



EMB145 - EMB135

AIRCRAFT
MAINTENANCE MANUAL

MAIN HYDRAULIC SYSTEM - INSPECTION/CHECK

EFFECTIVITY: ALL

1. General

- A. This section gives the procedures to do the analysis of the hydraulic fluid.
- B. The function of the analysis is to know the condition of the hydraulic fluid and the correct time for its change.
- C. Obey these instructions to do the analysis of the hydraulic fluid:
 - Collect samples from the sampling valves (pressure and return) of each hydraulic system.
 - Use four 100-ml (6-in³) flasks sealed with caps. Use two flasks for each system.
 - Make sure that the flasks are fully clean and washed with solvent (Fed. Spec. P-D-680, type 1, or equivalent).
- D. To get good results, it is very important to collect the samples in a clean environment.
- E. Too much contamination of the hydraulic fluid can cause unsatisfactory performance of the system. Contamination can cause wear of the components before the usual time.
- F. You can get access to system 1 through access panel 193BL (AMM MPP 06-41-01/100).
- G. You can get access to system 2 through access panel 193CR (AMM MPP 06-41-01/100).
- H. The procedures in this section are given in the sequence below. The tasks identified with (♦) are part of the Scheduled Maintenance Requirements Document (SMRD).

TASK NUMBER	DESCRIPTION	EFFECTIVITY
29-10-00-200-803-A ♦	HYDRAULIC FLUID - ANALYSIS	ALL



EMB145 - EMB135

AIRCRAFT
MAINTENANCE MANUAL

TASK 29-10-00-200-803-A

EFFECTIVITY: ALL

2. HYDRAULIC FLUID - ANALYSIS

A. General

(1) This task gives the procedures to do the analysis of the hydraulic fluid.

B. References

REFERENCE	DESIGNATION
AMM MPP 06-41-01/100	-
AMM TASK 12-13-01-600-802-A/300	HYDRAULIC SYSTEM RESERVOIR - REPLENISHMENT
AMM TASK 20-40-01-860-801-A/200	ENERGIZATION OF THE AIRCRAFT WITH AN EXTERNAL POWER SOURCE
AMM TASK 29-00-01-910-801-A/200	HYDRAULIC FLUID - DECONTAMINATION
AMM TASK 29-10-00-860-801-A/200	HYDRAULIC SYSTEM - PRESSURIZATION WITH HTS

C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
193	193BL	Hydraulic compartment of system 1
193	193CR	Hydraulic compartment of system 2

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

ITEM	DESCRIPTION	PURPOSE	QTY
Commercially available	100-ml (6-cubic inch) capped flasks	To collect the hydraulic fluid sample	4
Commercially available	250-ml (15-cubic inch) capped flasks	To collect the hydraulic fluid sample	4
Commercially available	Container with about 1 liter capacity (58 cubic inches)	To collect the hydraulic fluid to be discarded	1
Commercially available	Rubber Gloves	Protection for the hands	1
Commercially available	Goggles	Protection for the eyes	1

F. Consumable Materials

SPECIFICATION (BRAND)	DESCRIPTION	QTY
Fed. Spec. P-D-680, type I, or equivalent	Solvent	AR

G. Expandable Parts

Not Applicable

H. Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	Hydraulic compartment of system 1 and system 2

I. Preparation

SUBTASK 841-002-A

- (1) Remove access panel 193BL and/or 193CR (AMM MPP 06-41-01/100).

J. Check (Analysis) of Hydraulic Fluid ([Figure 601](#))

SUBTASK 280-002-A

NOTE: Do the necessary actions as a function of the test results.

- (1) Acceptable Contamination Limits.

WARNING: THE SOLVENTS CONTAIN TOXIC INGREDIENTS. WEAR GLOVES WHEN YOU USE THEM AND PREVENT THE CONTACT WITH YOUR SKIN OR EYES. HAVE SUFFICIENT VENTILATION OR USE RESPIRATORS.

