2. Aircraft at Contractor Facility - DD 250 aircraft will be in compliance with this message prior to departure.
- 6.3. Aircraft in Transit - Units with aircraft in Surface/Air Shipment will annotate the DA Form 2408-13-1 IAW para 4.1. of this ASAM upon arrival at final destination.

7. TECHNICAL PROCEDURES/INSTRUCTIONS

7.1. Prepare aircraft for safe ground maintenance.

.....  
..... NOTE.....  
..... ADDENDUM to CH-47-05-ASAM-05 for use in identifying  
..... the correct parts to be inspected and/or replaced

....and for the Pall Purification Procedure (PN PE01078-12-H-83)  
....can be viewed at (use lower case letters only)  
....<https://ams14.redstone.army.mil/safety/sof/pic/c47a0505.pdf>.  
....Adobe Reader or Adobe Acrobat, Version 6 or higher, is  
....required to view the Addendum. Adobe Reader may be  
....downloaded free of charge from "www.adobe.com".

.....  
.....NOTE.....  
....For all parts identified in paragraphs 7.2. through 7.4.,  
....remove IAW Tasks 7-3 and 7-6, TM 55-1520-240-23 (H-47D),  
....and Tasks 7-4 and 7-8, TM 1-1520-252-23 (MH-47E). Install  
....IAW Tasks 7-4 and 7-6, TM 55-1520-240-23 (H-47D), and  
....Tasks 7-5 and 7-8, TM 1-1520-252-23 (MH-47E).

.....  
7.2. For both the number 1 and number 2 flight hydraulic systems -

7.2.1. Identify the 3 port locations marked as "PUMP CASE  
DRAIN", "FLT CONT PUMP", and "EXT PWR SUPPLY" on the power  
control modules.

7.2.1.1. Remove the check valve PN 4C3074 from each port.

7.2.1.2. Install check valve PN 4C5202 (NSN 4820-01-518-9274) in  
each port.

7.2.2. Inspect the power control module at the port labeled "EXT  
PWR RET".

7.2.2.1. If adapter PN RF9910-13 is installed, go to para 7.3.

7.2.2.2. If any part other than adapter RF9910-13, is installed,  
remove the part and install PN RF9910-13.

7.2.3. Inspect the power control module at the port labeled "PTU  
PRESS".

7.2.3.1. If check valve PN 4C2866-2 is installed, go to  
paragraph 7.4.

7.2.3.2. If any part other than check valve PN 4C2866-2 is  
installed, remove the part and install check valve PN 4C2866-2.

7.3. For the utility hydraulic system return module -

7.3.1. Remove check valve PN 4C3074 from the 2 port locations  
marked as "APU-CD" and "UTIL PMP CD".

7.3.2. Install check valve PN 4C5202 (NSN 4820-01-518-9274) in  
each of the 2 ports identified above.

7.4. For the utility hydraulic system pressure module - Remove  
check valve PN 4C3074 at the port marked "EXT PWR SUPPLY" and  
install check valve PN 4C5202 (NSN 4820-01-518-9274).

7.5. General instructions regarding hydraulic system servicing.

7.5.1. Whenever a hydraulic system is serviced, particularly  
when components have been removed and reinstalled or replaced,  
that hydraulic system, whether it be a flight system, or a  
utility system, shall be replenished with hydraulic fluid and the  
system bled with the appropriate maintenance manual task. For  
this message, the flight hydraulic systems shall be bled IAW  
Task 7-16, TM 1-1520-240-23 (H-47D) and Task 7-19,  
TM 1-1520-252-23 (MH-47E); and the utility hydraulic system bled  
IAW Task 7-336, TM 1-1520-240-23 (H-47D), and Task 7-374,  
TM 1-1520-252-23 (MH-47E). Failure to replenish and bleed a  
hydraulic system can lead to pump cavitation which causes  
premature pump failures and poor flight control system  
performance. During ground maintenance, proper servicing  
procedures should be used when maintenance checks are completed.

7.5.2. All 3 aircraft hydraulic systems shall be purified using  
the Pall Purifier IAW ADDENDUM to CH-47-05-ASAM-05, prior to  
first flight after phase.

7.5.3. If an unusual noise is heard when hydraulic power is  
applied to a system, check for air in the system(s). Air  
entrained or entrapped in a hydraulic system causes a signature  
noise (i.e. a chattering sound similar to a water hammer) that  
should alert you to an abnormal hydraulic system condition.

7.5.4. Test the hydraulic circuit after component removal/reinstallation and bleeding by pressurizing the system using the APU or a Ground Service Unit. The pump rotor blades should not turn. If the pump rotor blades begin to turn in the opposite direction of normal rotation, further troubleshooting must be conducted. A possible cause of rotation is sticking or failed check valves in the hydraulic control modules. Incidences of sticking or failed check valves should be significantly reduced after completion of this message.

7.5. Clear the initial entry from para 4.1. and note compliance on DA Form 2408-15.

8. PROCEDURES/INSTRUCTIONS FOR ASSEMBLIES/COMPONENTS/PARTS IN WORK OR IN STOCK (AT ALL LEVELS INCLUDING WAR RESERVES) - N/A.

9. SPECIAL TOOLS AND FIXTURES REQUIRED - N/A.

10. SUPPLY/PARTS (REQUISITION/DISPOSITION) -

10.1. Parts Required -

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NOTE.....

....The Crissair Check Valves, PN 4C5202, will be provided at  
....no cost IAW the requisition instructions in para 10.3.1.

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.. Nomenclature	PN/NSN	Qty	Cost ea.	Total \$
.. Valve, Check	4C2866-2	1	\$307.52	\$307.52
.....	4820-01-130-7267			
.. Adapter, Straight	RF9910-13	1	72.11	72.11
.....	4730-00-475-4815			
.....	Total cost per aircraft = \$379.63			

10.2. Bulk and consumable materials -

.. Nomenclature	PN	NSN
.. O-Ring	MS28775-013	5330-00-684-3420
.. O-Ring	MS28775-014	5330-00-584-1840
.. O-Ring	MS28775-016	5330-00-684-3419

10.3. Requisitioning instructions -

10.3.1. For requisition of the Crissair Check Valve, PN 4C5202 (9 each) - Contact the Primary Log POC in paragraph 13.2.1. and provide a Unit POC,, activity DODAAC, shipping address, aircraft serial numbers, and hours until next 200/300 Hour PM or 400 Hour CSP. Valves will be provided to that address in time for PM/CSP replacement.

