

Critical Item: Winch (1 item)

Find Number: W-1

Criticality Category: 2

FMEA/CIL No: SSD92F0038

System/Area: Orbiter Windows/
OPF

**NASA
Part No:** -

**PMN/
Name:** H70-0899/ Orb. Fwd.
Window Handling Set

**Mfg/
Part No:** Jeamar Winches/
CW275

**Drawing/
Sheet No:** GW70-348899

Function: Lifts/holds/lowers Orbiter windows

Critical Failure Mode/Failure Mode No: Fails to hold load/
FMN: SSD92F0038.001

Failure Cause: Mechanical failure of internal piece part (shaft lug, left hand thread, brake disk) or by brake pad/disk contamination.

Failure Effect: Load falls. Possible damage to flight hardware.
Failure is detectable by uncontrolled movement. Time to effect: immediate

ACCEPTANCE RATIONALE

Design:

- Conforms to DIN 15820
- Winch loads (lbs):
 - Design rated: 275
 - User rated: 135
 - User actual: 90
- Design Safety Factor: 5 : 1
- After derating, Safety Factor: 10.2 : 1

ACCEPTANCE RATIONALE (continued)

- **Materials**
 - Brake pads: Micke L53 Asbestos Free
 - Brake disk: KST 37-2
 - Shaft lug/ Drive Shaft: GTW 40 Cast Steel
 - Thread: GK Unifont 90 Cast Aluminum
 - Spring: DIN 2076-C Spring Steel
 - Lubricant: Shell Alvania EP2

- This winch is stored & used in an sheltered environment. The internal brake mechanism is sheltered from contamination by the winch housing. The lubricant employed is too viscous to flow & contaminate the brake pads/disk during winch use and storage.

- Test:**
- OMRSD File VI requires annual performance of a rated load test.
 - A load test (190 lbs) of 125% of the user rated load will be performed annually by OMI V6116.
 - A Cert. proof load test (275 lbs) of 100% of the Design rated load was performed during the Certification Test.
 - A repetitive load test (135 lbs) of 100% of the user rated load for 1300 cycles (raising & lowering) was performed on an identical test article winch during the Certification Test.
 - A GW70-340899 proof load test of 275 lbs was performed during ATP.
 - Tests are performed in accordance with NSS/60-1740.9 requirements.

Inspection:

- OMI V6116 requires an annual inspection of hoist for damage, wear or corrosion.
- Inspections are performed in accordance with NSS/60-1740.9 requirements.

Failure History:

- The PRACA database was queried and no failure data were found on this component in the failure mode.
- The GIDEP failure data interchange system was queried and no failure data were 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.
- **Timeframe:** Since no correcting action is available, timeframe does not apply.