- (a) Method to be used:

- 1 Appearance.
- 2 Moisture. Refer to ASTM D1744 or ASTM D6304.
- 3 Neutralization No.. Refer to ASTM D974 or ASTM D664A.
- 4 Kinematic Viscosity. Refer to ASTM D445.
- 5 Elemental (ppm max) Contamination.
- 6 Particle Contamination. Refer to SAE AS4059, class 9. Highest acceptable limit for hydraulic fluid contamination.

NOTE: Class 9 is the highest limit permitted for hydraulic fluid contamination. If the contamination limit is above this class, you must replace the hydraulic fluid.

- (b) Table 601 gives the permitted contamination limits for the hydraulic fluid.

Table 601 - PERMITTED CONTAMINATION LIMITS

PARAMETER		CONTAMINATION LIMITS
APPEARANCE		No cloudiness, phase separation or precipitation, is permitted
MOISTURE % (maximum)		1.0 PERCENT maximum
NEUTRALIZATION No. mg KOH/gm (maximum)		1.0 mg KOH/gm maximum (x)
KINEMATIC VISCOSITY at 38°C/100°F, cs		6.0 - 12.5 cs
ELEMENTAL (ppm maximum) CONTAMI- NATION	CHLORINE	200 ppm maximum
MAXIMUM PARTICLE CONTAMINA- TION PER 100 ml		Class 9 as per AS4059 table 1, note (2), or table 2, note (2)

(2) - Size Range, APC Calibrated per ISO 11171 or Electron Microscope, based on projected area equivalent diameter.

(x) - The fluid manufacturer inform a maximum value of 1.5 mg KOH/gm but Embraer recommends a maximum limit of 1.0 mg KOH/gm because it will avoid additional flushing to achieve the neutralization level.

- (2) Collection of Hydraulic Fluid.
 - (a) Get access to the hydraulic reservoir of system 1 through access panel 193BL (AMM MPP 06-41-01/100). For the hydraulic reservoir of system 2, the access is through access panel 193CR (AMM MPP 06-41-01/100).
 - (b) Energize the aircraft with the External DC Power Supply ([AMM TASK 20-40-01-860-801-A/200](#)).

CAUTION: THE EMDP MUST BE KEPT ON ONLY DURING THE NECESSARY TIME TO COLLECT THE HYDRAULIC FLUID.

- (c) Pressurize hydraulic systems 1 and 2 ([AMM TASK 29-10-00-860-801-A/200](#)).
- (d) Operate the aileron and rudder to make the hydraulic fluid flow through the system to get a homogeneous sample of the hydraulic fluid.
- (e) To collect the hydraulic fluid, do as follows:

WARNING: THE HYDRAULIC SYSTEM CONTAINS PHOSPHATE-ESTER HYDRAULIC FLUID. THE FLUID CAN CAUSE IRRITATION IN YOUR SKIN OR INJURY TO YOUR EYES. USE THE APPLICABLE GOGGLES AND RUBBER GLOVES. IF THE FLUID TOUCHES YOU, FLUSH YOUR SKIN WITH WATER. IF IT GETS IN YOUR EYES, FLUSH THEM WITH WATER AND GET MEDICAL HELP.

- 1 **NOTE:** Get the sample in 1 hour after landing. When it is not possible to get the sample immediately after landing, for you to get homogeneous samples of hydraulic fluid, operate the units that use the hydraulic system at the highest flow possible and thus diffuse

the contaminants. It is recommended that the hydraulic system be operated for a minimum of 15 minutes at a fluid temperature higher than 30 °C (86 °F), before you can have a representative sample.

Put an open-top container with approximately 1-liter (58-cubic inch) capacity below the return sampling valve to collect the hydraulic fluid from system 1 ([Figure 601](#)).

NOTE: This procedure will help you get samples with more precision.

- 2 Drain approximately 50 ml of hydraulic fluid from system 1 through the return sampling valve and discard the fluid.
- 3 Do steps (1) and (2) again for the pressure sampling valve.
- 4 Do steps (1) thru (3) again for hydraulic system 2.

CAUTION: MAKE SURE THAT THE 100-ml or 250-ml FLASKS ARE COMPLETELY CLEAN AND WASHED WITH SOLVENT (SOLVENT PER FED. SPEC. P-D-680, TYPE I OR EQUIVALENT).