10.3.2. For requisition of parts identified in Para 10.1. - Requisition replacement parts using normal supply procedures. All requisitions shall use Project Code (CC 57-59) "X3F" (X-ray Three Foxtrot).

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NOTE.....

....Project Code "X3F" is required to track and establish  
....a data base of stock fund expenditures incurred by  
....the field as a result of message actions.

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10.4. Disposition of discrepant parts/components - Demilitarize/mutilate IAW TM 1-1500-328-23.

10.5. Disposition of hazardous material - N/A.

11. MAINTENANCE APPLICATION -

11.1. Category of maintenance - AVUM. Aircraft downtime will be charged to AVUM.

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NOTE.....

....The time stated below does not include time for  
....Maintenance Operational Checks or Maintenance Test  
....Flights, if required.

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11.2. Estimated time required for repair/replacement - Total of 18 man-hours using 2 persons with 9 hours NMCM.

## 12. PUBLICATION REQUIREMENTS -

## 12.1. References -

- 12.1.1. AR 95-1.
- 12.1.2. AR 200-1.
- 12.1.3. DA Pam 738-751.
- 12.1.4. TM 1-1500-328-23.
- 12.1.5. TM 55-1520-240-23.
- 12.1.6. TM 1-1520-252-23.
- 12.1.7. TM 55-1520-240-23P.
- 12.1.8. TM 1-1520-252-23P.
- 12.1.9. TM 1-1520-240-CL.
- 12.1.10. TM 1-1520-252-CL.

12.2. Publication changes - The following publications shall be changed to reflect this message. A copy of this message will be used as authority to implement the change until the official change is received.

12.2.1. TM 55-1520-240-23P, Fig. 227, Item 59, Check Valve 4C2866-2 - CHANGE to Item 62, RF9910-13, Straight Adapter, on the illustration. (Ref. port marked "EXT PWR RTN" on Boeing engineering drawing 145HS201.) NOTE - Item 59 is shown twice in the illustration--change only 1 of the 2 Item 59's to Item 62. Both callouts for Item 59 point to the vicinity of the actual location of the part on the back side of the control module housing, so either callout (but not both) will suffice.

12.2.2. TM 55-1520-240-23P, Fig. 227, Item 62, Straight Adapter, RF9910-13 - CHANGE to Item 59, 4C2866-2 check valve, on the illustration. (Ref. port marked "PTU PRESS" on Boeing engineering drawing 145HS201.)

12.2.3. TM 55-1520-240-23P, Fig. 232 - part number list Items 16 & 27 reference Fig. 227 as the NHA. DELETE these references.

12.2.4. TM 55-1520-240-23P, Fig. 232, Items 62 & 63 require differentiation on the illustration:

- ....a. Item 63 (145HS752-2) is on the left.
- ....b. Item 62 (145HS752-3) is on the right (in front or top views).

12.2.5. TM 55-1520-240-23P, Fig. 234, part number list Item 52 - CHANGE QUANTITY from 2 to 1.

12.2.6. TM 55-1520-240-23P, Fig. 227, part number list Item 46 (145HS214-1, check valve) - ADD the following to the description column, "SEE FIG 232 FOR BKDN".

12.2.7. TM 1-1520-252-23P, Fig. 7-19, Item 60, Check Valve 4C2866-2, CHANGE to Item 63, RF9910-13, Straight Adapter, on the illustration. (Ref. port marked "EXT PWR RTN" on Boeing engineering drawing 145HS201.) NOTE - Item 60 is shown twice in the illustration--change only 1 of the 2 Item 60's to Item 63.

Both callouts for Item 60 point to the vicinity of the actual location of the part on the back side of the control module housing, so either callout (but not both) will suffice.

12.2.8. TM 1-1520-252-23P, Fig. 7-19, Item 63, Straight Adapter, RF9910-13, CHANGE to Item 60, 4C2866-2 check valve, on the illustration (Ref. port marked "PTU PRESS" on Boeing engineering drawing 145HS201).

12.2.9. TM 1-1520-252-23P, Fig. 7-24, part number list Items 23 & 30 reference Fig. 7-19 as the NHA. DELETE these references.

12.2.10. TM 1-1520-252-23P, Fig. 7-24 Items 60 & 61 require differentiation:

- ....a. Item 61 (145HS752-2) is on the left.
- ....b. Item 60 (145HS752-3) is on the right (in front or top views).

## 13. POINTS OF CONTACT -

## 13.1. Technical POCs are -

13.1.1. Primary - Mr. Michael B. Moore, AMSRD-AMR-AE-C, DSN 897-3617 or (256) 313-3617. Fax is DSN 897-4726 or (256) 313-4726.

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Email is "michael.moore@peoavn.redstone.army.mil".

13.1.2. Alternate - Mr. Timothy Rickmeyer, AMSRD-AMR-AE-C, DSN 645-6485 or (256) 955-6485. Fax is DSN 897-4726 or (256) 313-4726. Email is "timothy.rickmeyer@peoavn.redstone.army.mil".

13.2. Logistical POCs are -

13.2.1. Primary - Mr. Dennis Yeargain, SFAE-AV-CH-CS, DSN 897-0732 or (256) 313-0732. Fax is 897-4726 or (256) 313-4726.

Email is "dennis.yeargain@peoavn.redstone.army.mil".

13.2.2. Alternate - Mr. Bill Olson, SFAE-AV-CH-CS, DSN 897-0721 or (256) 313-0721. Fax is 897-4348 or (256) 313-4348. Email is "William.olson@peoavn.redstone.army.mil".

13.3. Forms and Records POCs are -

13.3.1. Primary - Ms. Ann Waldeck, AMSAM-MMC-MA-NM, DSN 746-5564 or (256) 876-5564. Fax is DSN 746-4904 or (256) 876-4904. Email is "ann.waldeck@redstone.army.mil".

13.3.2. Alternate - Ms. Sibyl Johnson, AMSAM-MMC-MA-NM, DSN 788-6696 or (256) 842-6696. Fax is DSN 746-4904 or (256) 876-4904.

Email is "sibyl.johnson@redstone.army.mil".

13.4. Safety POCs are -

13.4.1. Primary - Mr. Harry Trumbull (SAIC), AMSAM-SF-A, DSN 897-2095 or (256) 313-2095. Fax is DSN 897-2111 or (256) 313-2111. Email is "harry.trumbull@us.army.mil".

