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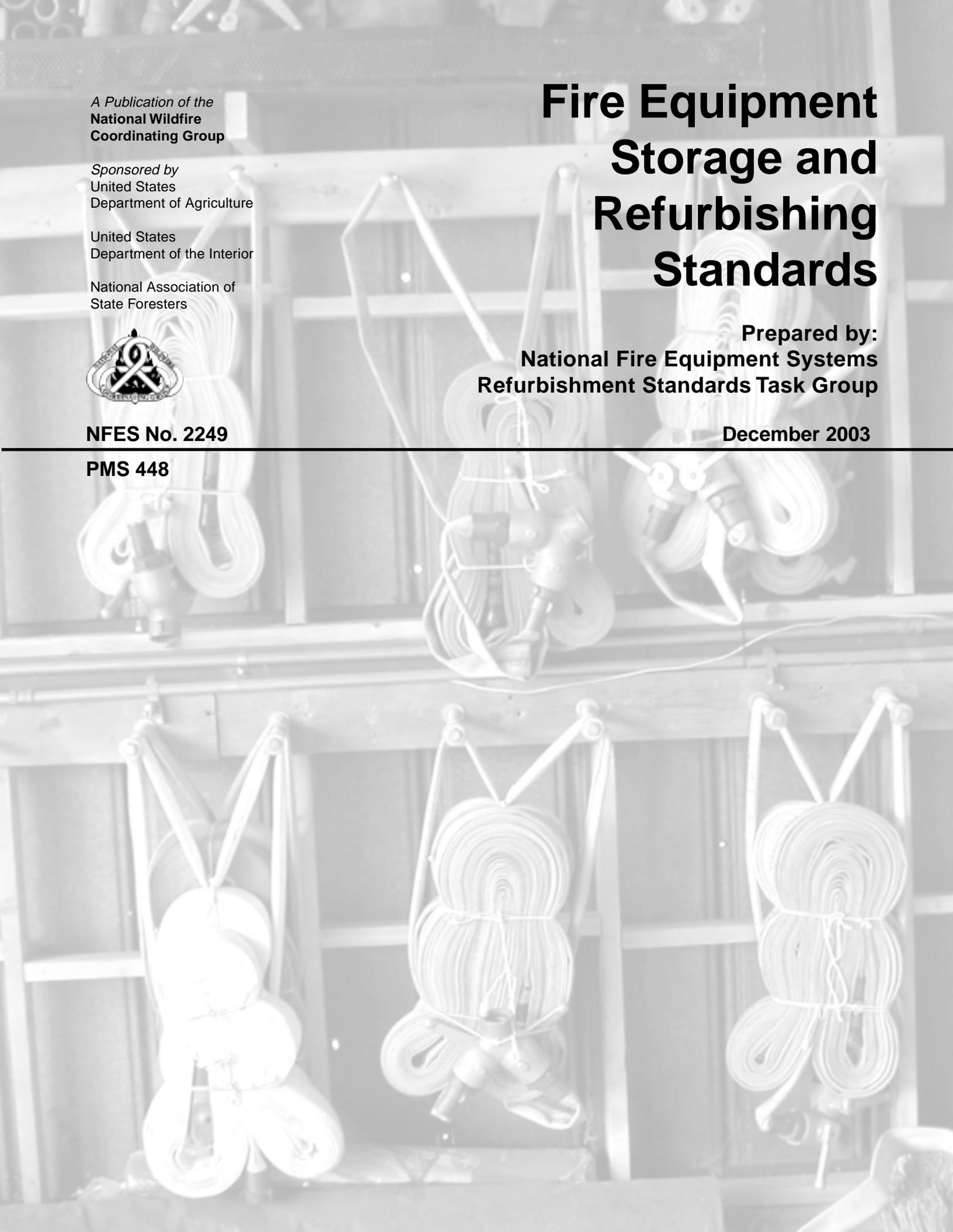
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PMS 448

Fire Equipment Storage and Refurbishing Standards

Prepared by:
**National Fire Equipment Systems
Refurbishment Standards Task Group**

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Fire Equipment Storage and Refurbishing Standards

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Questions or comments regarding the contents of this publication should be directed to any of the geographic area cache managers, or may be mailed to: National Wildfire Coordinating Group, Chairperson, Fire Equipment Working Team, c/o Director, Fire and Aviation Management, USDA Forest Service, P.O. Box 96090, Washington, D.C. 20090-6090. Additional copies of this publication may be ordered by mail/fax from: National Interagency Fire Center, ATTN: Great Basin Cache Supply Office, 3833 S. Development Avenue, Boise, Idaho 83705. Order NFES #2249.

PREFACE

NFES

STORAGE AND REFURBISHMENT STANDARDS

DEVELOPMENT HISTORY

In 1989, the NFES Refurbishment Standard committee established a task group to look at the development of a set of storage and refurbishment standards for fire equipment that is part of the NFES National Cache System. This task group was made up of several of the National Interagency Support Cache Managers and a select group of interested individuals from around the nation. The group met and established a standard outline for the Storage and Refurbishment Standards, and also identified all of the individual equipment items that should have standards. This list was then divided among the national and local caches and the two USDA Forest Service Technology & Development Centers for the development of the standards.

Bill Russell, USDA Forest Service Region 3, Aviation and Fire Management Staff, served as the first task group leader and editor of the standards. As standards were developed, they were shared among the Cache Managers. Suggested changes were incorporated and shared again. A final package of standards was available for the NFES committee meeting in Lexington, KY, in the spring of 1991, and was published in July 1992.

The 2003 edition contains the results of a total review of the existing standards and incorporates additional Refurbishment Standards and an appendix section that contains specific direction for refurbishment of items stocked within the National Cache System.

As new items are introduced into the National Cache System, there is a requirement, established by NFES, that the developer or proponent of the item provide a Storage and Refurbishment Standard. These must be in the same format as the current standards for ease of incorporation into future editions.

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**ITEM: ADAPTER, 1-INCH
ADAPTER, 1 1/2-INCH**

**NFES #0003, #0004
#0006, #0007**

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage.
2. Check for burrs.
3. Check tail gasket.
4. Check for fire damage. May cause failure in the future.
5. Check hose coupling threads for damage.

B. Tests

None.

C. Refurbishing Procedures

Replace tail gasket if missing, cracked, or stiff.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean in parts washer, high pressure wash, or clean in sink with dishwashing detergent using a brush or scouring pad.
2. Rinse thoroughly and let dry.

F. Repackaging

Package to protect threads.

Pack 10 each in carton (cache option) or 60 each in carton (cache option) and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: APPLICATOR, WATER, 2 PIECE

NFES #0720

A. Initial Inspection/Disposal Criteria

1. Check for burns.
2. Check for bad threads.
3. Check for cracks.
4. Check for gaskets in female fittings.

B. Tests

1. Assemble 2-piece applicator.
2. Attach to hose.
3. Check for leaks.

C. Refurbishing Procedures

Wash and remove dirt and grime.

D. Retesting Criteria

1. Attach to hose.
2. Check for leaks.

E. Cleaning Procedures

1. All items will be washed and cleaned of mud, dirt, and grease. Clean with a dishwashing detergent with bristle brush or scouring pad; pressure wash as needed.
2. Rinse thoroughly and let dry.

F. Repackaging

Package 20 each in NFES #0385 and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

ITEM: BAG, BACKPACK PUMP

NFES #1197

A. Initial Inspection/Disposal Criteria

1. Fabric and webbing.
 - a. Any holes, cuts, tears, burns, or torn seams that are not economically repairable.
 - b. Any fastener missing that does not provide adequate closure.
 - c. Unsightly dirt or fuel stain that cleaning cannot eliminate.
2. Hardware.

Check all plastic hardware for dirt, cracks, breaks, and proper function.
3. Replaceable liner if nonfunctional.

B. Tests

Open and close hook and pile fastener to determine if closure is adequate.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, and broken seams.
2. Replace nonfunctioning hardware.
3. Replace, insert extra plastic liners in pouch, if required. (See sections A and B).
4. Install rubber gasket on cap, if needed, to prevent leakage.

D. Retesting Criteria

Test replacement hook and pile fastener after sewing in place, as specified in section B.

E. Cleaning Procedures

1. Allow mud and loose dirt to dry. Remove with a stiff-bristle brush. If stains remain, wash as recommended below.
2. To remove heavy oil, as well as dirt and stains.
 - a. Soak in a solution of a water soluble, biodegradable degreaser for 30 minutes. Brush with a bristle brush, rinse thoroughly, and hang to dry.
 - b. Or, pretreat with a water-soluble biodegradable degreaser, high pressure wash, and hang to dry.
3. **DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.**

F. Repackaging

Pack 10 each in carton (cache option) and label accordingly.

G. Storage and Shelf Life Checks

None.

See appendix K for information on water-soluble biodegradable degreasers.

ITEM: BAG, BACKPACK PUMP (OLD STYLE)

NFES #1149

NOTE: When available stock is depleted, this item will be no longer be available.

A. Initial Inspection/Disposal Criteria

1. Check for:
 - a. Rips, holes.
 - b. Caps.
 - c. Straps (make sure they are all there and in good condition).
 - d. Pump and hose. (Refer to pump, single action NFES #0151)
2. Items that will determine disposal.
 - a. Bad seams and deterioration of adhesive.
 - b. Tears larger than 1 inch.
 - c. Depending on condition of bag, two to five patches.
 - d. Handheld pump that does not provide adequate pressure. See procedure for testing pumps.
 - e. Inoperative quick connection points.

B. Tests

1. Testing Bags.
 - a. Fill bag with 4 pounds of air.
 - b. Dip in water to check for leaks.
 - c. Patch leaks.
 - d. Check quick connections on bladder bags for proper seating.
2. Testing Straps.
 - a. Check buckles and D rings on straps for serviceability.
 - b. Check to see if strap attachments are coming unglued from bag. If needed, reglue.

NOTE: See gluing procedure.

- c. Pull test strap patch on bag to 45 pounds at 180 °F pull from bag.

C. Refurbishing Procedures

1. Wash unit.
 - a. Wash with soap and water, or steam clean.
 - b. Rinse in clear water.
 - c. Drain and let air dry.
2. Patching.
 - a. Gluing.

IMPORTANT NOTE: Most adhesives and thinners are flammable. Keep away from fire. Use in well ventilated space. Avoid prolonged contact with skin as well as breathing vapors. Cleanse hands thoroughly after contact. Read manufacturer's instructions and recommendations for adhesives and thinners before use.

- b. Patching procedure.
 - (1) Clean both surfaces to be bonded.
 - (2) Use abrasive strip or wire wheel to rough both surfaces before application of adhesive. Clean both surfaces again after roughing.
 - (3) Apply adhesive to both surfaces and let dry (15 to 25 minutes). Check for dryness by lightly touching surface with fingertip. Dry adhesive will feel tacky, but will not transfer to fingertip. If adhesive is allowed to dry more than 3 hours, apply a second coat of adhesive to both surfaces.

(4) Press the adhesive-coated surfaces together and use the roller to press the parts together. Use heavy pressure.

(5) For best results cure bonded surfaces for 72 hours.

c. Strap attachments.

(1) Remove all “old glue” residues from strap. Sand or wire wheel a 2-inch area on each strap, rough on both sides.

(2) Remove all “old glue” from attachment patch. Sand or wire wheel the backside of the patch. If the detached patch is not available, make patch of proper dimensions from salvaged bag material of same color. Clean using sandpaper or wire wheel to lightly roughen surface for adhesive.

(3) Check appearance of the patch. There should be a slit in the upper portion of the patch. If no slit exists, use a razor blade or sharp knife to add one.

(4) Locate the portion of the bag where the patch came from. Remove all old glue. Sand or wire wheel an area larger than the patch originally covered.

(5) **IMPORTANT:** All surfaces to be glued should be thoroughly sanded. Remove residue and clean surface. Check manufacturer’s recommendations for proper gluing and cleaning procedures. Failure to do so will adversely affect the strength of the adhesive.

(6) Assembling strap to patch: See section B.

(a) Slide D-ring on strap.

(b) Apply adhesive to sanded side of patch (just enough to cover where the strap will go) and on mating side.

(c) Slide strap through the slit in the patch.

(d) Press together.

(e) Use a roller to ensure a good bond.

NOTE: For best results, repaired bag should be held for 7 days at not less than 65 °F and not more than 70 percent humidity.

D. Retesting Criteria

None.

E. Cleaning Procedures

None.

F. Repackaging

1. Pack rolled bag similar to packaging of manufacturer. This prevents damage to bag by storage, transfer, handling, and ozone.

2. Pack 6 each in carton NFES #2007.

G. Storage and Shelf Life Checks

None at this time.

ITEM: BAG; TENT AND PERSONAL GEAR

NFES #0281

A. Initial Inspection/Disposal Criteria

1. Fabric and webbing.
 - a. Any hole, cut, tear, fray, or burn that cannot be repaired economically.
 - b. Any area of abrasion that has weakened the fabric beyond repair.
 - c. Any webbing that is cut, burned, or abraded beyond economical repair.
2. Hardware.

Check all plastic hardware for dirt, cracks, breaks, and proper function. See section B.
3. Zippers.

Check all zippers for broken coils, missing or broken sliders, and for proper function. See section B.
4. Any writing, drawings, and so on on pack; dispose of unit.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Test hardware by fastening and unfastening the item. The hardware should function easily with little force being applied and with no difficulty in the release.
2. Open and close zipper to test. The zipper should operate smoothly through its full length.

C. Refurbishing Procedures

1. Repair holes, cuts, or tears.
2. Replace nonfunctioning hardware.

D. Retesting Criteria

Retest all replacement hardware as specified in section B.

E. Cleaning Procedures

1. Allow any mud and loose dirt to dry, then remove using a stiff-bristle brush.
2. Remove light oil using a solution of warm water and mild detergent and a brush. Rinse with clear water, let dry.
3. Remove heavy oil by soaking in water-soluble biodegradable degreaser for 30 minutes and then high-pressure wash or steam clean, and hang to dry.
4. Pretreat with water-soluble biodegradable degreaser, steam clean or high-pressure wash, and hang to dry
5. **DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.**

F. Repackaging

Store 10 bags in carton (to be determined).

G. Storage and Shelf Life Checks

None at this time.

See appendix K for information on water-soluble biodegradable degreasers.

