USA Ground Operations CIL Sheet

Critical Item: Hydra-Set, 1/2-Ton
NASA Part No: 79K08312-1
Mfg/Part No: Del Mar Avionics / Model-0
System: Hydra-Set Linear Positioning Instruments

Criticality Category: 2
Total Quantity: 8

Find No.	Qty	Area	PMN	Baseline	Drawing / Sheet
None	5	Mobile	H72-0828-05	246.00	Ven-494 / All
None	3	OPF-1,2	H72-0328-C5	246.00	Ven-494 / All
None	0	OPF-3 (Shared)	H72-0828-05	246.00	Ven-494 / All

Function:

Precision vertical handling of flight hardware.

Failure Mode No. Failure Mode	Failure Cause Failure Effect	Detection Method Time to Effect	Crit Cat
09FT01-011.001	Twisted or cut O-ring	Visual	2
Leaking seal (piston head)	Hydraulic fluid leaking past the piston rod seal could spill on and contaminate flight hardware. Hydraulic fluid leaking past either seal would result in the uncontrolled lowering of the load a maximum of 12 inches. The maximum worst case lowering speed is 2.2 in/sec (132 in/min). The above failure effects could cause loss (damage) to a vehicle system.	Seconds to minutes	
09FT01-011.002	Twisted or cut O-ring	Visual	2
Leaking seal (piston rod)	Same as 09FT01-011.001.	Seconds to minutes	
09FT01-011.003	Twisted or cut O-ring	Visual	2
Leaking seals (up pump) 3 ea.	Hydraulic fluid leaking past either outer seal could spill on and contaminate flight hardware. Leakage past either the inner or outer seal on the high pressure side of either assembly would also result in the uncontrolled lowering of the load. The maximum worst case lowering speed is 2.2 in/sec (132 in/min). The above failure effects could cause loss (damage) to a vehicle system.	Seconds to minutes	
09FT01-011.004	Twisted or cut O-ring	Visual	2
Leaking seals (down valve) 3 ea.	Same as 09FT01-011.003.	Seconds to minutes	
09FT01-011.005	Internal leakage, broken spring	Visual	2
Down valve fails open	Load will continue to descend out of control until the piston bottoms out or the load contacts an obstruction. The rate of descent is proportional to how far the valve is opened at the time of failure. The maximum worst case lowering speed is 2.2 in/sec (132 in/min). The resulting effect could cause loss (damage) to a vehicle system.	Seconds to minutes	

ACCEPTANCE RATIONALE

Design:

- In the event of a seal failure, piston and piston rod travel would be limited to a maximum of 12 inches by mechanical stops.
- Seal (O-ring) material meets MIL-P-5515 (Buna).

- Slow degradation type failure would be detectable during O & M inspection and maintenance checks. Close tolerance between mated parts preclude gross seal failure and a quick descent of flight hardware.

- Down valve piston is spring-loaded closed; in addition, high pressure fluid assists in closing the valve.

- Down valve manufactured to close tolerance to prevent cocking of piston in valve body.

Test:

- OMRSD File VI requires:
  - Confidence checks prior to each lift to check seal integrity.
  - Units load tested annually for 30 minutes using known weight up to 50% capacity to verify seal integrity.

Inspection:

- OMRSD File VI requires units to be inspected for hydraulic leakage on external surfaces before each use.

Failure History:

- Current data on test failures, unexplained anomalies, and other failures experienced during ground processing activities can be found in the PRACA database. The PRACA database was researched and the following data was found on this component in the critical failure mode.
  - 21 PRs were found that address minor leakage. No cases of damage to flight hardware documented.

Operational Use:

Correcting Action	Timeframe
Emergency lift via crane so distance between load and obstruction is outside limit of Hydra-Set travel.	Seconds.