13.4.2. Alternate - Mr. Russell Peusch, AMSAM-SF-A, DSN 788-8631 or (256) 842-8632. Fax is DSN 897-2111 or (256) 313-2111. Email is "russell.peusch@us.army.mil".

13.5. Foreign Military Sales POC is Mr. Ronnie W. Sammons, AMSAM-SA-AS-UT, DSN 897-0875 or (256) 313-0875. Fax is DSN 897-0411 or (256) 313-0411. Email is "ronnie.sammons@redstone.army.mil".

13.6. After hours, contact the AMCOM Operations Center (AOC) DSN 897-2066/7 or (256) 313-2066/7.

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..... NOTE.....

.... A listing of published safety messages can be viewed at

.... "<https://ams14.redstone.army.mil/safety/sof/index.html>".

.... This is a secured website which requires an Army Knowledge

.... Online (AKO) ("www.us.army.mil") ID and password.

## ADDENDUM TO CH-47-05-ASAM-05 Locations of the Hydraulic Check Valves

### #1 & #2 Flight Hydraulic Systems Power Control Modules (PN 14H1201-6)



- Shown as straight adapter PN RF9910-13 in the parts manuals.
- Should be check valve PN 4C2886-2.

- Check Valves PN 4C3074, replace with PN 4C5202 (3 PLCS).

### #1 & #2 Flight Hydraulic Systems Power Control Modules (PN 145H1201-6) REAR VIEW



- Shown as check valve PN 4C2866-2 in the Parts Manuals.
- Should be PN RF9910-13.

## ADDENDUM TO CH-47-05-ASAM-05

### Locations of the Hydraulic Check Valves

#### Utility Hydraulic System Pressure Module (PN 145H1551-5)



- Check Valve PN 4C3074, replace with PN 4C5202.

#### Utility Hydraulic System Return Module (PN 145H1601-4)



- Check Valves PN 4C3074, replace with PN 4C5202 (2 PL CS).  
- Top check valve is behind tubing annotated by arrow.

**ADDENDUM TO CH-47-05-ASAM-05**  
**Purification Procedure Using the Pall P/N PE01078-12-H-83 Purifier**

**A1. PURPOSE.** This addendum provides procedures for removing air, water, causative agents of corrosion, and particulate contamination from hydraulic fluid using the Pall P/N PE01078-12-H-83 purifier, and using the Aviation Ground Power Unit (AGPU) to flush the aircraft systems using this purified fluid. This increases aircraft reliability and decreases response time of flight controls as well as extends the life of hydraulic components. The useful life of hydraulic fluid is extended, thereby reducing waste disposal expense (EPA and Hazardous Material (HazMat) requirements).

**A2. GENERAL PROCEDURES.**

a. The AGPU is filled with clean fluid, and then used to flush contaminated fluid from the aircraft into a dirty fluid drum for later purification. Once the flush is completed and reservoirs are refilled the aircraft can be released for flight. Two 30-gallon stainless steel (SS) drums (previously supplied to all H-47 units), one marked "CLEAN FLUID" and the other marked "DIRTY FLUID", are used in the process. Both drums are equipped with self-sealing quick disconnect fittings and a vent dryer for extended fluid storage. These drums and the following procedures are intended for use when all three systems on an H-47 aircraft require purification.

b. Prior to the aircraft purification process, the AGPU and the replenishment fluid are purified as follows:

(1) The AGPU to be used is operated in self-filtration mode to warm the fluid to dissolve as much water as possible, to break loose any particulate contamination, and to flush the hoses.

(2) The AGPU is then drained into the CLEAN FLUID drum.

(3) The CLEAN FLUID drum is filled to at least  $\frac{3}{4}$  full.

(4) The drum is connected to the purifier and the purifier operated for two hours.

(5) The AGPU is refilled to  $\frac{3}{4}$  full using the purifier and the CLEAN FLUID.

c. The aircraft is flushed as follows:

(1) Flush fluid in #1 Flight Boost system into the DIRTY FLUID drum.

(2) Refill AGPU from CLEAN FLUID drum.

(3) Flush fluid in #2 Flight Boost system into the DIRTY FLUID drum.

(4) Fill AGPU from CLEAN FLUID drum.

(5) Flush fluid in Utility system into the DIRTY FLUID drum.

(6) Transfer flushed fluid in DIRTY FLUID drum to CLEAN FLUID drum.

(7) Purify flushed fluid in CLEAN FLUID drum.

(8) Fill AGPU from CLEAN FLUID drum.

**A3. DETAILED PROCEDURES.**

a. Starting the Pall purifier.

**ADDENDUM TO CH-47-05-ASAM-05**  
**Purification Procedure Using the Pall P/N PE01078-12-H-83 Purifier**

**WARNING**

Purifier outlet pressure should never exceed +70 psig or serious injury to personnel and equipment may occur.

**CAUTION**

The purifier should only be connected to a power source providing 115 volts, 60 cycles. Due to the high current demand of the purifier any source that cannot provide at least 20 amps service may cause the unit to burn up internal electrical relays. Electrical extension cords are not recommended. If power is not readily available a portable generator rated at 3 KW or larger is recommend.

When operating the purifier indoors, vapors may need to be vented away from the purifier. Connect a suitable outlet line (3/4" ID Minimum) to the coalescing filter outlet and vent the line outside. Do not block or cap vent line while purifier is operating.

Hydraulic oil temperature should never exceed +145 °F.

**NOTE**

Operators shall read and become familiar with the commercial purifier operations manual and be a trained/qualified operator of the AGPU prior to using the equipment. This procedure requires 90-day currency to keep operators knowledgeable on procedures.

Stainless steel (SS) drum adapter kit desiccant breathers and AGPU vent breathers should be blue in color. Desiccant should be replaced when it turns pink, white or brown.

- (1) Attach hoses from purifier inlet and outlet ports as indicated in the specific procedure and illustration.
- (2) Open the purifier INLET, OUTLET, and BYPASS valves.
- (3) Start purifier. (See WARNING, CAUTION, and NOTE above.)
- (4) When READY light comes on close bypass valve and monitor purifier limitations.
- (5) Purifier limitations:
  - (a) Discharge pressure gauge should not exceed +70 psig.
  - (b) Inlet pressure gauge should read between 10 inches HG vacuum and 20 psi.
  - (c) Inlet hydraulic fluid temperature gauge should not exceed +145 degrees F.
  - (d) After one to three minutes of operation the chamber vacuum gauge should read between 22 inches and 26 inches HG vacuum.
  - (e) Check discharge filter replacement light. If lit, depress "STOP" button.
  - (f) If any problems are encountered with unit operation, refer to Section 8.0 (Troubleshooting) of the Pall Purifier Operation and Maintenance Manual.

