

FEB 26 1993

SAA09FT08-028
REV. A

B/L: 246.00
SYS: 250-TON
HYDRA-SETS

Critical Item: Solenoid Valve (poppet type) (2 Items Total)
Find Number: V7
Criticality Category: 2

SAA No:	09FT08-028	System/Area:	250-Ton Hydra-Sets/VAB
NASA		PMN/	H72-0828-11/
Part No:	None	Name:	250-Ton Hydra-Sets
Mfg/	AMBAC Industries Inc.	Drawing/	VEN-1324/All
Part No:	Fluid Power Systems Div./ 3-C5-2-110V (S/N 1) 3-C5AA-2 (S/N 2)	Sheet No:	Del Pub 77-2L/All

Function: Provides rapid or emergency load lowering capability.

Critical Failure Mode/Failure Mode No: Fails open/09FT08-028.001

Failure Cause:

- 1) Mechanically jammed
- 2) Poppet sticks open
- 3) Contamination

Failure Effect: Unable to control lifting, lowering or hold load in a fixed position. Flow control valve V8 setting restricts the maximum lowering speed to .200-in/min. Possible loss (damage) of a vehicle system (segment field joint) if failure occurs with insufficient clearance for the piston to bottom out or time for the operator to take action. Valve failure would be immediately detectable by the telesonics and the linear travel readout. Time to effect, seconds to minutes.

ACCEPTANCE RATIONALE

Design:

• Component Specifications:

Pressure:	Rated 3000 psi	Actual 1500 psi	Burst 9000 psi
Temperature:	Rated -45° to +185° F	Operating Ambient	

5050231AP
ATTACHMENT
PAGE 2 OF 8

FEB 26 1993

E02-SAA09FT08-028
2 OF 8



Materials:	Electrical Service:	110 V 60cy AC
Body: Aluminum Bar Stock	External Leakage:	None
Poppet: Steel	Internal Leakage:	5 dpm with 3000 psi Δ P
Seat: Steel		
Spring: Stainless Steel		

- High pressure fluid holds poppet on seat.
- A 3 micron filter is in the hydraulic system but, not immediately upstream of the valve.
- The Hydra-Set is used at less than 75% of its rated load capacity (500,000 lb) in SRB stacking operations.

Test:

- Manufacturer's and KSC operational acceptance tests (functional test under full rated load) were performed prior to first use.
- OMRSD File VI requires:
 - That a leakage/operational test of the Hydra-Set is performed using the four point lifting beam prior to SRM attachment.

Inspection:

- Government and Lockheed source inspections were performed at the Del-Mar plant.
- No preventive maintenance inspection is available that would be applicable to the critical failure mode.
- OMRS 80K51319 requires that the 3 micron filter be removed and replaced and is performed by OMI V6G99:
 - Upon evidence of contamination.
 - After initial 10 hours of operation.
 - Every 100 hours of operation thereafter.

The filter is routed to the Malfunction Analysis Branch for contaminant analysis.

Failure History:

- One problem report, PV-6-092265, was written against Hydra-Set S/N 1 for minor external leakage and inability to hold a test load in a fixed position. Initial investigation by the Hydra-Set manufacturer revealed that the fast lower valve V7 had failed to fully close properly due to metal slivers holding it open. The valve was replaced and the unit load tested which resulted in continued drift problems. The unit was disassembled and the cylinder walls were found to be severely scored causing the piston head seal to leak. The damage was repaired and the Hydra-Set was returned to service.
- The GIDEP failure data interchange system has been researched and no data on this component was found.

5050234A
ATTACHMENT
PAGE 3 OF 8

WORKSHEET 5122-012
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FEB 26 1993

SAA09FT08-028
REV. A

Operational Use:

- **Correcting Action:**

Damage to segment field joint may be prevented by emergency lift via the 250-ton bridge crane only if the failure occurs at a point in the mating operation in which there is sufficient clearance, affording the operators time to take action.

- **Timeframe: Seconds.**

5050234AP
ATTACHMENT
PAGE 4 OF 8

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