

Critical Items List (CIL) Sheet

Critical Item: PRCS Throat Plug, Ground Ops
Total Quantity: 168
Find Number: 1P2
Criticality Category: 1

B/L: 600.37 & 890.00
System: RCS

FMEA/CIL No.: SSD99FO027

System/Area: RCS/ OPF
VAB, PAD,
HMF, Landing
Sites

**NASA
Part No.:** -

**PMN/
Name:** A70-1136/ Universal
& Evacuation Throat
Plug Assembly

**Mfg/
Part No.:** G070-300012-307

**Drawing/
Sheet No.:** G070-300012/ 7

Function: Seals thruster chamber; supports Outer Cover Fitting Assembly. Allows pressurization of chamber for testing.

Critical Failure Mode/ Failure Mode No: Separates prematurely from thruster throat
SSD99FO027.002

Failure Cause: Material defect or end-of-life effect (fatigue)

Failure Effect: Plug falls from thruster. Falling plug and attachments may impact on personnel causing injury/loss of life.

ACCEPTANCE RATIONALE

Design: Materials of Construction –

Plug Body & Plug Fingers, Teflon
Piston, Stainless Steel
Spring, Stainless Steel
Vent Assembly, Stainless Steel
O-Rings, Kalrez

Design Factor of Safety – 4:1

Use – Inserted by properly trained personnel using the PRCS Throat Plug Installation Tool.

Test: - Certification Testing completed to verify operational use and performance of plug prior to usage as GSE. Testing included an extended life test which consisted of 100 simulated insert/removal cycles, fit check for snugness of fit into throat, insertion & removal force evaluation, and ferry flight vibration simulation.

- Acceptance testing done on each new production plug. Testing included a fit check for snugness of fit into throat and an insertion & removal force evaluation.

Inspection: - OMIs V6029 and S0028 details insertion requirements and requires periodic inspections of the thruster GSE attachments.

- OMI V6048 details inspection and refurbishment requirements after use.
- OMRSD File VI (TBD) requires inspection of the fingers with 10x magnification during refurbishment after every flow to verify no cracks or defects.

Failure History:

- Current data on test failures, unexplained anomalies, and failures experienced during ground processing activities can be found in the PRACA database. The PRACA database was researched and failure data was found on this component in the failure mode.
 - The failure occurred 01/19/1995 (PV-6-280376), 08/10/1995 (PV-6-291527), 03/19/1996 (PV-6-303449), 11/19/1997 (PV-6-332511), 11/09/1998 (PV-6-345024), 11/11/98 (PV-6-345028), 04/09/1999 (PV-6-349242), & 07/18/1999 (PV-6-352496)
 - The failure cause was broken fingers
 - The correcting action was replacement of the teflon housing.

NASA failure analysis KSC-MSL-0576-1999 was performed on broken fingers and the resulting report recommended that the fingers be inspected under magnification for evidence of crazing or hairline cracks during refurbishment.

- The GIDEP failure data interchange system has been researched and no failure data was found on this component in the critical failure mode.

Operational Use:

- Correcting Action:

There is no action which can be taken to mitigate the failure effect.

- Time Frame

Since no correcting action is available, time frame does not apply.