**ADDENDUM TO CH-47-05-ASAM-05**  
**Purification Procedure Using the Pall P/N PE01078-12-H-83 Purifier**

- b. Drain AGPU into CLEAN FLUID SS drum - see Figure A1.

CAUTION

AGPU must be shut down when connected to the purifier; failure to do so may damage purifier.

- (1) Operate the AGPU in self-filtration mode until the fluid temperature reaches 120°-140° F.

NOTE

Proper flushing of the AGPU hoses requires application of MWO 1-1730-229-50-3, Modification of Dual Service Hydraulic Manifold and Adapter Hoses. This MWO also provides a quick disconnect nipple, which is installed in the AGPU system drain port. This nipple mates with the coupling on the hose connected to the purifier input port.

- (2) Shut down AGPU.  
(3) Attach hose from purifier INLET port to AGPU SYSTEM DRAIN port.  
(4) Attach hose from purifier OUTLET port to clean FLUID drum inlet/return port.  
(5) Open the AGPU RESERVOIR DRAIN and SYSTEM DRAIN valves.  
(6) Ensure that the RESERVOIR select lever is in AGPU position.  
(7) Start purifier. (See WARNING, CAUTION, and NOTE in paragraph A3a above.)  
(8) Operate purifier until AGPU reservoir is empty and fluid level in purifier begins to drop.  
(9) Shut purifier off.  
(10) Close the AGPU RESERVOIR DRAIN and SYSTEM DRAIN valves.  
(11) Close purifier INLET and OUTLET valves.  
(12) Disconnect purifier INLET hose from AGPU.

- c. Fill SS drum. If CLEAN FLUID SS drum is not at least 3/4 full after draining AGPU:

- (1) Remove breather adapter from clean SS drum 2” bung.  
(2) Fill clean SS drum to 3/4 full using new fluid.  
(3) Replace breather adapter to clean SS drum 2” bung.

- d. Purify fluid in CLEAN FLUID SS drum - See Figure A2.

- (1) Attach hose from purifier INLET port to clean FLUID SS drum outlet port.  
(2) Attach hose from purifier OUTLET port to clean FLUID SS drum inlet port.  
(3) Start purifier. (See WARNING, CAUTION, and NOTE in paragraph A3a above.)  
(4) Operate purifier a minimum of 2 hours regardless of PPM water sensor readings.  
(5) After 2 hours of operation. Shut purifier off.  
(6) Close purifier INLET and OUTLET valves.  
(7) Disconnect hose from CLEAN FLUID drum inlet.

**ADDENDUM TO CH-47-05-ASAM-05**  
**Purification Procedure Using the Pall P/N PE01078-12-H-83 Purifier**

- e. Fill AGPU from CLEAN FLUID SS Drum – See Figure A3.

**WARNING**

AGPU must be shut down when connected to the purifier; failure to do so may damage purifier

- (1) Shut down AGPU if it is running.
- (2) Attach hose from purifier INLET port to CLEAN FLUID SS drum outlet port.
- (3) Attach hose from purifier OUTLET port to AGPU RETURN port.
- (4) Ensure that the RESERVOIR select lever is in AGPU position and that the bypass selector is set to BYPASS.
- (5) Start purifier. (See WARNING, CAUTION, and NOTE in paragraph A3a above.)
- (6) After AGPU reservoir has been filled to at least 3/4 full.
- (7) Shut purifier off.
- (8) Close purifier INLET and OUTLET valves
- (9) Disconnect hoses, install caps and plugs, and store them properly.

- f. Flush aircraft flight boost system – See Figure A4.

**CAUTION**

Prior to connecting AGPU to aircraft the aircraft log book shall be inspected to ensure applying hydraulic power and electrical power to aircraft will not damage any components i.e. pitch change links disconnected at upper end, upper boost actuators disconnected, or wires disconnected etc.

When running AGPU, ensure rotor blades are not over the exhaust of AGPU.

- (1) Ensure the AGPU reservoir is at least ¾ full. If not, fill AGPU from CLEAN FLUID SS drum.
- (2) Attach output hose from AGPU pressure port to aircraft No. 1 or No. 2 system GSE pressure connector.
- (3) Attach return hose from aircraft No. 1 or No. 2 system GSE return connector to DIRTY FLUID SS drum inlet port.
- (4) Ensure that the RESERVOIR select lever on the AGPU is in AGPU position.

**NOTE:**

Personnel are required to use the aircraft intercom communication system to maintain voice communications between the person operating the flight controls and the AGPU operator.

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- (5) Apply external power to the aircraft and establish voice communication via intercom communication system.
- (6) Recheck the AGPU reservoir fill level gauge on the hydraulic control panel to ensure the reservoir is at least  $\frac{3}{4}$  full. Add fluid if necessary.
- (7) Set hydraulic power switch to ON.
- (8) Set the AGPU hydraulic output switch to ON.
- (9) INCREASE PRESSURE on AGPU to 3000 psi.

NOTE

AGPU fluid level will decrease to between  $\frac{1}{2}$  and  $\frac{1}{3}$  full on the reservoir level gauge. Do not allow the reservoir level to decrease below  $\frac{1}{4}$  full. (5-7 gallons have been flushed.)

CAUTION

Do not let the reservoir go empty. Extensive damage to the AGPU hydraulic pump will occur.

- (10) Cycle all flight controls (collective, cyclic, and pedals) 5 cycles each.
- (11) Flush is complete.
- (12) DECREASE AGPU PRESSURE to 500 psi.
- (13) Switch AGPU hydraulic OUTPUT to OFF.
- (14) Switch AGPU hydraulic POWER switch to OFF.
- (15) Shut down AGPU.

g. Flush aircraft utility system - See Figure A4.

- (1) Ensure the AGPU reservoir is at least  $\frac{3}{4}$  full. If not, fill AGPU from CLEAN FLUID SS drum.
- (2) Attach output hose from AGPU pressure port to aircraft utility GSE pressure connector.
- (3) Attach return hose from aircraft utility GSE return connector to DIRTY FLUID SS drum inlet port.
- (4) Ensure that the RESERVOIR select lever on the AGPU is in AGPU position.

