

S 40904K - 44 - 22
SAA09PP03-001
REV. E
B/L 8/30
MPS LH2, LOA SYSTEM

Critical Item: Solenoid Valve
Find Number: A105997
Criticality Category: 2

SAA No: 09PP03-001

System/Area: LH2 MPS/LOA

NASA Part No: 79K80243-1

PMN/ Name: S72-0685-5 Orbiter He Anti-Ice Panel

Mfg/ Part No: Marotta/ 8037147-0008

Drawing/ Sheet No: 79K06063/79K40023 2

Function: Pilot operator for controlling pneumatic valve A105999 which supplies GHe for the ET LH2 and LOX prepress. line anti-icing purges.

Critical Failure Mode: Fail open. FM. No. 09PP03-001.017

Failure Effect: Loss of the heated GHe anti-icing purge and resultant possible damage to the Orbiter thermal protection system. Failure is detectable by the position switch on valve A105999 and by pressure switch A106009.

Acceptance Rationale

Design:

- o This solenoid valve is operated within all design specifications.
- o This component is only Criticality Category 2 when the ambient temperature is 36°F or below because the unheated backup helium supply is not effective at these temperatures.
- o Component Specifications:

	<u>Rated</u>	<u>Actual</u>
Pressure (psig)	3000	750
Flow (scfm)	495	N/A
Temperature (°F)	0-250	Ambient on the MLP

- o The burst pressure is 4 times rated pressure (12,000 psig).
- o The solenoid valve body is constructed of aluminum alloy, the poppet is made of 300 series SST, O-rings are Buna-N, seats are nylon and aluminum and the seat retainer is aluminum alloy.

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Solenoid Valve, A105997 (Continued)

Test/Inspection:

o File VI verifies the following:

- Functional operation of the primary purge prior to each launch and at component replacement. The purge is verified via pressure switch indication and must satisfy a temperature specification after heater activation.
- Functional operation of the redundant purge prior to each launch and at component replacement. The purge must satisfy a purge pressure specification.

o The manufacturer's certification test requires the following tests:

- Proof
- Leak
- Functional
- Continuity
- Insulation Resistance
- Voltage drop

o Drawing 79K12402 Requirements:

The valve will be functionally tested by LPS with each use.

This drawing requires that the component be tested annually and at component replacement. Tests will consist of valve position indication checks, internal leak checks, pull-in/drop-out voltage checks and low voltage checks.

Failure History:

o PRACA - There were 4 Problem Reports for this type component in the PRACA Data Base.

No failures found in the critical failure mode.

o GIDEP - The GIDEP Failure Data Interchange System has been researched, and no data on this component was found.