ITEM: BAG, DRINKING WATER, 55 GALLON

NFES #0435

A. Initial Inspection/Disposal Criteria

1. Nylon outer bag.
 - a. Any holes, cuts, tears, burns, or torn seams that are not economically repairable.
 - b. Any zipper that does not close properly.
 - c. Unsightly dirt or fuel stain that cleaning cannot eliminate.
 - d. Any buckle that does not function properly.
2. Fill and drain hardware.

Any part missing or damaged.
3. Liners.
 - a. Replace old liner and make sure plugs are tightly threaded onto fitment caps to keep new liner sanitary.
 - b. Check condition of spare liner. Unless the integrity of the liner is in question, do not remove from the sealed bag to make this inspection.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Test fill and drain fittings for proper function and tight seal. The fill fitting is the special hardware that keeps dirt and bacteria out of the liner.
2. Test buckles by fastening and unfastening. They should function easily with little force applied and with no difficulty in the release.
3. Test zippers by opening and closing. Zipper should operate smoothly over its full length.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, and broken seams.
2. Replace nonfunctioning buckles.
3. Replace nonfunctioning zipper.
4. Replace used liners (NFES #0436).
5. Replace missing or damaged fittings.

D. Retesting Criteria

Test any replacement buckle, zipper, or fitting as specified in section C.

E. Cleaning Procedures

1. Nylon outer bag.
 - a. Allow mud and loose dirt to dry, then remove with a stiff bristle brush. If stains remain, clean as recommended in E.1.b
 - b. To remove heavy oil, as well as dirt and stains, soak in a solution of water-soluble biodegradable degreaser for 30 minutes, then brush with a bristle brush. Rinse thoroughly and hang to dry.
 - c. Pretreat by spraying a solution of water-soluble biodegradable degreaser on bag and pressure wash and hang to dry.

DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.
2. Filling and draining hardware.
 - a. Wash thoroughly in a solution of chlorine bleach, consisting of 1-ounce bleach per gallon of water. Rinse in potable water and dry completely.
 - b. Once hose and fittings are sanitized and dried, reseal in the plastic storage bag provided and put in zipper pocket.

Storage and Refurbishing Standards

F. Repackaging

Pack 1 each in carton 18 inch by 15 inch by 10 inch with printed instructions and information and parts list enclosed.

G. Storage and Shelf Life Checks

None at this time.

See appendix K for information on water-soluble biodegradable degreasers.

ITEM: BAG, SLEEPING, GENERAL PURPOSE M-1980

NFES #0022

A. Initial Inspection/Disposal Criteria

See Local Job Hazard Analysis for proper personnel protective equipment required for inspecting bags.

1. Any hole, cut, tear, abrasion, or torn seam that cannot be repaired economically.
2. Unsightly dirt or stain that laundering cannot eliminate.
3. Missing slider, damaged chain, or other defects that make zipper unusable.
4. Polyester batting in hard clumps or inadequate lofting.
5. Ink or any type of writing on bag.
6. Any signs of any type of body fluids.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Check spring lock to ensure spring works properly and that the cord passes freely through when the lock is disengaged.
2. Close zipper to ensure it provides a smooth and secure closure the full length of the bag opening.
3. Open and close the hook and pile fastener to ensure closure is adequate.

C. Refurbishing Procedures

1. Repair any hole, cut, tear, abrasion, or open seam. See note in section A.
2. Remove dirt or stains.
3. Replace any zipper that has damaged chain and replace any missing slider. See note in section A.
4. Check loft of batting in bags prior to sending for laundering.

D. Retesting Criteria

Retest all replacement hardware.

E. Cleaning Procedures

1. Remove all contents not part of the bag and zip closed before laundering.
2. Launder bags in front-loading machine. Use mild soap in water of no more than 130 °F. Bags shall undergo six wash and rinse cycles in an alternating combination, i.e., three washes and three rinses.
3. With bag unzipped, sterilize by dry tumbling with vacuum extraction of loosened dirt and soil particles, with a controlled heat application. The heat shall be held at an average of 130 °F for a minimum of 20 minutes. The dryer unit shall be of the reverse-action type. All bags shall be unfolded and shall tumble free. (To obtain the average temperature, test the temperature every 5 minutes and average the findings.)
4. After drying, zip bags closed.

F. Repackaging

Package 5 bags in carton NFES #0644 (NSN 8115-00-139-0691).

Cache Option: Package 10 bags in carton NFES #0513 (NSN 8115-01-290-9543).

G. Storage and Shelf Life Checks

Prior to shipping, check carton for rodent damage. If found, handle accordingly and dispose of carton and contents in appropriate manner.

ITEM: BAG, SLEEPING, FIREFIGHTERS, M-1981

NFES #1062

A. Initial Inspection/Disposal Criteria

See Local Job Hazard Analysis for proper personnel protection equipment required for inspecting bags.

1. Any hole, cut, tear, abrasion, or torn seam.
2. Unsightly dirt or stain that laundering cannot eliminate.
3. Polyester batting in hard clumps or lofting inadequate.
4. Head tie(s) loose or missing.
5. Ink or any type of writing on bag.
6. Any signs of any type of body fluids.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

None.

C. Refurbishing Procedures

1. Repair any hole, cut, tear, abrasion, or open seam. See note in section A.
2. Remove unsightly dirt or stains.
3. Check loft of batting in bags that have been laundered more than three times.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Remove all contents not part of the bag before laundering.
2. Launder bags in front-loading machine. Use mild soap in water of no more than 130 °F. Bags shall undergo six wash and rinse cycles in an alternating combination, i.e., three washes and three rinses.
3. Sterilize bag by dry tumbling with vacuum extraction of loosened dirt and soil particles, with a controlled heat application. Heat shall be held at an average of 130 °F for a minimum of 20 minutes. The dryer shall be of the reverse-action type. All bags shall be unfolded and shall tumble free. (Obtain average temperature by testing temperature every 5 minutes and averaging the findings).
4. Lay out each dry bag flat and fold in half lengthwise. Tightly roll bag from head to foot and tie in the middle with a suitable cord.

F. Repackaging

1. Package 10 bags in carton NFES #0513 (NSN 8115-01-290-9543).
2. Local cache option to package in plastic bag prior to final packaging.

G. Storage and Shelf Life Checks

Prior to shipping, check carton for rodent damage. If found, handle accordingly and dispose of carton and contents in appropriate manner.

ITEM: BAG, SLINGABLE, WATER, 72 GALLON, NON-POTABLE
BAG, SLINGABLE, WATER, 250 GALLON, NON-POTABLE
BAG, SLINGABLE, WATER, 360 GALLON, NON-POTABLE

NFES #0426
NFES #6017
NFES #6021

A. Initial Inspection/Disposal Criteria

1. Separate by NFES #.
2. Visually inspect for missing components, or need for repair such as: straps, hoses, spigot, cap, and gasket.

B. Tests

1. Fill with air or clean water (NFES #0426). Check for obvious leaks and mark leaks (drain water). Check for bad seams and deterioration of adhesives (previous patches).
2. Visually inspect bags for rips, tears, or obvious defects. (NFES #6017, #6021)

C. Refurbishing Procedures

1. Clean area around damaged spot with lacquer thinner or other suitable cleaner. Caution: Utilize well-ventilated area. Apply suitable glue (manufacturers recommendation) to both surfaces (patch and tank). Let dry until tacky. Place patch on damaged area and apply pressure with roller or suitable device for at least 1 minute.
2. Repair or replace any damaged components. Clean exterior of tank thoroughly (with filler cap attached).
3. Support or hang tank with spigot closed, remove cap and fill with water to rinse out tank. Replace cap. Shake tank vigorously until all foreign matter is removed. Drain tank completely through hose and spigot.
4. Invert tank after removing cap, open spigot and empty as much water as possible. Let dry inverted for 1 hour in sun, if possible.

D. Retesting Criteria

1. Recheck any patches or repairs.
2. Replace cap and close spigot.

E. Cleaning Procedures

None.

F. Repackaging

1. Ensure that tank is stenciled visibly with the words "NON-POTABLE" or "SUPPRESSION USE ONLY" and proper NFES # is stenciled on tank.
2. Use carton (cache option) for NFES #0426 and label accordingly.
3. Use carton (cache option) for NFES #6017 and label accordingly.
4. Use carton (cache option) for NFES #6021 and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: **BAG, SUPPRESSION WATER, 55 GALLON**

NFES #0437

A. Initial Inspection/Disposal Criteria

1. Nylon outer bag.
 - a. Any holes, cuts, tears, burns, or torn seams that are not economically repairable.
 - b. Any zipper that does not close properly.
 - c. Unsightly dirt or fuel stain that cleaning cannot eliminate.
 - d. Any buckle that does not function properly.
2. Fill and drain hardware.

Any part missing or damaged.
3. Liners.
 - a. Replace old liner and ensure that plugs are tightly threaded onto fitment caps to keep new liner sanitary (GSA does not supply extra bag).

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Test fill and drain fittings for proper function and tight seal. The fill fitting is a special piece of hardware that keeps dirt and bacteria out of the liner.
2. Test buckles by fastening and unfastening. They should function easily with little force applied and with no difficulty in the release.
3. Test zippers by opening and closing. Zipper should operate smoothly over its full length.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, and broken seams.
2. Replace nonfunctioning buckles.
3. Replace nonfunctioning zipper.
4. Replace used liners (NFES #0438).
5. Replace missing or damaged fitting parts.

D. Retesting Criteria

Test any replacement buckle, zipper, or fitting as specified in section C.

E. Cleaning Procedures

1. Nylon outer bag.
 - a. Allow mud and loose dirt to dry; remove with a stiff-bristle brush. If stains remain, clean as recommended in E.1.b.
 - b. To remove heavy oil, as well as dirt and stains, soak in water-soluble biodegradable degreaser for 30 minutes and brush with a bristle brush. Rinse thoroughly and hang to dry.
 - c. Pretreat by spraying water-soluble biodegradable degreaser on bag, high-pressure wash, and hang to dry.
DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.

F. Repackaging

Suggested carton is 18 inch by 15 inch by 10 inch (NSN 8115-00-190-5007). Package printed instruction information and parts list with bag.

G. Storage and Shelf Life Checks

None at this time.

See appendix K for information on water-soluble biodegradable degreasers.

ITEM: BATTERY FOR HAND-HELD RADIOS

**NFES #0293, #1203, #1231,
#1255, #1264, #1520, #1538**

A. Initial Inspection/Disposal Criteria

Established by the National Radio Cache, Boise, ID, March 2, 1990.

1. Visual inspection of package—if package opened, return credit will not be given.
2. Batteries may be used by the agency ordering the batteries if package opened.
3. All unopened boxes of batteries that have not reached their expiration date will be returned for credit.

B. Tests

None at this time.

C. Refurbishing Procedures

None at this time.

D. Retesting Criteria

None at this time.

E. Cleaning Procedures

None at this time.

F. Repackaging

None at this time.

G. Storage and Shelf Life Checks

Not to exceed expiration date.

Storage and Refurbishing Standards

BERM, CONTAINMENT, 55 GAL. (1 to 4 drums)
BERM, CONTAINMENT, MK III

NFES #0692
NFES #0693

A. Initial Inspection/Disposal Criteria

1. Check for fuel or other liquids which may be present.
 - a. Use absorbent cloth or similar to pick up excess fluids.
 - b. Dispose of soiled absorbent according to local hazardous materials standards.
2. Check for small holes, rips or tears which may be repairable.
 - a. Mark with felt tip pen or other means of identification.

B. Tests

None.

C. Refurbishing Procedures

1. Clean and repair as stated in SEI Industries Guidelines For Use and Repair.
2. See section F.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean with steam cleaner/power washer to remove matter such as mud, dirt, and grease.
2. Use a solution of water-soluble biodegradable degreaser and water to remove grease with an absorbent cloth. Dispose of saturated cloth according local hazardous materials standards.

F. Repackaging

1. Roll berm and band for storage.
2. Store in a dry environment.

G. Storage and Shelf Life Checks

None at this time.

More information:
Mulligan & Associates
P.O. Box 819
Canby, OR 97013
Phone: 503-239-2311

SFI Industries
7400 Wilson Avenue
Delta, BC, Canada V4G 1F5
Phone: 604-946-3131
Web site: <http://www.sei-ind.com>

See appendix K for information on water-soluble biodegradable degreasers.

ITEM: BLANKET, WOOL

NFES #0441

A. Initial Inspection/Disposal Criteria

1. Check for visible rips, burns, or tears.
2. Check for possible mildew.

B. Tests

None.

C Refurbishing Procedures

1. To be DRY CLEANED ONLY.
2. Have small rips or holes sewn by laundry (up to 1-inch rip or hole).

D. Retesting Criteria

None.

E. Cleaning Procedures

Wool blankets must be DRY CLEANED ONLY.

F. Repackaging

1. Individually pack in plastic if possible.
2. Pack 15 each in carton NFES #0644 (33 inch by 16 inch by 22 inch) (NSN 8115-00-139-00691).

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: BUCKET, HELICOPTER, FIBERGLASS OR SLINGABLE (COLLAPSIBLE)

**NFES #0157, #6011
#6012, #6013**

A. Initial Inspection/Disposal Criteria

1. Inspect visually for missing parts (fill caps, etc.)
2. Inspect for structural damage that prevents repair—dispose (salvage usable parts).
3. Inspect, if used, to ensure serviceability.
4. Clean and forward to qualified inspector.

B. Tests

1. Tests conducted on specific bucket are by certified inspectors.
2. On NFES #6012 inspector is manufacturer:

SEI Industries
7400 Wilson Avenue
Delta, BC, Canada V4G 1E5
Phone: 604-946-3131

Manufacturer's authorized U.S. overhaul facility: (NFES #6012)
Field Support Services
2001 Flightway Drive
Atlanta, Georgia 30341
Phone: 770-454-1130

3. On other buckets, area inspectors can be used, such as:

Aero Accessory Service
612 S. Scott
Boise, Idaho 83705
Phone: 208-344-6461

C. Refurbishing Procedures

Completed in sections A and B.

D. Retesting Criteria

Completed in section B.

E. Cleaning Procedures

Completed in section A.

F. Repackaging

Local cache options.

G. Storage and Shelf Life Checks

None at this time.

ITEM: CAN, GASOLINE, SAFETY, 5 GAL. DOT, OSHA APPROVED STYLE

NFES # 0606

A. Initial inspection/Disposal Criteria

1. Check for fuel and dispose of properly.
2. See appendix F.

NOTE: Dispose of contaminated fuel according to hazardous material regulations in your area.