NOTE

Personnel are required to use the aircraft intercom communication system to maintain voice communications between the person operating the flight controls and the AGPU operator.

- (5) Apply external power to the aircraft and establish voice communication via intercom communication system.

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- (6) Depressurize utility hydraulic system by opening the UTILITY EMERGENCY valve. After system has been depressurized, close the valve.
- (7) Set hydraulic power switch to ON.
- (8) Set the AGPU hydraulic output switch to ON.
- (9) Increase pressure on AGPU to 3000 psi.

NOTE

AGPU fluid level will decrease to between 1/2 and 1/3 full on the reservoir level gauge. Do not allow the reservoir level to decrease below 1/4 full. (5-7 gallons have been flushed)

CAUTION

Do not let the reservoir go empty. Extensive damage to the AGPU hydraulic pump will occur.

- (10) Operate #1 PTU for approximately 5 seconds and turn OFF.
- (11) Operate #2 PTU for approximately 5 seconds and turn OFF.
- (12) Extend winch cable 20 feet and retract.
- (13) Operate center cargo hook, ramp and tongue twice each.
- (14) Flush is complete.
- (15) Decrease AGPU pressure to 500 psi.
- (16) Switch AGPU hydraulic output to OFF.
- (17) Switch AGPU hydraulic power switch to OFF.
- (18) Shut down AGPU.

h. Service aircraft reservoirs. Use Reservoir Servicing Unit (RSU), P/N 1730-EG-180-2, NSN 4940-01-504-1936 to refill all reservoirs.

i. Transfer fluid to the CLEAN SS Drum - See Figure A5.

- (1) Attach hose from purifier INLET port to DIRTY FLUID drum outlet port.
- (2) Attach hose from purifier OUTLET port to CLEAN FLUID drum inlet port.
- (3) Start purifier. (See WARNING, CAUTION, and NOTE in paragraph A3a above.)
- (4) Operate purifier until fluid level in purifier begins to drop or until clean fluid drum is full.
- (5) Shut purifier off.
- (6) Relocate hose from purifier INLET port to CLEAN FLUID drum outlet port.
- (7) Start purifier. (See WARNING, CAUTION, and NOTE in paragraph A3a above.)
- (8) Operate purifier a minimum of 2 hours regardless of PPM water sensor readings.
- (9) After 2 hours of operation, shut purifier off.
- (10) Close purifier INLET and OUTLET valves
- (11) Disconnect hoses, install caps and plugs, and store them properly.

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j. Alternate method for fluid transfer. A hand truck/filter cart has been provided to facilitate refilling the AGPU from the CLEAN FLUID SS drum in locations where the Pall purifier is not available. The AC motor driven pump provided with this cart can be powered off of the ProWatt 800, 60-Hz inverter mounted in the air hose compartment of the AGPU. The connections are the same as when using the purifier. The filters on this cart are to protect the fluid from contamination during transfer. The fluid must still be purified using the Pall cart.

**A4. SUPPLY/PARTS AND DISPOSITION.**

a. The following additional equipment is provided to support this process:

NOMENCLATURE	NATIONAL STOCK NUMBER	PART NUMBER	CAGE	QTY RQD
30 Gallon SS Drum	N/A	ST3003	3A0A6	2 ea
..Drum Breather Kit	N/A	DB-1004-1CH47	3A0A6	2 ea
..Desiccant Breather/Filter	N/A	B6000	3A0A6	2 ea
Hand Truck/Filter Cart	N/A	Y2K2100-1CH47	3A0A6	1 ea

b. The following items are required to fabricate two 10-ft hoses to connect the purifier to the SS drums or to the AGPU. The hoses were originally shipped with the Pall purifier to connect the purifier into the aircraft-to-AGPU return line.

NOMENCLATURE	NATIONAL STOCK NUMBER	PART NUMBER	CAGE	QTY RQD
Hose, 3/4-inch	4720-00-447-0027	AE373-12	01276	20 ft
Fitting, Swivel nut, 3/4-in JIC	4730-00-472-2611	94-4721-12	01276	4 ea
QD coupling	4730-01-270-2034	VPHC12-12EM-9MHO	78357	2 ea
Plug, Dust	5340-00-790-8423	AMPH12 W/SC10	78357	2 ea
QD nipple	4730-01-225-0465	VHN12-12-EM-HMO	78357	2 ea
Cap, Dust	5340-01-225-0459	ADCH12 W/SC10	78357	2 ea

c. The following fittings are removed from the AGPU dual manifold when MWO 1-1730-229-50-3, Modification of Dual Service Hydraulic Manifold and Adapter Hoses, is applied. These fittings are installed in the AGPU drain port and connect to the purifier input hose.

NOMENCLATURE	NATIONAL STOCK NUMBER	PART NUMBER	CAGE	QTY RQD
QD coupling, 3/4-in	4730-01-224-2966	81015-1	06177	1 ea

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with male JIC				
Plug, Dust, 3/4-in with chain	5340-01-224-2948	81015-2	06177	1 ea
O-ring, 3/4-inch	5330-00-251-8839	MS28778-12	96906	1 ea

d. The following additional parts are installed on the purifier to connect to the above hoses and provide a bypass. These were shipped with the Pall purifier.

NOMENCLATURE	NATIONAL STOCK NUMBER	PART NUMBER	CAGE	QTY RQD
Adapter, straight to NPT	4730-00-187-0848	AN816-16-12	88044	1 ea
Adapter, straight to NPT	4730-00-194-1116	AN816-16	88044	3 ea
Tee, tube	4730-01-347-7341	871-FS-16	12174	2 ea
Tubing, metallic, 1" dia	4710-00-279-0197	AMS5567	81343	1 ft
Nut, tube coupling	4730-00-314-6546	AN818-16	88044	6 ea
Reducer, tube, 1"-3/4"	4730-01-167-7048	2215-12-16S	01276	2 ea
QD coupling	4730-01-270-2034	VPHC12-12EM-9MHO	78357	1 ea
Plug, Dust	5340-00-790-8423	AMPH12 W/SC10	78357	1 ea
QD nipple	4730-01-225-0465	VHN12-12-EM-HMO	78357	1 ea
Cap, Dust	5340-01-225-0459	ADCH12 W/SC10	78357	1 ea
Ball Valve, 1-in	4820-00-148-8584	70-105-01	72219	1 ea
Hose, 1-in	4720-00-595-1088	MIL-H-8794-16	81349	1 ft
Adapter, tube to hose	4730-00-842-1139	MS24587-16	96906	1 ea
Elbow, tube to hose	4730-00-203-7304	MS27224-16	96906	1 ea

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e. The following parts are used to assemble a sampling attachment to the aircraft return line for taking bottle samples. These were shipped with the Pall purifiers.

