SAA09PP03-001
REV. E
B/L 8/30
MPS LH2, LOA SYSTEM

Critical Item: Solenoid Valve

Find Number: A105961

Criticality Category: 2

SAA No: 09PP03-001

NASA Part No: 79K80223-12

Mfg/ Part No: Marotta/ 8060977-0002

System/Area: LH2 MPS/LOA

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

Drawing/ Sheet No: 79K06063/79K40023 2

Function: Controls flow of heated helium for the ET LH2 prepressurization line. Normally closed.

Critical Failure Mode: Fail closed. FM. No. 09PP03-001.015

Failure Effect: Inability to provide heated GHe flow to the LH2 prepressurization line. Possible damage to the Orbiter thermal protection system from falling ice. Failure is detectable by the valve position switch on the solenoid valve and by the pressure switch A106009.

Acceptance Rationale

Design:

- This solenoid valve is operated within all design specifications.
- This failure 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.
- Component Specifications:

	Rated	Actual
Pressure (psig)	750	200
Flow (scfm)	1670	29
Temperature (°F)	0-270	240-260

- The burst pressure is 4 times rated pressure (3,000 psi).

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Solenoid Valve (Continued)

- o The solenoid valve body and poppet are constructed of 300 series SST. the O-rings are made of Viton, the backup rings are Teflon, and the seat is Vespel.

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 required 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 to consist of valve position indication checks, pull-in and drop-out voltage and internal leak checks.

Failure History:

- o PRACA - There were 7 Problem Reports for this type component found 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.