3. Check for leaks or separation along seams.
4. Check all threads on nozzles for serviceability.
5. Check for proper labeling.
6. Check all cotter keys and pins.

B. Tests

1. Visible checks only.
2. Dispose of unserviceable cans.

C. Refurbishing Procedures

1. Drain all existing fuel.
2. Turn upside down with lids off or open to dry.
3. Replace any defective cotter key or pins.
4. Check spring closure devices to be sure they are functioning properly.
5. Secure proper spout to top of can (3/4 inch on old style and 1 inch on new style).
6. Visually verify that no rust exists inside container.
7. Wipe down outside of container and repaint if necessary.
8. Purge can.
9. Ensure that containers are properly marked and labeled flammable liquids only.

D. Retesting Criteria

None.

E. Cleaning Procedures

See section C.

F. Repackaging

Package according to DOT standards.

G. Storage and Shelf Life Checks

Annual visual inspection for rust.

Replacement parts available from:

SAFE-T-WAY
National Sales Office
P.O. Box 1188
Salem, OH. 44460

Phone: 330-332-3200

Fax: 330-332-2340

Fax order entry: 800-721-7216

Web site: <http://www.safetway.thomasregister.com/>

Storage and Refurbishing Standards

**ITEM: CAN, GAS, VARIOUS
CONTAINER, FUEL/OIL**

**NFES #0085, #0265, #0350,
#0741, #1175, #1290, #1291**

A. Initial Inspection/Disposal Criteria

1. Check for fuel and dispose of properly.

NOTE: Dispose of contaminated fuel according to hazardous material regulations in your area.

2. Check for leaks or separation along seams.
3. Check all threads on nozzles for serviceability.

B. Tests

1. Visual checks only.
2. Dispose of unserviceable cans including those with unidentifiable contents.

C. Refurbishing Procedures

1. Drain all existing fuel.
2. Use a rag and air hose to dry the interior of the container.
3. Turn upside down with lids off or open to dry.
4. Inspect vent hole to ensure it is clean and serviceable.
5. Visually verify that no rust exists inside container.
6. Wipe down outside of container and repaint if necessary.
7. Purge can.

D. Retesting Criteria

None.

E. Cleaning Procedures

See section C.

F. Repackaging

Local cache option.

G. Storage and Shelf Life Checks

Annual visual inspection for rust.

ITEM: CASE, CARRYING, FIRE SHELTER, M-2002

NFES #0927

A. Initial Inspection/Disposal Criteria

1. The M-2002 Fire Shelter Carrying Case is royal blue in color with white markings.
2. Inspect for cuts, tears, torn seams or flap. If any found that are unrepairable, remove from service.
3. Ensure that M-2002 use instructions (English on one side, Spanish on the other) are in the Use Instructions pocket on the front.
4. Check that there are two belt clips and that they are in good working condition.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on the available repair facilities.

B. Tests

None.

C. Refurbishing Procedures

1. If necessary, replace Use Instructions with M-2002 Use Instructions English on one side, Spanish on the other.
2. If necessary, replace belt clips.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Allow any mud and loose dirt to dry, then remove with a stiff brush.
2. Remove light oil using a solution of warm water and detergent and a brush. Rinse with clear water, let dry.
3. Remove heavy oil with a water-soluble biodegradable degreaser; brush with spray cleaners or detergent and water solution; rinse with clear water and let dry.
4. Or steam clean and let dry.
5. Do not machine wash or dry.

F. Repackaging

If not part of the Fire Shelter, Complete, M-2002, pack 100 carrying cases in a commercial carton, Style RSC, Type CF, class domestic, grade 275, sized to fit.

G. Storage and Shelf Life Checks

None.

Storage and Refurbishing Standards

ITEM: CASE, CARRYING, FIRE SHELTER, PRACTICE, M-2002

NFES #2680

A. Initial Inspection/Disposal Criteria

1. The M-2002 Practice Fire Shelter Carrying Case is orange in color.
2. Inspect for cuts, tears, torn seams or flap. If any found that are unrepairable, remove from service.
3. Ensure that a M-2002 use instruction sheet and a folding instructions sheet are in the Use Instructions pocket on the front.
4. Check that there are two belt clips and that they are in good working condition.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on the available repair facilities.

B. Tests

None.

C. Refurbishing Procedures

1. If necessary, replace Use Instructions with M-2002 Use Instructions, English on one side, Spanish on the other.
2. If necessary, replace Folding Instructions with M-2002 Folding Instructions.
3. If necessary, replace belt clips.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Allow any mud and loose dirt to dry, then remove with a stiff brush.
2. Remove light oil using a solution of warm water and detergent and a brush. Rinse with clear water, let dry.
3. Remove heavy oil with a water-soluble biodegradable degreaser, brush with spray cleaners or detergent and water solution, rinse with clear water and let dry; or steam clean and let dry.
6. Do not machine wash or dry.

F. Repackaging

If not part of the Practice Fire Shelter, Complete, M-2002, pack 100 carrying cases in a commercial carton, Style RSC, Type CF, class domestic, grade 275, sized to fit.

G. Storage and Shelf Life Checks

None.

ITEM: CHAIN SAW

NFES #0159

A. Initial Inspection/Disposal Criteria

Check Local Job Hazard Analysis for proper personnel protection equipment required when working on this item.

1. Evidence of use (dust, oil, fuel and starter seal broken).
2. Return to stock if not used and run within the last 12 months.
3. Evidence of damage.
4. Check and remark/replace accountable property tags if necessary.

B. Tests

NOTE: See Refurbishing Procedures (section C).

1. Repair to recommended manufacturer's standards using local repair procedures.
2. Test for performance.
3. Drain fuel and purge.
4. Tie off starter rope to handle to determine field use. Use plastic snap seal.
5. Dispose of according to local policies if saw is not economically repairable.

C. Refurbishing Procedures

1. Refurbish to manufacturer's specifications and tolerances.
2. Check for broken seal to verify that saw was used, even if seal is intact, look for exterior damage. If used, disassemble and clean complete saw, removing chain, bar, sprocket cover, sprocket, clutch drum clutch, worm gear, air filter cover, air filter, cylinder cover, sparkplug, starter cover, pawls, rope rotor, and muffler.
3. Clean all parts, inspecting each part as reassembling.
4. Filters should be cleaned with warm soap and water. New filter material (flocking) degrades quickly with solvent washing. Replace if holes appear in flocking.
5. Replace sparkplug if there are any doubts. Inspect sparkplug boot and high-tension lead.
6. Lubricate starter spring. Check rope for fraying. Replace if frayed.
7. Clean muffler of excess carbon. Check spark arrestor screen for build up. Bead blast and repair if necessary.
8. Replace sprocket or star drum if the wear is deep enough to catch a fingernail.
9. Sharpen chain, using manufacturer's procedures after each use. Check and adjust raker depth with a depth gauge regularly. Replace chain if: cutters are of unequal length on opposing sides; two or more cutters are broken; tiestraps are worn down to rivets; if stretched beyond tensioning abilities; or when side plate is filed back to rear attaching rivet.
10. Service bar after each use. Check groove depth and width; true and file rails; and check for bends. Replace if rails are cracked, chipped, burned, or have a dip deeper than 1/16 inch. Check sprocket tip for wear and looseness. Lubricate tip if grease type.
11. Inspect clutch shoes and springs. Replace if burned or missing. Replace clutch drum if badly burned (discolored).
12. Test run. Set oiler to full open and check function, test brake function. Set RMS's with a digital tach, between 12,500 and 13,000 (or manufacturer's specifications). Make a test cut.
13. If saw runs properly, purge fuel, wipe sawdust and oil off saw, seal starter rope, and tag it with the date and a signature.
14. If a problem is exposed on run-up, use Stihl 15-minute engine analysis to troubleshoot.

D. Retesting Criteria

Completed in section B.

E. Cleaning Procedures

Completed in sections B and C.

Storage and Refurbishing Standards

F. Repacking

1. Place bar cover over chain saw bar for safety.
2. If packaged in kit form, assemble in carton NFES #0353 with other component items.

G. Storage and Shelf Life Checks

Retest annually when used.

ITEM: CHAPS, PROTECTIVE

**NFES #0044, #0045
#0078, #0150**

A. Initial Inspection/Disposal Criteria

1. Fabric and webbing.
 - a. Any hole, cut, tear, or burn that cannot be repaired economically.
 - b. Any area of abrasion that has weakened fabric beyond repair.
 - c. Any webbing that is cut, burned, or abraded beyond economical repair.
 - d. Either leg has more than five patches.
 - e. Any cut exceeds 7 inches.
 - f. All layers have been cut through.
2. Hardware.

Check all plastic and metal hardware for dirt, cracks, breaks, and proper function. See section B.

NOTE: The cache manager shall determine when repair is economical. This decision will be based on available repair facilities.

B. Tests

- See appendix A.
- Test hardware by fastening and unfastening. The hardware should function easily with little force being applied and no difficulty in the release.

C. Refurbishing Procedures

1. Repair burn holes and cuts. Repair techniques vary depending on whether damage is restricted to the outer layer of green nylon duck or involves the yellow Kevlar also. If only the nylon is burned or cut through, hand stitch this folded edge to the nylon. When hand stitching the patch to the nylon, ensure no stitches are sewn into the Kevlar. Deeper cuts that involve the Kevlar material must be repaired with a patch equal to the number of layers cut and must be machine sewn. If three layers are cut, the patch must contain these three layers. Make the patch large enough to extend 1-inch beyond the damaged area. Insert the patch under the nylon, then sew on all four sides and along the cut in the nylon shell. Obtain patch materials from a pair of previously damaged chaps.
2. Replace burned, abraded, or cut webbing with like items.
3. Replace broken or nonfunctioning hardware.
4. Reference: Inspection and Repairing Your Chainsaw Chaps, MTDC Publication 8267 2505.

D. Retesting Criteria

Retest all replaced hardware as specified in section B.

E. Cleaning Procedures

1. Allow any mud or loose dirt to dry, then remove using a stiff-bristle brush. If stains remain, wash as recommended below.
2. Clean to remove heavy oil, as well as dirt and stains. Soak in a water-soluble biodegradable degreaser for 30 minutes. Brush with a bristle brush, rinse thoroughly, and hang to dry.
3. Or pretreat with a water-soluble biodegradable degreaser, pressure wash, and hang to dry.
DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.

F. Repackaging

Recommended carton is 16 inch by 14 inch by 12 inch (NSN 8115-00-183-9484). Pack 10 pair of chaps of the same size in carton and label with proper NFES label.

G. Storage and Shelf Life Checks

None at this time.

See appendix K for information on water-soluble biodegradable degreasers.

ITEM: CHEST HARNESS, FIRE SHELTER

NFES #0294

A. Initial Inspection/Disposal Criteria

1. Webbing.
 - a. Any webbing that has been cut, torn, frayed, or burned beyond economical repair.
 - b. Any area of abrasion that has weakened the webbing beyond repair.
2. Hardware
Check all plastic hardware for cracks, breaks, and proper function (see section B).

NOTE: The cache manager shall determine when repair is economical. This decision will depend on the available repair facilities.

B. Tests

Test hardware by fastening and unfastening. The hardware should function easily with little force and difficulty in opening and closing.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, and/or burns.
2. Replace damaged hardware.

D. Retesting Criteria

Retest as specified in section B.

E. Cleaning Procedures

1. Allow any mud and loose dirt to dry; remove with a stiff brush.
2. Remove light oil by spraying with a water-soluble biodegradable degreaser, power wash or scrub with a stiff brush, and hang to let dry.
3. Remove heavy oil by soaking in water-soluble biodegradable degreaser, power wash, and hang to dry.

Do not machine wash or dry.

F. Repackaging

Pack 20 chest harnesses in (carton to be determined).

G. Storage and Shelf Life Checks

None at this time.

See appendix K for information on water-soluble biodegradable degreasers.

ITEM: CONNECTOR, PIGTAIL

NFES #0398

A. Initial Inspection/Disposal Criteria

1. Inspect wire and connections for damage.
2. Broken wires (electrical cord).
3. Bent or distorted electrical connections.
4. Cuts, tears or frayed electrical wires.

B. Tests

Check electrical connections per drawing FS/OAS A-16 accessory connector pin assignments: simplex helitorch, bambi bucket, remote hook, and seeders (2-wire). Electrical pin connections can be checked per the above drawing with an ohmmeter.

C. Refurbishing Procedures

Repair if economically feasible.

D. Retesting Criteria

See section B.

E. Cleaning Procedures

Clean electrical connections with electrical cleaner, wipe, or blow dry.

F. Repackaging

Local cache option.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: CORD, MULTI-LIGHT SOCKETS

NFES #0563

A. Initial Inspection/Disposal Criteria

1. Bent or missing bulb guards.
2. Missing or broken bulbs.
3. Bent plug.
4. Dispose of if:
 - a. Cracked and/or broken light sockets.
 - b. Broken plugs (deliberate alterations).
 - c. Broken, frayed, or burned cords.
5. Validate cord is a UL approved with a 12/3 gauge minimum wire.

B. Tests

1. Install new bulbs in all sockets.
2. Plug into 110-volt outlet.
3. Test cord with a Ground Fault Interrupter (GFI) testing device.
4. Test 110-volt outlet first, then plug cord into outlet and check cord by plugging GFI testing device into end of cord.

C. Refurbishing Procedures

1. Replace blown and/or broken bulbs.
2. Replace missing bulb guards.

D. Retesting Criteria

Retest if bulbs were replaced.

E. Cleaning Procedures

1. Damp wipe with mild detergent solution to remove mud, dirt, and grease.
2. Clean guards with soapy water, brush, and scouring pad.
3. Do NOT soak.
4. Dry completely before use (due to possible electric shock).

F. Repackaging

Local cache option for coiling and repacking.

G. Storage and Shelf Life Checks

None at this time.

ITEM: CORDS, EXTENSION, 3 WIRE

NFES #0560, #1172

A. Initial Inspection/Disposal Criteria

1. Visually inspect for broken plugs, cracked, or damaged cord.
2. Discard field modified cords if not economically feasible to repair.
3. Ensure that neutral grounding prong is intact.
4. Validate cord is a UL approved with a 12/3 gauge minimum wire.

B. Tests

Test cord with a Ground Fault Interrupter (GFI) testing device. Test 110-volt outlet first, then plug cord into outlet and check cord by plugging GFI testing device into end of cord.