NOMENCLATURE	NATIONAL STOCK NUMBER	PART NUMBER	CAGE	QTY RQD
Quick Disconnect	4730-01-224-2966	81015-1	06177	1 ea
Plug Dust	5340-01-224-2948	81015-2	06177	1 ea
Quick Disconnect	4730-01-225-0465	81014-1	06177	1 ea
Cap Dust	5340-01-225-0459	81014-2	06177	1 ea
T-Fitting	4730-00-277-5151	AN938-12	88044	1 ea
Drain Valve	2915-00-097-0325	775C-62NW	91551	1 ea
Reducer	4730-00-203-7458	AN893-12	88044	1 ea

**A5. Points of Contact.**

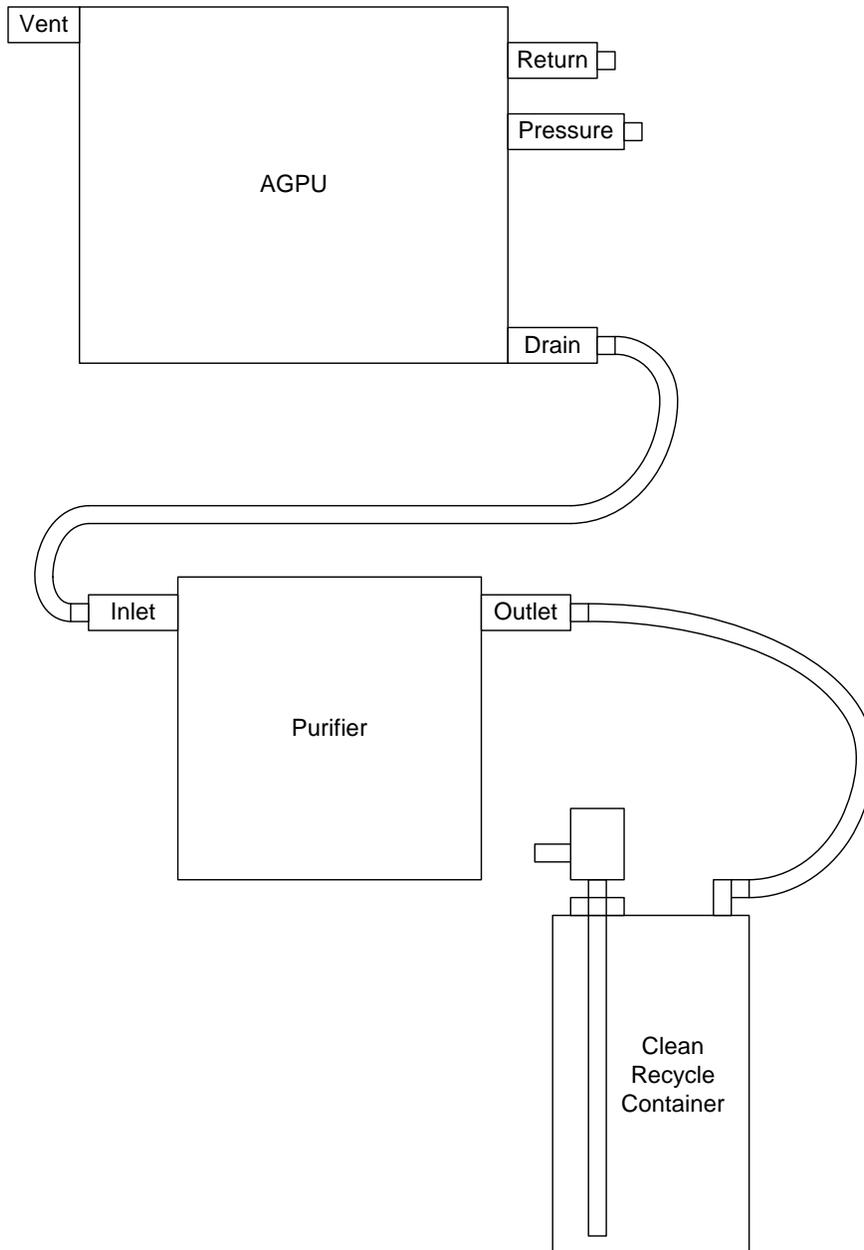
a. Engineering point of contact for this TB is Mr. Stewart Block, AMSRD-AMR-AE-P, DSN 897-2350, ext 5213 or commercial (256) 319-5213.

b. Ground support engineering point of contact for this TB is Mr. Jerome Smith, AMSRD-AMR-AE-B, DSN 897-2350, ext 9858 or commercial (256) 705-9858.

**ADDENDUM TO CH-47-05-ASAM-05  
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**A6. ILLUSTRATIONS.** Figures A1 through A5 follow.

