

JUL 21 1989

~~SAA09FT07-003~~
~~REV 1~~

R/L: 264.01
SYS: ET Portable
Hoist

Critical Item: Gear Reducer (2 each)

Find Number: None

Criticality Category: 2

SAA No: 09FT07-003

System/Area: ET-Portable Hoist - VAB

NASA
Part No: None

PMN/
Name: H78-0839-01

Mfg/ Thern Inc.
Part No: Model 472

Drawing/ 79K09480/
Sheet No: Sh. 5 or M-4

Function: Transfers power from the hand-operated crank to the wire rope drum.

Critical Failure Mode: Disengages. FM No. 09FT07-003.002

Failure Cause: Structural failure.

Failure Effect: Torque for holding load will be lost. Load suspended from hook may drop. Possible loss (damage) to vehicle systems.

Acceptance Rationale

Design Parameters:

- o Mechanical braking is provided by manually driving the load through a worm gear drive with a gear ratio of 24 to 1. To prevent backdriving of the load through the gear reducer, a manual safety lock plate to stop the handle from turning is provided on the hoist.
- o The gear reducer is rated by the manufacturer at 2,000 lbs. with a design safety factor of 4 to 1. The operational working load is 400 lbs. resulting in a safety factor of 20 to 1.
- o Gearing is captured on the shafts by interference fits, pins, and shoulders, and would require structural failure for disengagement.
- o Material:

Drum and gearcase are of cast iron.
Frame is of steel.
Worm gear is machine cut of cast iron.
Worm is of steel.

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Gear Reducer (Continued)

Test Requirements:

- o Hoists are load tested to 100 percent of operational rated load annually.
- o Hoists were proofloaded to 125 percent of operational rated load in 1983, after Gear Reducer modification.

Inspection Requirements:

- o OMRSD, File VI requires that hoists be inspected annually to:
 - Verify load test
 - Hydraulic fluid level of reservoir and lubrication of handpump, winch gears, casters, and boom pivot pins
 - Inspect cable, sling, hinge pin, exposed bolts and nuts, cable puller pins, and Gear Reducer
- o OMRSD, File VI requires pre-operations inspection and checkout of gear reducers and hoists.

Failure History:

- o No failure history was found at the manufacturer, in the GIDEP data base, or in the PRACA data base.

Operational Use:

- o During operation, any grinding, rough operation, etc., of the gear reducer may be felt at the handle or heard while raising or lowering the load.
- o Typical loads supported by the model H78-0839-01 hoists during installation/removal on the Orbiter, external tank, or SRB are listed below. With the exception of the ET Transporter Fitting, ET Nose Fairing, and SRB Aft Integrated Electronics Assembly, the hoist may be used only when the boom is fully retracted and in the horizontal position.

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<u>Equipment Name</u>	<u>Approximate Weight (lbs.)</u>	<u>Location</u>
ET Transporter Fitting	159/101	VAB HB 2/4
*ET Nose Fairing	80	VAB HB 2/4
ET-SRB Upper Strut	340	RPSF
ET Diagonal Strut	290	RPSF
ET Lower Strut	290	RPSF
SRB Aft Integrated Electronics Assembly	80	RPSF

*Hoist used on a contingency basis only for this equipment.