C. Refurbishing Procedures

Wipe down cord with damp cloth to remove foreign material.

D. Retesting Criteria

Check visually before issue to ensure that damage has not occurred during storage or that someone possibly placed a defective cord in storage location.

E. Cleaning Procedures

Completed in section C.

F. Repackaging

1. Rollup cord (approximately 12- to 14-inch loop). Tie off with wire ties or strappex banding (minimum of 1 per cord).
2. Tag cord with proper NFES number and nomenclature.
3. Repack in carton 18 inch by 15 inch by 5 inch (NSN 8115-00-290-3386).
 - a. NFES #0560-3 each per carton.
 - b. NFES #1172-2 each per carton.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: COT, FOLDING

NFES #0053

A. Initial Inspection/Disposal Criteria

1. Visually inspect for tears in cover, soiled cover, missing parts, and loose nuts and bolts.
2. Structural damage to frame.
3. Broken wooden framed cots—dispose (salvage usable parts when feasible).

B. Tests

Assemble to check for weakness or nonvisual damage.

C. Refurbishing Procedures

1. If cover is torn or its seam is separated, replace the cover. See parts list section C.4.a.
2. Replace damaged rail-rubbing pieces. See parts list section C.4.b.
3. If plug for cot ends are missing replace them with the appropriate plug. See parts list, section C.4.c, d, e.
4. Parts list for cot parts available from Department of Defense-S9I.
 - a. Cover, Nylon 7105-00-935-1845.
 - b. Rail End Tubing 7105-00-935-0424.
 - c. Plug (Dowel) 7105-00-935-0433.
 - d. Plug (Spacing) 7105-00-935-0344.
 - e. Plug (End) 7105-00-935-0435.
5. Soiled covers can be steam cleaned and left to dry. Assemble cot before steam cleaning covers.

D. Retesting Criteria

Reassemble to ensure completeness and all parts fitting properly.

E. Cleaning Procedures

Completed in section C.

F. Repackaging

1. Refold and seal with nylon tie wrap or band. When it is returned from the next incident, visual inspection can readily determine if it is used. If still sealed, it will not need rechecking.
2. Local cache option for repackaging.

G. Storage and Shelf Life Checks

None at this time.

ITEM: COUPLINGS

NFES #0710, #0855, #0856
#0857, #0916

A. Initial Inspection/Disposal Criteria

1. Visual checks on male couplings.
 - a. Check for worn or damaged threads.
 - b. Check coupling to ensure it has not been smashed, bent, or cracked.
 - c. Ensure that rocker lugs are not stripped.
2. Visual checks on female couplings.
 - a. Check for worn or damaged threads.
 - b. Check coupling to ensure it has not been smashed, bent, or cracked.
 - c. Check for gaskets.
 - d. Ensure that swivel operates properly.
 - e. Ensure that rocker lugs are not stripped.

B. Tests

1. Male coupling.

Attach to female coupling to ensure that threads operate smoothly.
2. Female coupling.

Ensure that threads operate smoothly.

C. Refurbishing Procedures

1. Male coupling.
 - a. If threads are damaged, try to file with a triangular file.
2. Female coupling.
 - a. Replace gaskets if necessary.
 - b. Lubricate with a dry lubricant, i.e., graphite.

D. Retesting Criteria

1. Recheck male threads that have been repaired or “chased.”

E. Cleaning Procedures

1. Wash and clean of mud, dirt, and grease.
2. Clean in parts washer, high pressure wash or clean in sink with dishwashing detergent with a brush or scouring pad.
3. Rinse thoroughly and let dry.

F. Repackaging

- Package 10 each in carton (cache option) and label accordingly.
Package 60 each in carton (cache option) and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

**ITEM: EXTINGUISHER, FIRE, DRY CHEMICAL 20 POUND
EXTINGUISHER, FIRE, DRY CHEMICAL 10 POUND
EXTINGUISHER, FIRE DRY CHEMICAL 2-B:C
EXTINGUISHER, FIRE DRY CHEMICAL 5 POUND**

**NFES #0307
NFES #0319
NFES #1033
NFES #2143**

A. Initial Inspection/Disposal Criteria

1. Visual inspection indicating use (discharge).
2. Check for missing parts.
 - a. Safety pin.
 - b. Inspection card.

B. Tests

1. Testing and filling performed by authorized service representatives only.

C. Refurbishing Procedures

1. Verify expiration date and signature of authorized service representative.
2. Clean extinguisher with damp rag to remove dust, dirt, and grime. Completed in sections A and B.

D. Retesting Criteria

Completed in section B.

E. Cleaning Procedures

Completed in section B.

F. Repackaging

- NFES #0307 Package 1 each in carton NFES #0385 to prevent accidental discharge of extinguisher.
- NFES #0319 Package 1 each in carton (cache option) to prevent accidental discharge of extinguisher.
- NFES #1033 Package 1 each in carton (cache option) to prevent accidental discharge of extinguisher.
- NFES #2143 Package 1 each in carton (cache option) to prevent accidental discharge of extinguisher.

G. Storage and Shelf Life Checks

Yearly inspection by authorized service representative.

ITEM: FENCE, BARRICADE, PLASTIC, 4' X 50' ROLL

NFES #0608

A. Initial Inspection/Disposal Criteria

1. Check for damage.
2. Check for length.
3. Check for grease, oil, or paint.

B. Tests

Measure to ensure that length is 50 feet. If short, splice as required.

C. Refurbishing Procedures

Replace damage barricade section by splicing. Splice using small cable ties or small hog rings one top, one bottom, and one every 6 inches to ensure splice security; only one splice for each barricade fence.

D. Retesting Criteria

Measure to ensure that the roll is 50 feet.

E. Cleaning Procedures

Clean with high-pressure wash; or clean in sink with dishwashing detergent using a brush or scouring pad.

F. Repackaging

Reroll and secure. Store as needed.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: FIRELINE PACK, COMPLETE

NFES #0674

A. Initial Inspection/Disposal Criteria

1. The Fireline pack with canteen case and stuff sack is royal blue in color with white markings.
2. Inspect for cuts, tears, torn seams or flaps. Work the zippers on the cap for proper operation. Check that there are cord locks in place for both side pockets, the top rain skirt, and on the stuff sack, and that all cords are serviceable. If any are found that are unrepairable, remove from service.
3. Check that all buckles are complete and serviceable. Replace any that are not.
4. Check that there are two belt clips on the canteen case and that they are in good working condition.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on the available repair facilities.

B. Tests

None.

C. Refurbishing Procedures

1. If necessary, replace belt clips, cords, cord locks, and buckles.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Allow any mud and loose dirt to dry, then remove with a stiff brush.
2. Remove light oil using a solution of warm water and detergent and a brush. Rinse with clear water, let dry.
3. Remove heavy oil with a water-soluble biodegradable degreaser; brush with spray cleaners or detergent and water solution; rinse with clear water and let dry.
4. Or steam clean and let dry.
5. Do not machine wash or dry.

F. Repackaging

Insert 1 blue canteen case and blue stuff sack into main compartment. Close all buckles, secure the shoulder yoke. Pack 20 packs per box.

G. Storage and Shelf Life Checks

None.

ITEM: FLIGHT SUIT

**NFES #0501, #0507, #0508, #0509
#0514, #0517, #0518, #0519
#0521, #0525, #0527, #0539
#0545, #0546, #0547, #0548
#0567, #0572, #0574, #0576**

A. Initial Inspection/Disposal Criteria

1. Any holes, cuts, tears, burns, or torn seams that cannot be repaired economically.
2. Any hook and pile fastener missing or that does not provide adequate closure.
3. Any zipper broken or missing a slider.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Open and close the hook and pile fasteners to ensure they provide an adequate and secure closure.
2. Open and close zipper to ensure smooth operation and a secure closure.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, burns, and torn seams by darning, patching, or by duplicating original construction (see note in section A).
2. Replace damaged hook and pile fastener tape, with tape of the same length, width, and quality as the original (see note in section A).
3. Replace damaged zippers with the same type, length, and quality as the original (see note in section A).
4. Use Nomex® (Aramid) thread and Nomex® (Aramid) materials for all repairs.

D. Retesting Criteria

Test all replacement hook and pile fasteners and zippers after sewing in place, as specified in section B.

E. Cleaning Procedures

See appendix B.

1. Follow the cleaning procedures described in the publication, Nomex®- Aramid -Laundering Guide (2197). The publication can be obtained by calling DuPont at 1-800-453-8527 or by writing:

DuPont Company
Aramid Inquiry Center
Chestnut Run Plaza
Laurel Run Building
Wilmington, DE 19880-0705

2. Washing procedures from above publication:
 - a. "Tests show that (commercial and industrial detergent) formulations designed for use at a temperature of 140 °F (60 °C) or less, adequately clean NOMEX® and provide the best fabric color retention.
 - b. "Garments of NOMEX® must be adequately rinsed to remove residual wash chemicals.
 - c. "In some instances, tumble dry conditioning is the only finishing necessary for garments of NOMEX®."
3. In addition to these guidelines:
 - a. Select temperatures to maintain color fastness, except as necessary to clean heavily soiled items.
 - b. The use of commercial cold-water process may be used in remote field locations as necessary.
 - c. Garments heavily soiled with petroleum products may require dry-cleaning with perchloroethylene.

Storage and Refurbishing Standards

F. Repackaging

1. Close zipper and pocket flaps. With inseams meeting, fold flight suit lengthwise toward the collar.
2. Repack per local cache options. Standard pack is 20 each (same size) in carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: FLY, SUNSCREEN, 20' x 20' W/GUY ROPES

NFES #6131

A. Initial Inspection/Disposal Criteria

1. Nonstandard item.
2. Rips and tears (uneconomical to repair).
3. Stained with petroleum products.
4. Mildew present.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests.

None

C. Refurbishing Procedures

1. Completely unfold fly on clean, dry floor or work area so that any defects (tears, burns, mildew, etc.) will be visible.
2. Sweep off entire fly with stiff-bristle broom.
3. Power wash if needed
4. Dry fly at this time if necessary.
5. Repair any rips, tears, or any other defects at this time (if possible). If repairs cannot be made easily and cost effectively, continue to clean fly and tag it for repair. Replace missing or damaged guy ropes with 25 foot by 1/4 inch manila rope w/ sliders.
6. Replace missing grommets with 5/8-inch brass grommets.

D. Retest Criteria.

None.

E. Cleaning Procedures

See section C.

F. Repackaging

1. Utilize flat, clean surface greater than 20 foot by 20 foot. Fold lengthwise once, fold lengthwise again, sweep after each fold until fly is in a neat, tight package approximately 16 inch by 24 inch.
2. Secure fly with 1/4 inch manila or similar rope. Use carton NFES #2006 (NSN 8115-00-139-0722), or band.
3. Tag finished product with proper NFES # and nomenclature.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: FLY, TENT, TYPE II, 9' x 10'

NFES #1521

A. Initial Inspection/Disposal Criteria

1. Nonstandard item.
2. Rips and tears.
3. Mold or mildew.
4. Missing or loose grommets.

B. Tests

None.

C. Refurbishing Procedures

1. Wash with soapy water and rinse with clean water (use a mild degreasing soap) or high-pressure wash.
2. Air dry.
3. Replace missing or damaged grommets.
 - a. Ridge grommets are number 4 spur, brass.
 - b. Guy line grommets are number 2 spur, brass.
4. Repair rips and tears.

D. Retesting Criteria

None

F. Cleaning Procedures

1. Wash with water and mild degreaser detergent.
2. Rinse to remove all soap residue.
3. Air dry.

F. Repackaging

Package 20 each in carton (cache option) and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

ITEM: FLY, TENT, 16" X 24" W/GUY ROPES
FLY, TENT, KIT, 16' X 24' W/GUY ROPES

NFES #0070, #0960

A. Initial Inspection/Disposal Criteria

1. Nonstandard item.
2. Rips and tears (uneconomical to repair).
3. Stained with petroleum products.
4. Mildew present.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

None.

C. Refurbishing Procedures

1. Completely unfold fly on clean, dry floor or work area so that any defects (tears, burns, mildew, etc.) will be visible.
2. Sweep off entire fly with stiff-bristle broom.
3. Power wash if needed.
4. Dry fly at this time if necessary.
5. Repair any rips, tears, or any other defects at this time (if possible). If repairs cannot be made easily and cost effectively, continue to clean fly and tag it for repair. Replace missing or damaged guy ropes with 25 foot by 1/4 inch manila rope with sliders.
6. Replace missing grommets with 5/8-inch brass grommets.

D. Retest Criteria

None.

E. Cleaning Procedures

See section C.

F. Repackaging

1. Utilize flat, clean surface greater than 20 foot by 20 foot. Fold lengthwise once, fold lengthwise again, sweep after each fold until fly is in a neat, tight package approximately 16 inch by 24 inch.
2. Secure fly with 1/4 inch manila or similar rope. Use carton NFES #2006 (NSN 8115-00-139-0722), or band.
3. Tag finished product with proper NFES # and nomenclature.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: FOOD, MEALS, READY-TO-EAT (MRE)

NFES #1842

A. Initial Inspection/Disposal Criteria

1. Receipt inspection: Verify shipping container for marking of MRE meals. The container must show the following data.

NSN (Military Stock Number)

Item Nomenclature

Wt. _____ Cu _____

Contract No. _____ Lot No. _____

Name and Address of Ration Assembly Contractor

Date packed

ITD Inspection test date

Subsistence Symbol

2. Disposal of MRE Meals, (Ready-to-Eat) will be based on official food service inspection documentation, or based on MRE item manager disposal authority.

- a. MRE meals will be disposed of if the meal storage pouch is open.
- b. That meal will be removed from its container and rendered unusable and placed in a wet-garbage container.
- c. The water activated heater, for heating the MRE entree will be removed from the meal and held at the cache.
- d. The storage cache will advise the South Zone (SZ) Cache of the number of heating units held.
- e. SZ Cache will provide disposition instruction for MRE heating unit.

B. Tests

None. Requires food service inspection.

C. Refurbishing Procedures

See appendix C.

None. Dispose of all loose, partial, or open MRE meals, and all unmarked MRE meals, and MRE meals in unmarked shipping containers, i.e., not in original shipping containers.

D. Retesting Criteria

Inspect container for proper marking, look for container damage, look for insect or rodent damage, look for product leakage and foul odor. If damage found follow section A. Mark case/pallet with next inspection test date if no damage found.