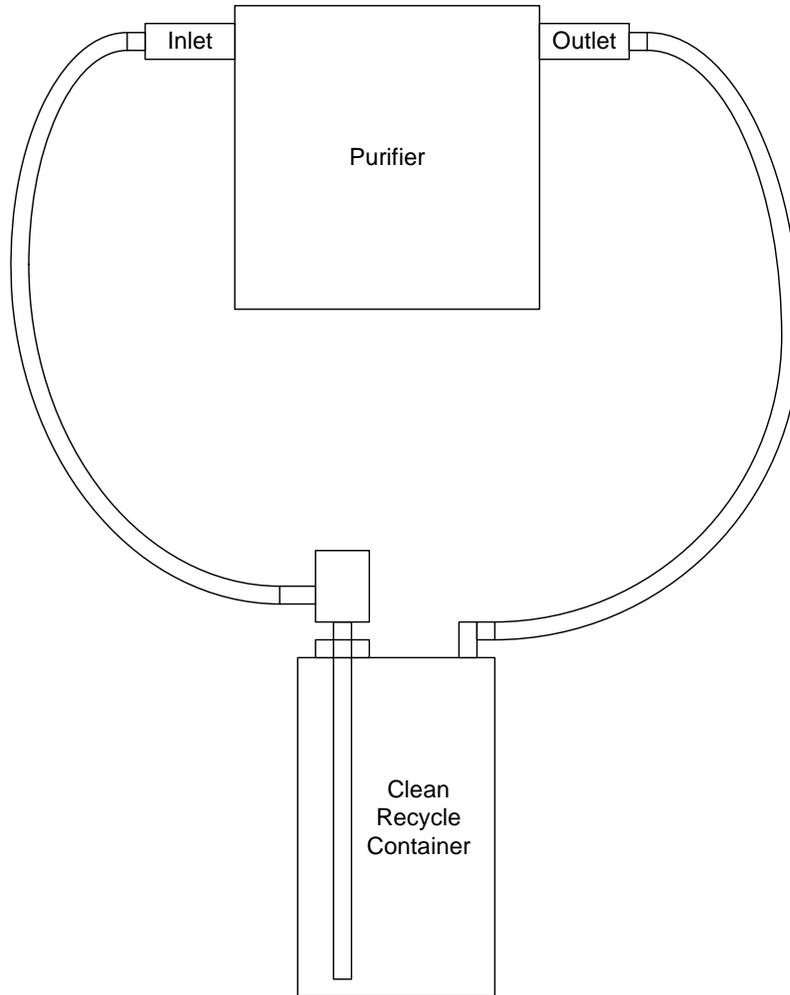
**DRAIN AGPU INTO CLEAN FLUID SS DRUM**



**Figure A1.**

**ADDENDUM TO CH-47-05-ASAM-05  
Purification Procedure Using the Pall P/N PE01078-12-H-83 Purifier**

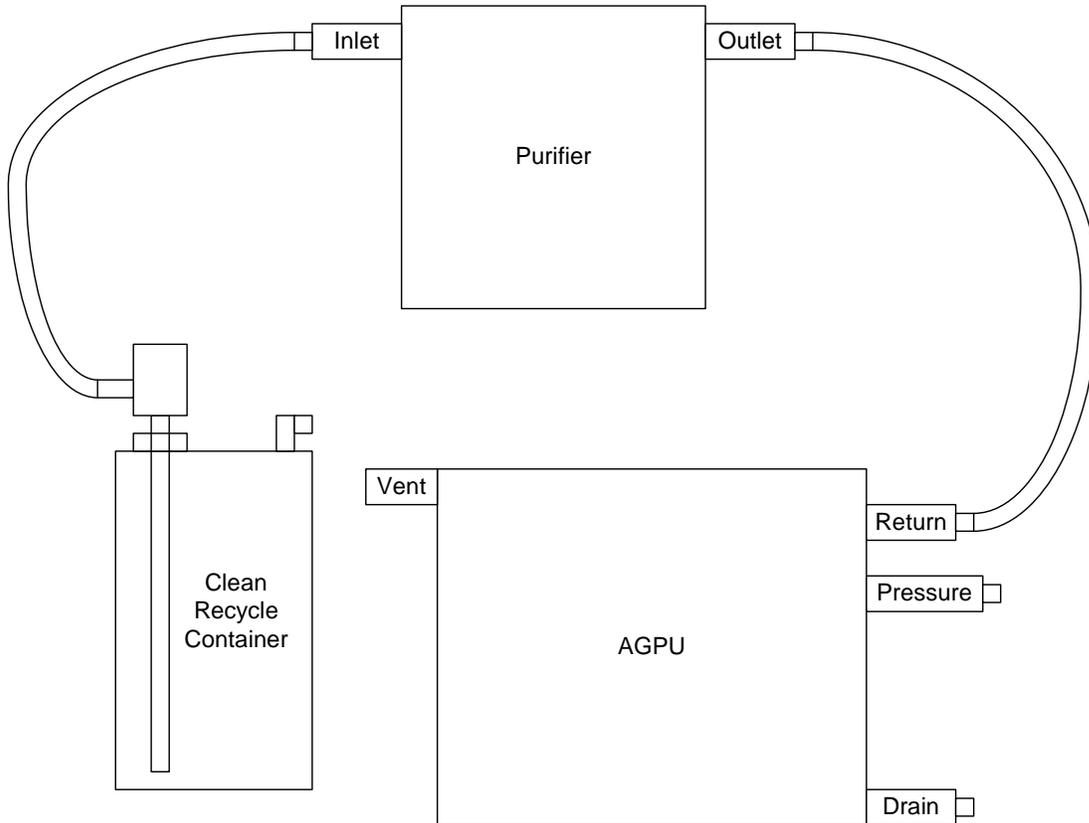
**PURIFY CLEAN FLUID SS DRUM**



**Figure A2.**

**ADDENDUM TO CH-47-05-ASAM-05  
Purification Procedure Using the Pall P/N PE01078-12-H-83 Purifier**

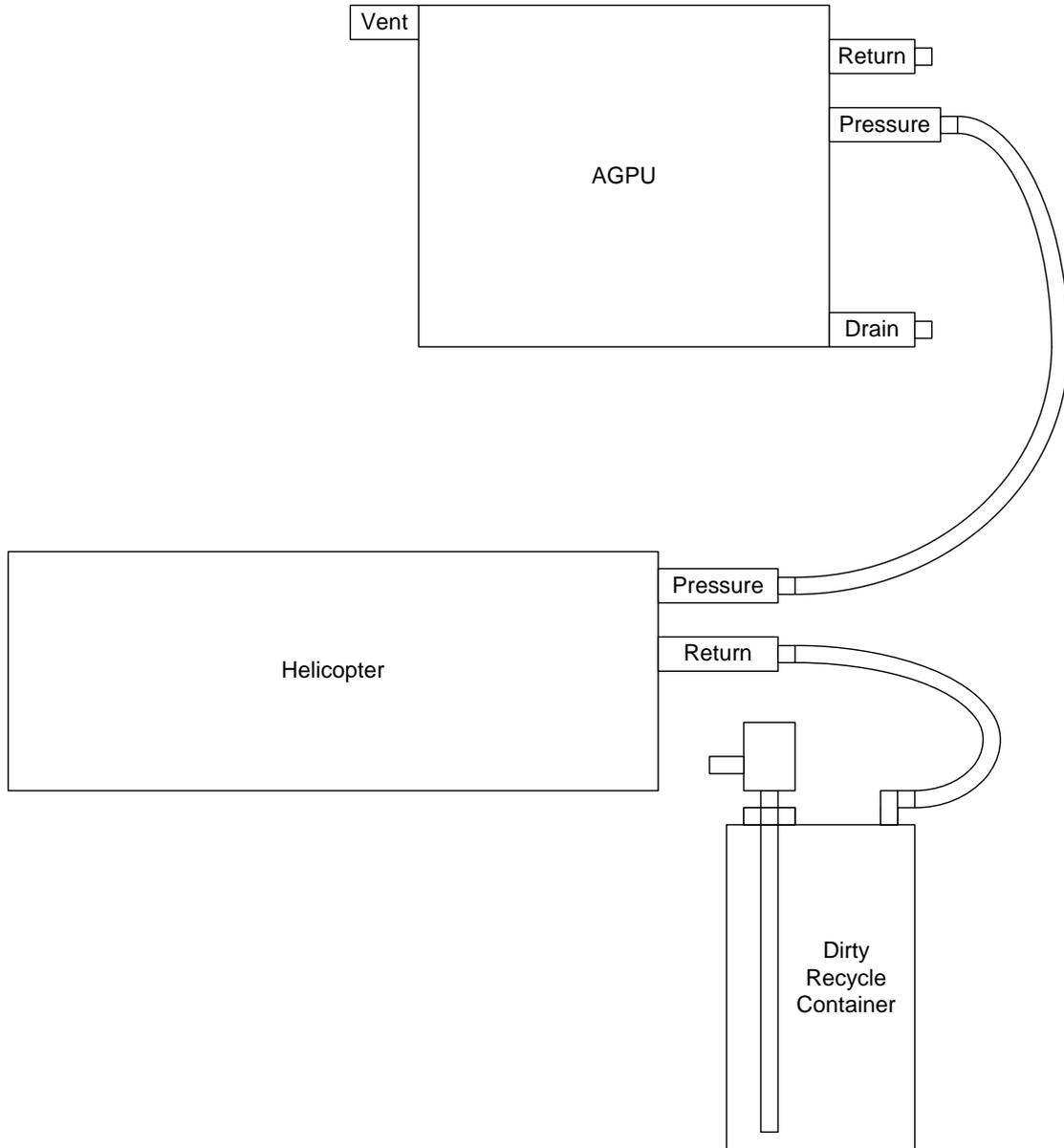