- 5 Put the 100-ml or 250-ml flask below the return sampling valve of system 1.

NOTE: 1. If the laboratory will use the automatic particle counters (APC) calibrated per the new ISO 11171 method to identify the particle contamination, use a flask of 250 ml.

2. If the laboratory will use the Electron Microscope method to identify the particle contamination, use a flask of 100 ml.

- 6 Fully fill the 100-ml or 250-ml flask with fluid. Next, close the flask and put a label on it to identify the aircraft, the return sampling valve, and hydraulic system 1.

- 7 Do steps (5) and (6) again for the pressure sampling valve.

- 8 Do steps (5) thru (7) again for hydraulic system 2.

- 9 Send hydraulic fluid samples to a laboratory for analysis by the methods indicated in step (1)-a.

- (f) Depressurize hydraulic systems 1 and 2 ([AMM TASK 29-10-00-860-801-A/200](#)).

- (3) Analysis of Hydraulic Fluid during Scheduled Maintenance.

NOTE: It is recommended that the hydraulic fluid analysis be made during scheduled maintenance when there is sufficient time to get the laboratory analysis results and do additional actions, if necessary.

- (a) Compare the laboratory report with the data in Table 601.

- (b) If the laboratory report shows that the hydraulic fluid is not contaminated, the job is OK.

- (c) If the laboratory report shows that the hydraulic fluid is contaminated because the fluid inspection by the particle-counting method shows more contamination than the permitted quantity, do as follows:

- 1 Do the Hydraulic Fluid - Decontamination ([AMM TASK 29-00-01-910-801-A/200](#)).
- 2 Operate the aileron and rudder to make the hydraulic fluid flow through the systems.
- 3 Obey the instructions given in step (2) (e) and send the samples to a laboratory for analysis.
NOTE: It is not necessary to wait for the laboratory report to put the aircraft back into service.
- 4 Do the procedures specified in step (3) again and again until the laboratory report shows that the hydraulic fluid is not contaminated.

- (4) Analysis of Hydraulic Fluid during In-Service Operation.

NOTE: Do the Analysis of Hydraulic Fluid during In-Service Operation when:

- The aircraft is in in-service operation.
- There is not sufficient time to wait for the test results.