E. Cleaning Procedures

Dust case, look for damage as noted in section D.

F. Repackaging

Label appropriately and store accordingly.

G. Storage and Shelf Life Checks

Ensure that shelf life records for MRE cache stock are maintained. The inspection date is established at time of cache receipt.

Ensure that pallets and loose cases are marked with the next inspection test date.

ITEM: GENERATOR, GASOLINE ENGINE 3 to 6 KW

NFES #0709

A. Initial Inspection/Disposal Criteria

1. Inspect generator for any obvious damage to body, frame, or shock absorbing system.
2. Inspect for oil leaks, dirty air filters, and condition of spark plug.

B. Tests

1. Check oil level, fuel level, condition of gas and oil, and condition of spark plug and air filter. Do this before starting.
2. See operator's manual for specified generator. Start generator; look for items that need repair.
 - a. Engine smoking, running rough, missing.
 - b. Not starting.
 - c. Leaking fuel lines.
3. Turn on generator.
 - a. Check voltage output using test meter.
 - b. Plug in an electric tool to check the generator under load.

SAFETY NOTES:

1. Ensure that generator is grounded properly to prevent electrical shock.
2. Attach noise label on generator to warn operator.
3. Do not fuel generator when hot. Watch out for hot mufflers.
4. Check operation of Ground Fault Interrupter (GFI).
5. Check to be sure there is a 12-gauge GET at generator.

C. Refurbishing Procedures

A generator should be able to run properly and put out the proper amount of voltage (see operator's manual). If the generator does not meet this criteria, refer to the operator's manual and troubleshooting guide, or send it out to a local repair shop to be repaired. Ensure that the shop has the operator's manual and troubleshooting guide.

D. Retesting Criteria

1. Start generator to make sure it is operating properly.
2. Use a test meter to check for proper voltage output.

E. Cleaning Procedures

Clean off dirt and oil (using degreaser if necessary). Allow generator to dry.

F. Repackaging

1. Drain fuel from tank and fuel lines.
2. Purge gas tank using NFES #0700 Purge.
3. Ensure that all identification is on the generator: Property No's, Serial No's, Cache Identification.
4. Tie off starter rope to handle to determine field use. Use plastic snap seal.

G. Storage and Shelf Life Checks

Shelf life checks should be made once or twice a year to ensure proper operating conditions. This is necessary if they are not shipped out during the year.

Storage and Refurbishing Standards

ITEM: HEADLAMP, 4-CELL "AA"

NFES #0713

A. Initial Inspection/Disposal Criteria

1. Broken wires.
2. Rust or corrosion on any metal part.
3. Cracked case or lens cover.

B. Tests

1. Test unit with new batteries.
2. Test both bulbs; if defective, replace.
3. Test elasticity of headband; if defective, replace.
4. If cracks in insulation are less than 3 inches from termination point, cut out bad section and rewire or throw away.

C. Refurbishing Procedures

NFES #0713 Check battery adapter type and replace with one of the same kind (9-volt battery configuration or battery with contacts on outer part of adapter).

1. Install test batteries.
2. Test and clean entire unit, install new bulbs and headband if required.
3. Remove test batteries.
4. Validate "O" rings are present in lens and battery compartment.

D. Retesting Criteria

None.

E. Cleaning Procedures

Wipe entire unit clean to include lamp housing, battery cam, and both sides of lens.

F. Repackaging

1. Package 48 individual headlamps in 20 inch by 20 inch by 20 inch carton (NSN 8115-00-428-4158).
2. **CAUTION—Do not repack units with batteries.**

G. Storage and Shelf Life Checks

None at this time.

ITEM: HEADLAMP, FIREFIGHTER'S (5 AA CELL)

NFES #0667

A. Initial Inspection/Disposal Criteria

1. Lamp head.
 - a. Lamp head should have two bulbs, one in place for use, and one inside the housing as a spare.
The computer chip inside the housing should be intact and firmly in place.
 - b. Lens/reflector should be clear, unscratched, and turn on the housing with resistance.
 - c. The housing should be free of cracks and the switch boot free of cracks or tears. The strap lugs should be intact.
 - d. The o-ring should be free of cracks and pliable.
 - e. The wire should be tight and have no cracks; the connector should be round and clean.
2. Battery pack.
 - a. Housing should free of cracks, both cap lugs and strap lugs should be present and intact.
 - b. The cap should be free of cracks, the wire tight and without defect, and the o-ring intact. The cap should fit snugly on the battery housing and lock in place. The connector plate inside the cap should be centered and free of corrosion.
 - c. The battery frame should be intact and firmly hold 5 AA batteries. The electrical connectors should mate with the connectors in the cap.
3. Helmet strap.

The helmet strap should be without tears, pliable, and hold the headlamp components.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on the available repair facilities.

B. Tests

1. Insert 5 new AA batteries into the battery frame all pointing towards the top. Insert battery frame into the battery housing. Tighten the cap, attach the lamp head, the light should go on. Press and release the lamp button, the light should either brighten or dim. Press and hold the lamp button, the light should go off.
2. Remove batteries.

C. Refurbishing Procedures

Replace components until the lamp works properly.

D. Retesting Criteria

Retest as specified in section B.

E. Cleaning Procedures

Clean headlamp with clean water.

F. Repackaging

Store 48 headlamps per carton.

G. Storage and Shelf Life Checks

Headlamps should be stored without batteries.

Replacement parts can be obtained from:
Easter Seals Greater Hartford Rehabilitation Center, Inc.
100 Deerfield Road
Windsor, CT 06095
Phone: 860-714-9500

Storage and Refurbishing Standards

**ITEM: HEATER, PROPANE, 20# TANK MOUNTED
HEATER, PROPANE, OUTDOOR, 360° RADIANT HEAT**

**NFES #6139
NFES #6187**

A. Initial Inspection/Disposal Criteria

1. Visual inspection indicating use or missing parts (guards, knobs, etc.).
2. Structural damage preventing repair—dispose (salvage usable parts).
3. Torn or cut heater element.
4. Damaged hose connections.
5. Damaged built in regulators.

B. Tests

1. Check to see if cost effective to repair.
2. Check hoses for cracks, checking for breaks by flexing.
3. Check “O” rings on supply hose and replace if needed.
4. Check for out-of-round fittings by screwing regulator into tank POL fitting.
5. Mount or install heater unit.

CAUTION: Do not check by using a match or any other type of flame.

7. When assured that there are no leaks, light heater. If heater does not ignite within 5 seconds, extinguish flame and shut off gas valve.
8. Once lit, let run for 5 minutes, cycle on/off cycle 2 to 3 times.
9. If heater fails, repair and retest.
10. Check auto shut off valve is in working condition by tipping unit over.

C. Refurbishing Procedures

1. Replace regulator if there is any damage to the regulator or threads do not properly seat.
2. Replace or straighten any damaged or bent parts.
3. Check hose or valve for foreign material that might cause a blocked line.
4. Repair or replace auto shut off valve if not working properly.
5. Replace “O” ring on feeder hose if necessary.
6. Wipe unit clean.

D. Retesting Criteria

Follow procedures in section B.

E. Cleaning Procedures

Wipe entire unit clean.

F. Repackaging

Repack in original carton if possible or pack to local cache requirements.

G. Storage and Shelf Life Checks

None at this time.

ITEM: TANK, HELIWELL 15,000 GALLON

NFES #0669

A. Initial Inspection/Disposal Criteria

1. Observe condition prior to take down or after setting unit up following manufacturer's assembly procedures.
2. Look at rim covers and inspect attached webbing.
3. Remove rim covers and inspect top of tank for abrasions or tears.
4. Look in tank for slices or holes and mark with felt pen if repairs needed.
5. Inspect panels to ensure they are not bent or misshapen and attached clips are functional.
6. Inspect turn buckles and cables for frays and buffs.

B. Tests

Verify panels close together by inspecting placement.

C. Refurbish Procedures

1. Clean interior by running hose through a 3-inch drain hole and washing with water.
2. Patch all holes.
3. Rivet rim covers if missing.
4. Straighten panels and replace clips if needed.
5. File off buffs on turn buckles.

D. Retesting Criteria

None.

E. Cleaning Procedures

Clean tank liner and panels using warm soapy water. Steamcleaning, plus brushes efficiently expedites this process.

F. Repackaging

1. Fold tank in a shape that fits under one panel. Place folded tank on provided pallet and stack panels atop tank.
2. Box other components, place on pallet, and strap down securely.

G. Storage and shelf life checks.

None.

Storage and Refurbishing Standards

**ITEM: HELMET, FLIGHT, SPH-4C, SPH-5TPL
HELMET, FLIGHT, SPH-5C**

**NFES #1314, #1315, #1214, #1215
NFES #2313, #2314, #2315**

A. Initial Inspection/Disposal Criteria

1. Visual inspection indicating use or missing parts (screws, visors, worn cords, etc.).
2. Structural damage (cracked shell, visor housing, booms, etc.).
3. Structural damage preventing repair and refurbishment (cracked helmet shell, salvage useable part and dispose of helmet shell).
4. Flight helmets must meet requirements in Instruction Memo No. 96-2006 (In reply refer to: 9400 (FA-100)).
5. See appendix D.

B. Tests

1. All testing and refurbishment will be conducted by qualified personnel.
2. Concerns and questions about flight helmet testing and refurbishment procedures may be directed to:

National Interagency Fire Center
Ramp Services
3833 S. Development Avenue
Boise, ID 83705
Phone: 208-387-5529
Fax: 208-387-5785

C. Refurbishing Procedures

1. Test avionics.
 - a. earphones.
 - b. microphone.
 - c. cord assembly.
 - d. microphone cable assembly.
2. Clean flight helmet thoroughly.
3. Replace missing or damaged parts.
4. Replace thermoplastic liner (TPL) in SPH-5 TPL only.
 - a. Size Regular NFES #3063.
 - b. Size XL- NFES #3064.
 - c. Size Small NFES #3065.

Contact address above for further information.

D. Retesting Criteria

Retest avionics if necessary.

E. Cleaning Procedures

Use general purpose cleaner. (Do not use bleach, paint remover, thinner, or acetone on flight helmet shell. It may cause damage).

F. Repackaging

Package 1 each in 12 inch by 12 inch by 12 inch carton (NSN 8115-00-079-8680).

G. Storage and Shelf Life Checks

None at this time.

ITEM: HELMET, SAFETY, PLASTIC

NFES #0109

A. Initial Inspection/Disposal Criteria

1. Cracks/chips in shell.
2. All attachment clips present (chin strap, headlamp, liner, neck and face shroud).
3. Nonremovable markings.
4. All certification labels must be present in helmet. (ANSI, etc)

B. Tests

See appendix E.

C. Refurbishing Procedures

1. Wash with soap and water and air dry.
2. Replace with new liner and new chin strap, if needed.
Bullard helmet use liner NFES #2025
Mine Safety Appliances (MSA) helmets use liner NFES #1840
3. Attach front 2 suspension clips to helmet to ensure proper fit.
4. Add or replace reflective strips.
5. Add or replace Velcro strips
 - a. Velcro strips 1 1/2 inch by 2 1/4 inch and placed at center at rear of helmet and 9 1/2 inch around curvature of helmet on each side.
 - b. The adhesive used shall be approved by the manufacturer for use on the helmet

Velcro available from:

Textrol Systems Inc.
435 Meadow Lane
Carlstadt, NJ 07072
Part #193973 (Part B-male)
Phone: 800-624-8746

D. Retesting Criteria

None.

E. Cleaning Procedures

Wash entire shell with soap and water, or high-pressure wash.

F. Repackaging

1. Pack in carton NFES #2007 (NSN 8115-00-292-0123).
2. Place 20 helmets per carton and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: HOOK, CARGO, ELECTRIC W/BRUSH GUARD

NFES #0243

A. Initial Inspection/Disposal Criteria

1. Check for structural damage.
2. Ensure safety latch is not bent.

B. Tests

No local testing is recommended.

C. Refurbishing Procedures

Repair of corrosion of the cargo hook must be authorized by an approved government maintenance inspector, FAA certified Airframe Mechanic, or FAA Repair Station.

D. Retesting Criteria

1. The hook assembly shall be functionally tested each 5 years.
2. The hook can be functionally tested by:

Aero Accessory Service
612 S. Scott
Boise, ID 83705
Phone: 208-344-6461

Field Support Services
2001 Flightway Drive
Atlanta, Georgia 30341
Phone: 770-454-1130

Boise Rigging Supply
106 West 32nd St.
Garden City, ID 83714
Phone: 208-342-8919; 800-342-7673
Fax: 208-342-8919

E. Cleaning Procedures

The hook assembly may be cleaned with hot water. A light water-displacement oil (such as WD 40) may be used to displace water on the hook assembly. Any use of degreasing products during cleaning of the hook assembly will require the hook to be lubricated in accordance with the hook manufacturer's recommendations.

F. Repackaging

Local cache option.

G. Storage and Shelf Life Checks

None at this time.

For further information on this subject, see copy of Office of Aircraft Services Memorandum, dated December 14, 1989 (or later revision) on this subject.

ITEM: HOSE ROLLER, ELECTRIC OR GAS (ELECTRIC ONLY)

NFES #0633

A. Initial Inspection/Disposal Criteria

Check local Job Hazard Analysis for proper personnel protective equipment required when checking this item.

1. Check for missing parts, foot pedal switch, cracks in frame structure power cord and motor.
2. Verify protective guards are on any and all moving parts. (i.e., pulleys, etc.).

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

Plug in and test motor and moving parts.

C. Refurbishing Procedures

1. Blow dust and dirt out of electric motor.
2. If needed wash with high-pressure washer (cover electric motor).
3. Let dry.
4. Repair cracks in frame as needed.
5. Tie-wrap power cord and control switch (foot pedal) to frame.

D. Retesting Criteria

Plug and test motor and moving parts.

E. Cleaning Procedures

Covered in section C.

F. Repackaging

None.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: HOSE ROLLER, ELECTRIC OR GAS (GAS ONLY)

NFES #0633

A. Initial Inspection/Disposal Criteria

Check local Job Hazard Analysis for proper personnel protective equipment required when checking this item.

1. Pressure wash hose roller.
2. Inspect hose roller for any obvious damage to body or frame.
3. Inspect motor for:
 - a. Oil leaks.
 - b. Dirty air filters.
 - c. Condition of spark plug.
4. Check all belts.
5. Inspect all cables and accessories.
6. Verify protective guards are on any and all moving parts (i.e., pulleys, etc.).