**FILL AGPU FROM CLEAN SS DRUM**



**Figure A3**

**ADDENDUM TO CH-47-05-ASAM-05  
Purification Procedure Using the Pall P/N PE01078-12-H-83 Purifier**

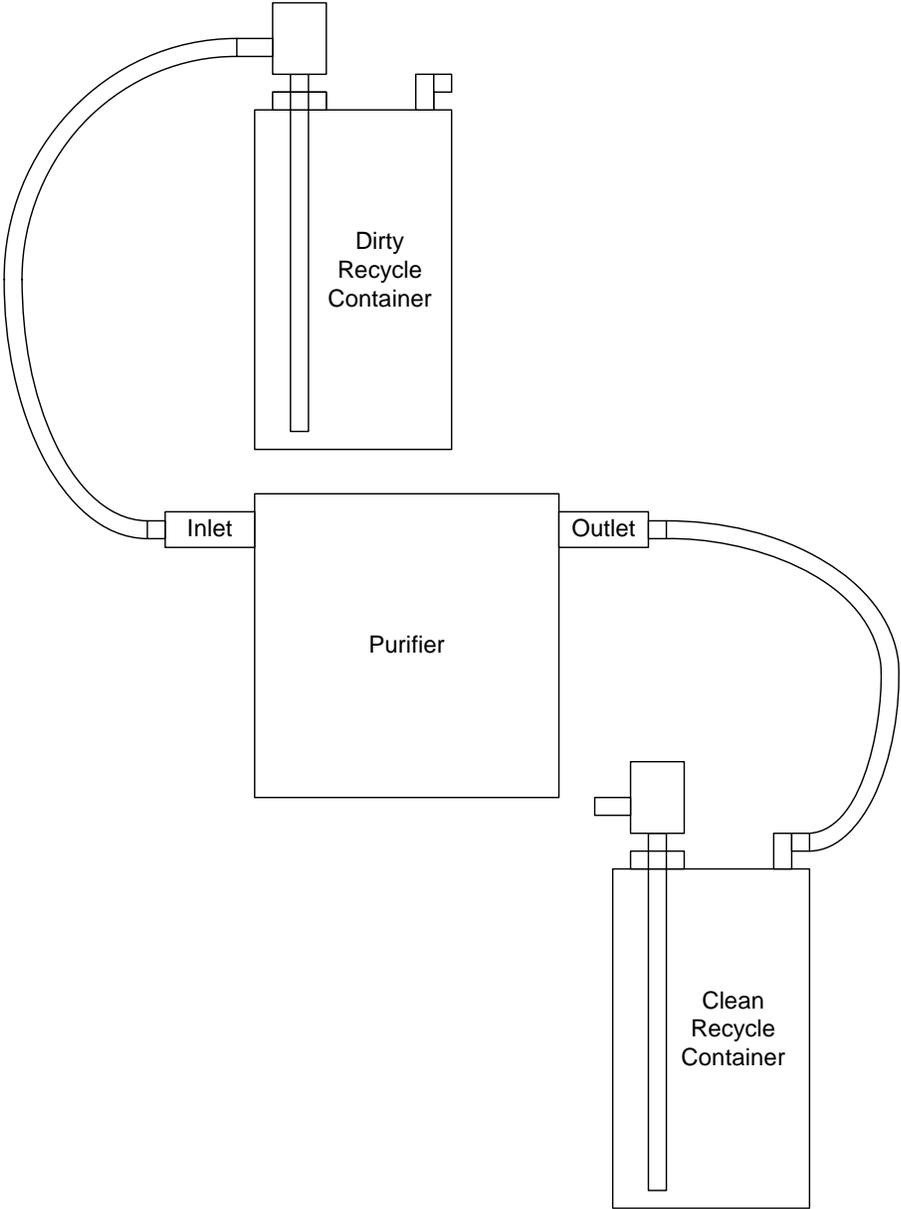
**FLUSH AIRCRAFT FLIGHT BOOST AND UTILITY SYSTEMS**



**Figure A4**

**Addendum A**  
**Purification Procedure Using the Pall P/N PE01078-12-H-83 Purifier (Conc.)**

**TRANSFER FLUID TO CLEAN SS DRUM**



**Figure A5**