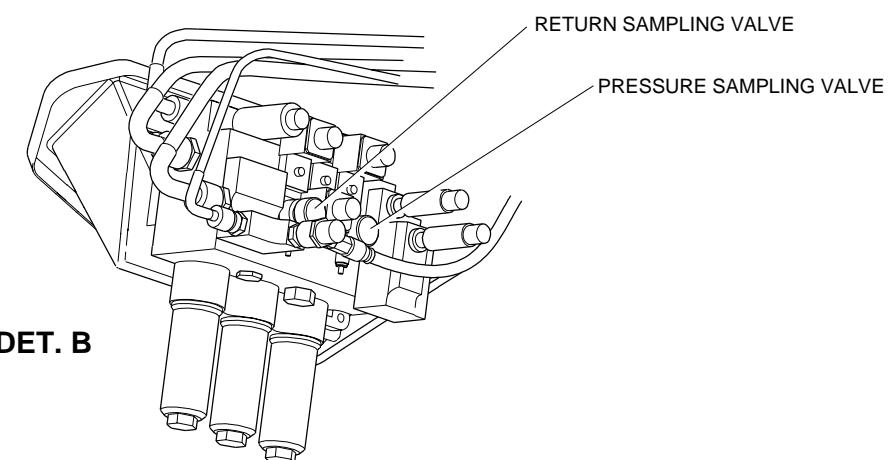
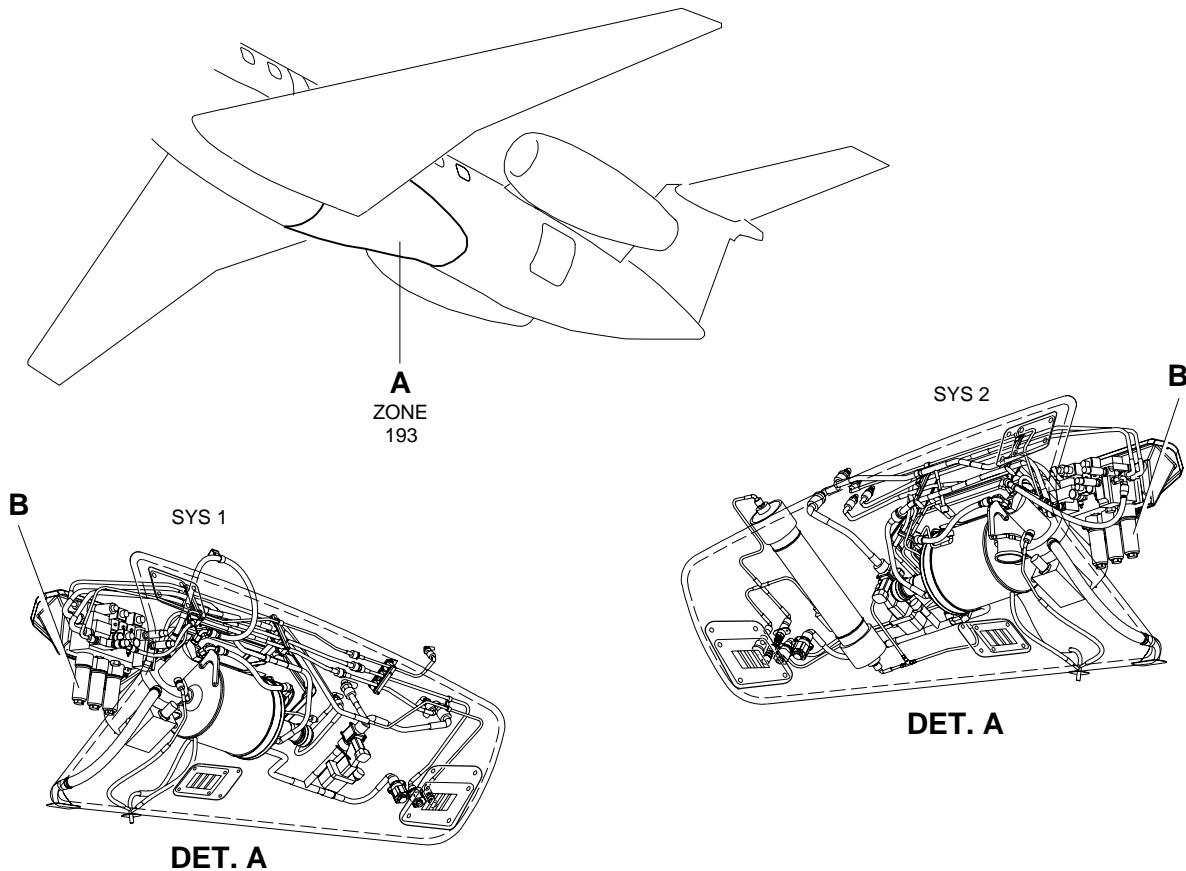
- (a) Fully drain the fluid from the reservoir of the related system (system 1 or system 2) through the sampling valves.
- (b) Fill the hydraulic reservoir with new fluid ([AMM TASK 12-13-01-600-802-A/300](#)).
- (c) Operate the aileron and rudder to make the hydraulic fluid flow through the systems.
- (d) Obey the instructions given in step (2) (e) and send the samples to a laboratory for analysis.
- (e) Do the procedures specified in step (3) again and again until the laboratory report shows that the hydraulic fluid is not contaminated.

K. Follow-on

SUBTASK 842-002-A

- (1) Make sure that the hydraulic reservoir is full. If necessary, fill the reservoirs ([AMM TASK 12-13-01-600-802-A/300](#)).
- (2) Deenergize the aircraft ([AMM TASK 20-40-01-860-801-A/200](#)).
- (3) Install access panel 193BL and/or 193CR (AMM MPP 06-41-01/100).

EFFECTIVITY: ALL

 Collection of Hydraulic Fluid from the Reservoirs
 Figure 601


145AMM290019.MCE A