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Try to start engine and check for:
 - a. Hard starting.
 - b. Smoking engine.
 - c. Running rough.
 - d. Missing.
 - e. Adjust carburetor as needed to run smoothly. (Refer to the engine owner's manual and troubleshooting guide for specifications.)
2. Worn or loose belts.
3. Leaking fuel lines.
4. Worn pulleys.

C. Refurbishing Procedures

1. Engine should be properly adjusted to obtain the standard idle speed. (Refer to engine owner's manual and troubleshooting guide for proper adjustments.)
2. Replace any worn belts, worn pulleys, and fuel line if it leaks.
3. Tighten all loose belts.
4. Adjust carburetor as needed. (Refer to engine owner's manual and troubleshooting guide for specifications).
5. Drain fuel from tank and fuel line. Start engine to ensure that all gas has been run out of unit.
6. Use clean rag to rid fuel tank of any excess fuel and then purge fuel tank.
7. Ensure that all identification labels are on unit (i.e., property numbers and serial numbers on engines). If lost, reapply to unit.
8. Use plastic TY-RJP to tie off starter rope (gas units) to determine field use.
9. Lubricate wheels on hose roller.

D. Retesting Criteria

If unit has not been run in past 12 months, start hose roller and complete section C.

E. Cleaning Procedures

Clean dirt and oil off unit using a degreaser if necessary.

F. Repackaging

Place back in stock area. Tag with dated last tested.

G. Storage and Shelf Life Checks

See section D.

Refer to specific engine owner's manual and troubleshooting guide for all needed specifications on gas engine.

Storage and Refurbishing Standards

ITEM: HOSE, GARDEN, SYNTHETIC, 3/4" NH x 50'

NFES #1016

A. Initial Inspection/Disposal Criteria

1. Visually inspect for burns, cuts, damaged fittings, and gasket.
2. Recycle brass fittings from discarded hose.

B. Tests

1. Start pump.
2. Test hose at 150 psi.
3. Check hose for leaks.
4. Shut down pump.
5. Drain excess water from hose.

C. Refurbishing Procedures

Replace gasket if necessary.

D. Retesting Criteria

None required.

E. Cleaning Procedures

1. Remove excess dirt from hose.
2. Wash hose with clean water or clean water with mild detergent or high pressure wash.
3. If detergent is used, rinse with clean water.
4. Allow hose to dry thoroughly.

F. Repackaging

1. Roll hose in single-roll configuration, male fitting in center of roll.
2. Secure roll with band, string, etc.
3. Package 20 lengths in a carton 16 inch by 12 inch by 10 inch and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

ITEM: HOSE, LINED

**NFES # 0966, #0967
#1238, #1239**

A. Initial Inspection/Disposal Criteria

1. Segregate by NFES number.
2. Check for obvious burns, cuts, damaged couplings, worn or defective gaskets.

B. Tests

1. Replace gasket if necessary.
2. Connect female end of hose to pump or manifold (confirm not out of round and no damaged threads). All 1 1/2-inch hose should be NH threads. All 1-inch hose should be NPSH threads
3. See current edition of Water Handling Guide for hose testing procedures.
4. When hose is under pressure, walk the length of hose checking for the following which will indicate a need for repair or disposal: leaks between hose and couplings, and at swivel portion of female coupling.
5. Pressure Test
 - a. Start pump.
 - b. Make sure nozzles are open. Let all air escape from hose. Shut nozzles.
 - c. Time for 3 minutes after reaching 250 psi.
 - d. Walk the length of the hose looking for burns or cuts.
 - e. Test for 3 minutes, turn off pump water.
 - f. Female and male couplings.
 - (1) Check for leaks where hose goes into coupling.
 - (2) Check for crooked coupling (easier to see when hose is charged).
 - g. Remove hose.
 - h. Stretch out good hose to drain.

C. Refurbishing Procedures

1. Refurbished hose shall result in lengths that are a minimum of 90 percent of original length.
2. Good couplings shall be salvaged from discarded hose.
3. Recoupling procedures.
 - a. Remove old expansion ring and coupling from hose.
 - b. Remove unserviceable portion of hose, squaring end to be recoupled.
 - c. Utilize expander machine to insert new expander and coupling. Follow specific machine operating instructions.
4. Refurbished hose shall result in hoses that are 90 to 100 foot in length.

D. Retesting Criteria

1. None required unless recoupling has occurred.
2. Following recoupling, follow test procedures as outlined in section B.5.

E. Cleaning procedures

1. Clean excess dirt from hose.
2. Run hose through hose washer using other clean water or clean water with a mild detergent.
3. If detergent is used, rinse with clean water.
4. Allow jacket to dry thoroughly.

F. Repackaging

1. Roll in a single roll configuration-male coupling in center of roll.
2. Secure roll (rubber or plastic band, string)
3. Local cache option for storage.
 - a. Roll, secure, and place on pallet. Cache option quantity per pallet 1 inch by 100 foot length/pallet.

Storage and Refurbishing Standards

- b. Roll, secure, and place on pallet. Cache option quantity per pallet 1 1/2 inch by 100 foot length/pallet.
- c. Roll, secure, and package 2 lengths in carton (to be determined). Cache option quantity per pallet.

G. Storage and Shelf Life Checks

None at this time.

ITEM: HOSE, LINEN AND SYNTHETIC WEEPING

NFES #1873, #0334

A. Initial Inspection/Disposal Criteria

1. Segregate by NFES number.
2. Check for obvious burns, cuts, damaged couplings, worn or defective gaskets.

B. Tests

1. Replace gasket if necessary.
2. Connect female end of hose to pump or manifold (confirm not out of round and no damaged threads). All 1 1/2 inch hose should be NH threads. All 1 inch hose should be NPSH threads.
3. See current edition of the Water Handling Guide for hose testing procedures.
4. For linen hose, begin pressure test with a 5-minute wet soak at 50 psi prior to applying full test pressure.
5. When hose is under pressure, walk the length of hose checking for the following which will indicate a need for repair or disposal: leaks between hose and couplings and at swivel portion of female coupling.
6. Pressure test.
 - a. Start pump.
 - b. Time for 3 minutes after reaching 250 psi.
 - c. Walk the length of the hose two or three times looking for burns or cuts.
 - d. After 3 minutes turn off pump water.
 - e. Female and male couplings.
 - (1) Check for leaks where hose goes into coupling.
 - (2) Check for crooked coupling (easier to see when hose is charged).
 - f. Remove hose.
 - g. Stretch out good hose to drain.

NOTE: Items 6.c and 6.e require special attention with synthetic hose.

C. Refurbishing Procedures

1. Refurbished hose shall result in lengths that are a minimum of 90 percent of original length.
2. Good couplings shall be salvaged from discarded hose.
3. Recoupling procedures:
 - a. Remove old expansion ring and coupling from hose.
 - b. Remove unserviceable portion of hose, squaring end to be recoupled.
 - c. Utilize expander machine to insert new expander and coupling. Follow specific machine operation instructions.

D. Retesting Criteria

1. None required unless recoupling has occurred.
2. Following recoupling, follow test procedures as outlined in section B.6.

E. Cleaning procedures

1. Clean excess dirt from hose.
2. Run hose through hose washer using other clean water or clean water with a mild detergent.
3. If detergent is used, rinse with clean water.
4. Dry linen hose immediately after testing and washing to avoid mildew. Allow synthetic hose to dry thoroughly before rolling.
 - a. A 100-foot hose is hung from the middle and left to drain for 4 hours.
 - b. After 4 hours, double hose again, with couplings off the ground.

Storage and Refurbishing Standards

F. Repackaging

1. Roll in a single roll configuration-male coupling in center of roll.
2. Secure roll (rubber or plastic band, string).
3. Local cache option for storage.

G. Storage and Shelf Life Checks

Linen hose should be checked periodically for mildew or rot, and should be retested after 3 years on the shelf, regardless of appearance.

ITEM: HOSE, SUCTION

**NFES #0115, #0652
#0914, #1808**

A. Initial Inspection/Disposal Criteria

Visually inspect for cracks, cuts, damaged couplings, and gasket.

B. Tests

1. Service pressure test.
 - a. Start pump.
 - b. Test for 3 minutes at 50 psi.
 - c. Check hose for leaks.
 - d. Shut down pump.
 - e. Drain hose completely.
2. Dry vacuum test.

See current edition of the Wildland Fire Hose Guide for complete annual testing procedures.

C. Refurbishing Procedures

Replace gasket if necessary.

D. Retesting Criteria

None required.

E. Cleaning Procedures

1. Remove excess dirt from hose.
2. Clean with damp rag.
3. Apply a rubber protectant to prevent drying and cracking.

F. Repackaging

1. No special repack requirements.
2. Protect male coupling threads.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: INCREASERS

NFES #0416, #0854, #2235

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage.
2. Cracks.
3. Bad threads.
4. Tail gaskets.

B. Tests

None.

C. Refurbishing Procedures

1. Replace tail gasket if stiff, missing, or cracked.
2. Check threads for damage. Use triangular file to “chase” threads.

D. Retesting Criteria

Recheck threads by using appropriate female fitting.

E. Cleaning Procedures

1. Clean in parts washer, high pressure wash or clean in sink with dishwashing detergent with a brush or scouring pad.
2. Rinse thoroughly.
3. Stand upright to drain and dry.

F. Repackaging

1. NFES #0416 package 10 each in carton (cache option) or 60 each in carton (cache option) and label accordingly.
2. NFES #0854 package 10 each in carton (cache option) or 60 each in carton (cache option) and label accordingly.
3. NFES #2235 package 10 each in carton (cache option) or 60 each in carton (cache option) and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

ITEM: JEAN, BDU

NFES #2700 - #2707, #2800 - #2807

A. Initial Inspection/Disposal Criteria

1. Any holes, cuts, tears, burns, or torn seams.
2. Any alterations cutting of the pants cuff off that cannot be repaired to a minimum of 30-inch inseam.
3. Buttonhole has frayed or broken stitching.
4. Any hook and pile fastener missing or that does not provide adequate closure.
5. Zipper broken or missing teeth.
6. Any belt loop missing or broken.
7. Any side take-up tape or buckle missing, damaged, or with loose thread (see section C note).

NOTE: Lost or damaged cuff closure cord should not be disposal criteria. It is not recommended to replace any lost or damaged cuff closure cords.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on the available repair facilities.

B. Tests

1. Open and close the hook and pile fasteners to ensure that they provide an adequate and secure closure.
2. Open and close zipper to ensure smooth operation and a secure closure.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, burns, and torn seams by darning, patching, or by duplicating the original construction (see note in section A).
 - a. Use Nomex® (Aramid) patching material for all repairs.
2. Restitch frayed buttonholes using a buttonhole or zig-zag stitch that has 50 to 60 stitches per buttonhole.
3. Replace damaged hook and pile fastener tape with tape of the same length, width, and quality as the original (see note in section A).
4. Replace damaged zipper with the same type, length, and quality as the original.
5. Replace damaged belt loops with loops of the same material and construction as the original (see note in Section A).
6. Replace side take-up tape using Nomex® (Aramid) tape with a metal tri-glide. The replacement tape should be 3/4 inch wide Aramid tape, style #70-6185-2007-3/4 inch, color black. Order from:

C. M. Offray & Son, Inc.
Rt. 24, Box 601
Chester, NJ 07930
Phone: 908-879-4700

NOTE: The first lot of pants manufactured in 2000 have thin light green side take-up tapes, later contracts have heavier black side take up-tapes. It is recommended that the loose end of the light green take-up tapes be replaced by the recommended Nomex® tape (#6 above). It is not necessary to replace the tape that is holding the metal tri-glide.

D. Retesting Criteria

Test all replacement hook and pile fasteners and zippers after sewing in place, as specified in section B.

Storage and Refurbishing Standards

E. Cleaning Procedures

See appendix B for Nomex® laundering instructions.

DO NOT USE BLEACH TO CLEAN FABRIC.

F. Repackaging

1. Close fly and all pocket flaps, properly thread side take-up tape, untie cuff cord. With inseams meeting, fold pants from the leg bottom up toward the waist band to an overall length of about 23 inches.
2. Pack 30 pairs of the same size pants in carton NFES #2007.

G. Storage and Shelf Life Checks

None at this time.

**ITEM: JEANS, FLAME RESISTANT
MENS AND WOMENS**

**NFES #0503 to #0506
#0581 to #0585
#2010 to #2024
#2117**

A. Initial Inspection/Disposal Criteria

1. Any holes, cuts, tears, burns, or torn seams that cannot be repaired economically.
2. Any alterations or cutting of the jeans cuff off that cannot be repaired to a minimum 30-inch inseam.
3. Any buttonholes with frayed or broken stitching.
4. Any missing or tack buttons.
5. Any hook and pile fastener missing or that does not provide adequate closure.
6. Any zipper broken or missing a slider.
7. Any belt loops missing or broken.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Open and close the hook and pile fasteners to ensure that they provide an adequate and secure closure.
2. Open and close zipper to ensure smooth operation and a secure closure.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, burns, and torn seams by darning, patching, or by duplicating original construction (see note in section A).
2. Restitch frayed buttonholes using a buttonhole or zig zag stitch that has 50 to 60 stitches per buttonhole.
3. Replace damaged hook and pile fastener tape with tape of the same length, width, and quality as the original (see note in section A).
4. Replace damaged zippers with the same type, length, and quality as the original (see note in section A).
5. Replace damaged belt loops with loops of the same material and construction as the original (see note in section (A)).
6. Use Nomex® (Aramid) thread and materials for all repairs.

D. Retesting Criteria

Test all replacement hook and pile fasteners and zippers after sewing in place, as specified in section B.

E. Cleaning Procedures

See appendix B for NOMEX® laundering instructions.

DO NOT USE BLEACH TO CLEAN FABRIC.

F. Repackaging

1. Close fly and pocket flaps. With inseams meeting, fold jeans from the leg bottom up toward the waistband to an overall length of about 23 inches.
2. Pack 30 pairs of the same size jeans in carton NFES #2030 (NSN 8115-00-183-9481).

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

**ITEM: JUG, INSULATED 5 GALLON
JUG, VACUUM 10 GALLON**

NFES #0827, #0943

A. Initial Inspection/Disposal Criteria

1. Check for damage.
2. Dents interior and exterior.
3. Check interior for warping.
4. Holes.
5. Spigots.
6. Lids.

B. Tests

1. Fill with water, check for leaks.
2. Check lid for secure fit.
3. Check spigot and seals properly, no leaks.
4. Check spigot gasket.

C. Refurbishing Procedures

1. Replace spigot and spigot gaskets if necessary.
2. Vacuum jugs may need gasket replaced on lid.

D. Retesting Criteria

If spigots or gaskets were replaced, retest according to section B.

E. Cleaning Procedures

1. Clean outside with a mild to strong detergent solution and rinse.
2. Clean vent hole and sterilize lid.
3. Sterilize inside of jug with a solution of unscented chlorine bleach (i.e., Purex®) and water using either of these options:
 - a. Mix 1 cup unscented chlorine bleach (i.e., Purex®) to 50 gallons of water, let solution stand in container for minimum of 4 hours, drain, and air dry with lid off.
 - b. Mix 1 cup unscented chlorine bleach (i.e., Purex®) to 5 gallons of water, rinse inside of container with solution, drain, and air dry with lid off.
 - c. An antibacterial solution per manufacturer's specifications.

F. Repackaging

1. Suggested repack carton is NFES #0943, 20 inch by 16 inch by 16 inch (NSN 8115-00-275-5777).
2. Or, band top on jug and place in storage in clean area without carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: KIT, COFFEE HEATING

NFES #0480

A. Initial Inspection Disposal Criteria

1. Visually inspect kit components.
2. Dispose of bad hose lines, badly bent stove, urn, lid, and broken faucets.

B. Tests

1. Connect stove and all fittings to propane source.
2. Turn on tank with valve in "OFF" position at burner.
3. Check connections for leaks.
4. Light burner and make sure it is operable.
5. Check and test propane regulator.
6. Confirm test date on propane tank. (Must be recertified, [hydrostatic testing] 12 years from manufacture date and every 5 years after the first recertification).
7. Check handle to ensure that tank meets current 04/01/2002 standards for proper valve.
See appendix L about propane tanks

C. Refurbishing Procedures

1. Clean heater components.
2. Clean with soap and water and disinfect urn, lid, and faucets.
3. Repaint if necessary with high-temperature paint.

D. Retesting Criteria

Concerns and questions about propane fittings, regulators, and propane tanks should be directed to an authorized service representative.

E. Cleaning Procedures

1. Use soap, water, and disinfectant to clean coffee urn, lid, and faucets.
2. Clean heater components.

F. Repackaging

Recommended carton is NFES #0500.

G. Storage and Shelf Life

None at this time.

ITEM: KIT, FOAM PROPORTIONER (FLOW-MIX MODEL 500)

NFES #0626

A. Initial Inspection/Disposal Criteria

1. Remove proportioner from kit box, clean by rinsing off with water.
2. Check all lines, fittings, and alien bolts for wear and tightness.

B. Tests

1. Fill unit with a small amount of foam (1/2 gallon).
 - a. Set selector valve to “REFILL” (D, F-i).
 - b. Connect foam wand to pump opening (E, F-i).
 - c. Put wand into foam bucket and pump. As foam is pumped into the unit, water should come out at the water discharge tube (I, F-i).
 - d. Set selector valve to “FOAM” (D, F-i).
 - e. Set metering valve to 1.0 percent (C, F-i).
 - f. Connect fire hoses (use a foam nozzle).
 - g. Open hydrant valve to fire hose, turn on foam nozzle.
2. Foam concentrate should be seen flowing through the clear plastic tube (G, F-I) into the differential valve. It should only take a few seconds for the concentrate to enter the hose line and come out the nozzle as white foam. (Use as short a piece of hose as possible from proportioner unit to nozzle).
3. If foam is not being produced, see Troubleshooting Section of the Model 500 Operation Manual enclosed in the kit. (The selector, metering and differential valves may have to be serviced.)
4. Test the short 1 1/2 inch piece of standard fire hose that is in the kit to fire hose testing specifications. If bad, replace the hose.

C. Refurbishing Procedures

1. Flush the unit.
 - a. Disconnect lines (F and G, F-i) on the differential valve.
 - b. Set selector valve to “FOAM” (D, F-i).
 - c. Set metering valve (C, F-I) to 1.0 percent.
 - d. Place an air line in line F to blow foam concentrate from the bladder. Do not use a very high air pressure, only enough to do the job. Collect the foam from line G. (Continue until foam stops coming out of line G.)
 - e. Open drain cock (H, F-I). Continue blowing air until air is coming out of drain cock: tilt unit for complete draining.
 - f. Disconnect foam hose from refill pump at (A, F-I).
 - g. Disconnect foam hose from bladder fitting on tank (B, F-i).
 - h. Hold water hose to open end of foam line (B, F-i) and turn on water to flush—about 2 minutes.
 - i. Turn selector valve (D, F-i) to refill and continue to flush—about 2 minutes.
 - j. Hold water hose to pump opening (E, F-I) and flush pump.
 - k. Blow with low pressure air into line B. Move selector valve setting from—“FOAM” to “REFILL” and back about 1 minute of air at each setting. Blow air into the foam fill pump opening (E, F-I) and into the end of line F with the selector valve set for FOAM. Air will come out at drain cock. This will help dry lines, pump, and valves.
2. Reassemble hoses.
3. Return metering and selector valves to “ON” and “OFF” positions, and close drain cock.
4. Let dry.

D. Retesting Criteria

Retest (same as B above) if a new bladder was installed, or the valves needed to be serviced, otherwise no retest is needed.

E. Cleaning Procedures

1. Remove all equipment from kit box and clean each item and box.
2. Check equipment against inventory list and replace missing items.

F. Repackaging

Replace all equipment in kit box.

G. Storage and Shelf Life Checks

None at this time.

ITEM: KIT, LONGLINE WITH REMOTE HOOK

NFES #1309

A. Initial Inspection Disposal Criteria

1. Inspect for structural damage:
 - a. Broken wires (electrical cord).
 - b. Severe kinks in wire rope (bad line cable).
 - c. Ballooning of cable wires (bad line cable).
 - d. Collapsed hooks and rings (bad line cable ends and hook assembly).
 - e. Distorted hook, rings, and wire rope eyes.
 - f. Missing or broken nylon tie raps.
 - g. Bent, squashed, or distorted electrical connections.
 - h. Cuts, tears, or frayed electrical wires.
2. Inspect longline wire rope
 - a. Wearing gloves, run a dry rag over the entire length of the wire rope.
 - b. Snags indicate broken wires—replace wire rope if broken cable wires are discovered.
3. Repair of corrosion of the wire rope, ring, or cargo hook must be authorized by an approved government maintenance inspector, FAA certified Airframe Mechanic, or FAA Repair Station.

B. Tests

The wire rope can be proof tested by a certified wire rope rigging company, such as:

Boise Rigging Supply
106 West 32nd St.
Garden City, ID 83714
Phone: 208-342-8919; 800-342-7673
FAX: 208-342-8919

The wire rope and hook assembly can be functionally tested by:

Aero Accessory Service 612 S. Scott Boise, ID 83705 Phone 208-344-6461	Field Support Services 2001 Flightway Drive Atlanta, GA 30341 Phone: 770-454-1130
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C. Refurbishing Procedures

1. Replace missing or broken nylon tie raps.
2. Other repairs should be completed by qualified testing personnel, see Section B.
3. Replace unserviceable sections if possible to maintain a serviceable unit.
4. Damaged sections of the wire rope may be repaired provided the repaired section does not reduce the length of the section by more than 10 percent. The minimum length of a 50-foot section shall be at least 45 feet.

D. Retesting Criteria

1. Repaired sections shall be tested at twice the rated working load prior to being returned to the available stores system.
2. The wire rope and hook assembly shall be proof and functionally tested each 5 years. Completed in section B.

E. Cleaning Procedures

The cable and hook assembly may be cleaned with hot water. A light water-displacement oil (such as WD 40) maybe used to displace water on the hook assembly. Any use of degreasing products during cleaning of the hook assembly will require the hook to be lubricated in accordance with the hook manufacturers recommendations.

F. Repackaging

Local cache option.

G. Storage and Shelf Life Checks

None.

For further information on this subject, see copy of Office of Aircraft Services Memorandum, dated December 14, 1989 (or later revision) on this subject.

Storage and Refurbishing Standards

ITEM: KIT, SHELTER, 15' X 27'
KIT, SHELTER, 16' OCTAGON
KIT, SHELTER, 18' OCTAGON
KIT, SHELTER, 20' OCTAGON

NFES #0430,
NFES #0550
NFES #0540
NFES #0549

A. Initial Inspection/Disposal Criteria

1. Check packing list and instructions. Assemble the mainframe and components according to instructions. All locking pins and flex joints should move easily. Check for burrs on all components of mainframe, even bars, and base bars.
2. Loosen flex joints and remove burrs as needed.
3. Install door; should open and close easily.
4. Install shelves and desk, making sure the proper clamps are used.
5. Repair or replace any part of the main frame as needed. When dismantling, wipe all component parts with a damp cloth and return to proper container.
6. Check roof and wall panels for any tears or rips and repair as needed. Repair according to instructions. Clean the roof and wall panels with a mild soap and water solution using a brush to remove hard dirt and grime. Check windows and screens in wall panels. Ensure that the Velcro is dry on all panels before folding and replacing in proper container.
7. Stencil all parts that need to be identified for tracking/demobilization process.

B. Tests

None.

C. Refurbishing Procedures

1. Repair or replace any part of the main frame as needed.
2. Check roof and wall panels for any holes, tears or rips, repair as needed.
3. Ensure that all locking buttons snap into place.
Major repairs and replacement parts may be obtained by contacting:

Western Shelter Systems

830 Wilson Street
Eugene, OR 97402
Phone: 541-344-7267

D. Retesting Criteria

None.

E. Cleaning Procedures

1. When dismantling, wipe all component parts with a damp cloth.
2. Clean the roof and wall panels with a mild soap and water solution; use a brush to remove hard dirt and grime or high pressure wash.
3. Ensure that the Velcro is dry on all panels before folding and replacing in proper container.

F. Repackaging

1. Repack according to manufacturer's instructions and local cache standards.
2. Ensure that installation/assembly instructions are included in package.

G. Storage and Shelf Life Checks

None at this time.

ITEM: KIT, FIRST AID, 10-PERSON, BELT
KIT, FIRST AID, 10-PERSON, BOX
KIT, FIRST AID, 24-PERSON, BOX

NFES #1143
#0068
#1604

A. Initial Inspection/Disposal Criteria

1. Case is checked for excessive wear and cleanliness. Check belt and buckles for serviceability.
2. Open case and check contents. Standard updated packing slip should be utilized while inventorying contents.
3. Empty contents and check expiration dates.
4. Check any items that require sanitary package for tears or other damage.

B. Tests

None required.

C. Refurbishing Procedures

Clean, repair, or replace container as needed.

D. Retesting Criteria

None required.

E. Cleaning Procedures

Clean as necessary.

F. Repackaging

1. Utilizing packing slip, replace items in elastic retainers inside container.
2. Hook belt buckles together and fold against back of container on belt kit.
4. Enclose in a clear plastic bag with kit label and expiration dates visible and then heat seal bag.
5. Package 10 each NFES #1143 in carton NFES #2007 and label accordingly.

G. Storage and Shelf Life Checks

Check expiration dates of contents annually.

Storage and Refurbishing Standards

ITEM: LADDER, STEP 8' FIBERGLASS

NFES #0586

A. Initial Inspection/Disposal Criteria

1. Check for damage, nicks, gouges, or broken parts; replace unit.
2. Check for paint, if covered with large amount—dispose.
3. Check footpads, if missing replace with matching set.
4. Check steps for damage, if missing—dispose.
5. Check legs for damage.
6. Check pail platform for damage.
7. Check ladder for cracks or breaks.
8. Check ladder for oil and grease.
9. Check ladder hinge supports and cross supports for damage.
10. Check ladder for missing cross supports.

B. Tests

Visual inspection of all ladder steps, ladder legs, and ladder cross supports.

C. Refurbishing Procedures

See section E below.

D. Retesting Criteria

Visually inspect ladder steps, ladder legs, ladder foot pads, and ladder cross supports.

E. Cleaning Procedures

1. Fiberglass.
 - a. Remove all oil and grease.
 - b. Clean with soap and water or power wash.
 - c. Air dry.

F. Repackaging

Local cache option for storage.

G. Storage and Shelf Life Checks

If stored upright, must be securely strapped to prevent falling.

ITEM: LANTERN, MANTLE, GAS WITH SPARK LIGHTER

NFES #0125

A. Initial Inspection/Disposal Criteria

1. Check for usage, fuel in tank, burned mantles, etc.
2. Inspect for missing or damaged parts.
 - a. Glass broken, handle missing, mantles missing.
 - b. Rust in fuel or found on the tank seams—dispose.
3. Dirty.
4. Broken frame—dispose.

B. Tests

1. Ensure that lantern has working mantle(s).
2. Fill tank with fuel and charge with air.
3. Light mantles and test for proper burning.
4. Replace with new mantles at conclusion of test.

C. Refurbishing Procedures

1. Drain fuel and purge.
2. Clean and paint.

D. Retesting Criteria

See section B.

E. Cleaning Procedures

See section C.

F. Repackaging

1. Package in 8 inch by 8 inch by 16 inch carton (NSN 8115-00-079-8693) or manufacturer's travel case.
2. Place one lantern in each carton with packing to keep it from rattling loose in the carton and possibly breaking.

G. Storage and Shelf Life Checks

Check oil plunger assembly yearly to prevent drying.

NOTE: When stock is depleted this item will no longer be available.

Storage and Refurbishing Standards

**ITEM: LANTERN, PORTABLE, ELECTRIC, 6 VOLT,
LANTERN, CAMP, ELECTRIC, FLUORESCENT**

**NFES #0127,
NFES #2501**

A. Initial Inspection/Disposal Criteria

Check for broken lens, cracked cases, missing bulbs, and broken switches.

B. Tests

Install batteries to test operation of switch and bulbs.

C. Refurbishing Procedures

Clean as necessary, remove batteries and repair as needed.

D. Retesting Criteria

Only if needed.

E. Cleaning Procedures

Use soft cloth to clean lens and battery compartment.

F. Repackaging

Local cache options.

G. Storage and Shelf Life Checks

None at this time.

**ITEM: LEADLINE, HELICOPTER, EXTERNAL LOADS, 6,000 POUNDS
LEADLINE, HELICOPTER, EXTERNAL LOADS, 3,000 POUNDS**

**NFES #0380
#0528**

A. Initial Inspection/Disposal Criteria

1. The leadline/hook shall be inspected for damage each time it is received into the cache.
2. Make sure there is a proof tag on the leadline. If not, send it out to a rigging house to be proofed to twice the rated working load and retagged.
3. Measure all leadlines, swivels, rings, and hooks length and diameter to make sure they meet Forest Service 5100-500 Standard.
4. Inspect the leadline; wear gloves. Run a dry rag over the entire length of the line. Snags indicate broken wires; dispose of or repair (see number 8 below) if broken cable wires are discovered.
5. Ensure that cable has no basketing or kinks; dispose of or repair if basketing is discovered.
6. Ensure that the swedge has not slipped and that it is painted. If it has slipped, have it replaced, painted red, and proof tested. (With a painted swedge and cable, if the swedge has moved, you will see an unpainted space on the cable.)
7. If the leadline is plastic coated, and the coating is scratched down to the steel, it is OK; provided there are no broken strands.
8. If the leadline is damaged, the cable can be cut and reswedged into shorter lengths: 12-, 25-, or 50-foot lengths only. (See 5100-500 Standard.)
9. Safety gates (keepers or latches) that are bent or distorted shall be replaced.
10. Always ensure that the spring will force the hatch against the tip of the hook.
11. A replacement latch kit may be ordered from the original vendor.

NOTE: For numbers 9, 10, and 11 above, see 5700 Aviation Tech Tips. July 1993, 9357 1304-SDTDC.

A suspension cable is not a leadline. A leadline is not the same as a suspension cable. A suspension cable section is part of the remote hook system and is larger in diameter and stiff, so that it will not rotate. (If it rotates the electrical cable attached to it will twist around the suspension cable.)

B. Tests

Any certified rigging company can test the leadline assembly such as:

Boise Rigging Supply
106 West 32nd St.
Garden City, ID 83714
Phone: 208-342-8919; 800-342-7673
FAX: 208-342-8919

C. Refurbishing Procedures

1. Qualified rigging personnel should make repairs. See section B.
2. Spray paint swedge, if needed, before testing.

D. Retesting Criteria

The wire rope and hook assembly shall be proof and functionally tested each 5 years. See section B.

E. Cleaning Procedures

1. Remove dirt using water only—no soap, which can cause corrosion.
2. Thoroughly dry and lubricate all exposed steel parts before storing.
3. Remove grease by using petroleum solvent.

Storage and Refurbishing Standards

F. Repackaging

1. NFES #0528 package individually in carton (cache option) and label accordingly
2. NFES #0528 package in carton NSN 8115-00-417-9378, 5 each per carton and label accordingly.
3. NFES #0380 package, commercial carton Style RSC, Type CF, class domestic, grade 275, size 17 inch by 17 inch by 4 inch and label accordingly.

G. Storage and Shelf Life Checks

None.

For further information on leadlines, hooks, rings, swivels, and links, see Forest Service Standard 5100-500, with amendments.

ITEM: LINER, FIRE SHELTER CARRYING CASE, M-2002

NFES #0928

A. Initial Inspection/Disposal Criteria

Inspect the plastic liner for cracks or tears, if there is any evidence of damage the liner should be removed from service.

B. Tests

None.

C. Refurbishing Procedures

None.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean with a damp cloth.

F. Repackaging

If not part of the Fire Shelter, Complete, M-2002, pack 100 liners in a commercial carton, Style RSC, Type CF, class domestic, grade 275, sized to fit.

G. Storage and Shelf Life Checks

None.

Storage and Refurbishing Standards

ITEM: LITTER, S.K.E.D.

NFES #1670

A. Initial Inspection/Disposal Criteria

1. If bloodstained, alert supervisor for further instructions.
2. Visual inspection for cuts or tears in plastic surface, soiled surface, missing parts such as straps or fasteners.
3. Structural damage such as grommets pulled out.
4. All straps, handles (web gear) are intact and functional.

B. Tests

Check for weakness or nonvisible damage.

C. Refurbishing Procedures

1. If plastic is cut or torn and cannot be economically repaired, remove from service. Retain all serviceable components for replacement on other litters.
2. Wash S.K.E.D. with mild soap and warm water. Wash with power washer and hang to dry.
3. Replace worn or damaged straps or fasteners.

D. Retesting Criteria

Reassemble to ensure completeness and all parts are fitting properly.

E. Cleaning Procedures

Completed in section C.

F. Repackaging

Roll up S.K.E.D (using rubber gloves for better grip) small enough to fit into case. Fasten retaining strap tightly so S.K.E.D can be easily extracted.

G. Storage and Shelf Life Checks

None at this time.

For information and parts lists see:

SKEDCO, Inc.

PO Box 230487

Portland, OR. 97281

Phone: 800-770-7533

Web site: <http://www.skedco.com>

ITEM: LONGLINE, CABLE 50' WINEMA PLUGS

NFES #0849

A. Initial Inspection/Disposal Criteria

1. Inspect for structural damage.
 - a. Broken wires (electrical cord).
 - b. Severe kinks in wire rope (bad line cable).
 - c. Ballooning of cable wires (bad line cable).
 - d. Distorted hook, rings, and wire rope eyes.
 - e. Missing nylon tie raps.
 - f. Bent or distorted electrical connections.
 - g. Cuts, tears, or frayed electrical wires.
 - h. Inspect longline wire rope cable; wear gloves and run a dry rag over the entire length of the wire rope. Snags indicate broken wires—dispose or replace wire if broken cable wires are discovered.

B. Tests

The wire rope can be proof tested by any certified rigging company, such as:

Boise Rigging Supply
106 West 32nd St.
Garden City, ID 83714
Phone: 208-342-8919; 800-342-7673
FAX: 208-342-8919

C. Refurbishing Procedures

1. Replace missing or broken nylon tie raps.
2. Other repairs should be completed by qualified testing personnel. See section B.
3. Replace unserviceable sections if possible to maintain a serviceable unit.
4. Damaged sections of the wire rope may be repaired provided the repaired section does not reduce the length of the section by more than 10 percent. The minimum length of a 50-foot section shall be at least 45 feet.

D. Retesting Criteria

1. Repaired sections shall be tested at twice the rated working load prior to being returned to the available stores system.
2. The wire rope shall be proof tested each 5 years.

E. Cleaning Procedures

The wire rope may be cleaned with hot water.

F. Repackaging

Local cache option.

G. Storage and Shelf Life Checks

None.

For further information on this subject, see copy of Office of Aircraft Services Memorandum, dated December 14, 1989 (or later revision) on this subject.

Storage and Refurbishing Standards

ITEM: NET, CARGO, 12' x 12'
NET, CARGO, 15' x 15'
NET, CARGO, LIGHTWEIGHT CARGO, 10' X 10'

NFES #0531
#0458
#0695

A. Initial Inspection/Disposal Criteria

1. Any fraying or deterioration of lines. (If more than 10 percent of strands in any two adjacent cycles of the net are broken, see Equip Tips 8657 1304 5700-Aviation Oct 1986).

NOTE: Before disposal, consider cost effectiveness of repair by manufacturer.

2. Any netting that has contamination by fuel oils or other liquids considered degenerative to netting.
3. Verify certification tag is attached to net. (300, 3,000 or 6,000 pounds)
4. Any NFES #0695 net that has black mesh must be taken out of service.

B. Tests

1. Brittleness: Test by bending several areas of the nets rope 180 degrees back on itself. If more than 2 strands break per bend, dispose of net or return to manufacturer for repair. (See Equip Tips 8657 1304 5700-Aviation Oct 1986).

C. Refurbishing Procedures

1. Lay out net and inspect all ropes for fraying, burns, or wear points.
2. Clean all dirt from netting.
3. Remove all flagging, string, and rope.

NOTE: On some heavy cargo nets, the mesh intersections are fixed with molded plastic crosses. These should be visually inspected for cracks and missing parts whenever the loop thimbles are inspected.

D. Retesting Criteria

None.

E. Cleaning Procedures

Hang or stack polypropylene nets and clean with water from high-pressure hose.

F. Repackaging

Suggested cartons are:

1. NFES #0531 net, package in carton NFES #2006, 23 inch by 19 inch by 10 inch (NSN 8115-00-139-0722). Label accordingly.
2. NFES #0458 net, package in carton NFES #2007. 24 inch by 16 inch by 16 inch (NSN 8115-00-292-0123). Label accordingly.
3. NFES #0695 net, package in carton NFES #2006. 23 inch by 19 inch by 10 inch (NSN 8115-00-139-0722). Label accordingly.

G. Storage and Shelf Life Checks

None at this time.

ITEM: NOZZLE TIPS, STRAIGHT-STREAM AND SPRAY

**NFES #0635, #0636, #0637, #0638,
#0903, #0094, #0737**

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage:
 - a. Check for burrs.
 - b. Check for tail gasket (correct or not correct). Replace if needed.
 - c. Check for cracks.
 - d. Check for bad threads.
 - e. Look through tip, if clogged, clean out. Take out disk to clean out on spray tips.

B. Tests

1. Attach to hose.
2. Turn on water and ensure adequate flow and pattern are attained.

C. Refurbishing Procedures

None.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. All items will be washed and cleaned of mud, dirt, and grease. Clean in a dishwashing detergent with brush or scouring pad or high-pressure wash as needed. Do not soak for extended periods of time or the detergent will corrode the metal.
2. Rinse thoroughly.
3. Stand upright to drain water and dry.

F. Repackaging

1. Local cache option and label accordingly.
2. Standard pack is 24 each per carton.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: NOZZLE, GARDEN HOSE

NFES #0136

A. Initial Inspection/Disposal Criteria

1. Check for burrs.
2. Check for washer.
3. Check for bad threads.

B. Test

Test at hose bib pressure.

C. Refurbishing Procedures

Replace missing or cracked gaskets.

D. Retesting Procedures

Test at 100 psi. If nozzle leaks, throw away.

E. Cleaning Procedures

1. Wash and clean of mud, dirt, and grease.
2. Clean in a dishwashing detergent with brush or scouring pad or high-pressure wash.
3. Rinse thoroughly.
4. Stand upright to drain water and dry.

F. Repackaging

Local cache option for repacking.

Standard pack is 10 each per carton or 100 each per carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: NOZZLE, TWIN TIP SHUTOFF, 1-INCH BASE

NFES #0024

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage:
 - a. Check for burrs.
 - b. Check for tail gasket and screen.
 - c. Check handle for damage or missing screw. Is handle in right position?
 - d. Does handle turn freely in proper position?
 - e. Check for fire damage. May cause failure in the future.
 - f. Check hose coupling threads for damage.

B. Tests

1. Install on pump.
2. Open handle on nozzle.
3. Turn on water.
4. Check pattern on fog-tip to see if clogged—CLEAN OUT.
5. Close handle.
6. Turn on pump to 250 psi.
7. Check for leaks:
 - a. Tail gasket.
 - b. Under the handle.
 - c. At both tips.

C. Refurbishing Procedures

1. Replace handle and ball with a new kit if needed.
2. Replace tail gasket and/or screen if missing, cracked, or stiff.
3. Nozzle will have a 3/16 inch straight-stream tip (NFES #0637) and a 2- to 4-gal/min fog tip (NFES #0635).

D. Retesting Criteria

See section B.

E. Cleaning Procedures

1. Clean in a dishwashing detergent with brush, scouring pad, or high-pressure wash as needed. Do not soak for extended periods of time or the detergent will corrode the metal.
2. Rinse thoroughly, stand upright with handle in open position and allow to dry.
3. Lubricate with appropriate dry lubricant such as graphite.

F. Repackaging

1. Package in units containing nozzle body with a 3/16 inch straight-stream tip and 2- to 4-gal/min fog tip.
2. Package 20 each in carton 12 inch by 9 inch by 10 inch (NSN 8115-01-012-5504).

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

**ITEM: NOZZLE, SHUTOFF, COMBINATION, BARREL
NOZZLE, SHUTOFF, COMBINATION, BARREL, PLASTIC**

**NFES #1081, #1082
#0137, #0138**

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage:
 - a. Check for burrs and cracks.
 - b. Check tail gasket. Replace if missing, cracked, or stiff.
 - c. Check screw or washer.
 - d. Must turn freely.
 - e. Check for fire damage. May cause failure in the future.
 - f. Check hose coupling threads for damage.
 - g. Old Style KK: check threads inside of barrel; if they show—dispose.

B. Tests

1. Pressure testing:
 - a. Turn on pump to 250 psi.
 - b. Check for leaks:
 - (1) Around the tail gasket.
 - (2) Behind the barrel.
 - (3) The tip of the barrel.
 - (4) If plastic nozzle is found defective, dispose (NFES #0137, #0138).

C. Refurbishing Procedures

Replace tip, screw, and “O” ring, if needed (NFES #1081, #1082).

D. Retesting Criteria

Retest according to section B.

E. Cleaning Procedures

1. All items will be washed and cleaned of foreign matter, such as mud, dirt, and grease. Clean in a dishwashing detergent with brush and scouring pad, or high-pressure wash”as needed. Do not soak for extended periods of time or the detergent will corrode the metal.
2. Rinse thoroughly.
3. Stand upright with barrel in open position to drain water and dry.
4. Lubricate threads on back of the barrel with appropriate dry lubricant (graphite).

F. Repackaging

Package 20 each in carton 12 inch by 9 inch by 10 inch and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

ITEM: NOZZLE, FIRE FOAM, PLASTIC

NFES #0627, #0628, #0629

A. Initial Inspection Disposal Criteria

1. Check for worn or damaged threads.
2. Check for gasket.
3. Ensure nozzle barrel has no cracks in plastic.

B. Tests

None required.

C. Refurbishing Procedures

Replace gasket if necessary.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Wash and clean of foreign matter, such as mud, dirt, and grease.
2. Clean with scrub brush in water with dishwashing detergent or high pressure wash.
3. Rinse thoroughly.
4. Stand upright and allow to dry.

F. Repackaging

Package 10 each in carton (cache option) and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

ITEM: PACK, FIREFIGHTER'S FIELD

NFES #1372

A. Initial Inspection/Disposal Criteria

1. Fabric and webbing.
 - a. Any hole, cut, tear, fray, or burn that cannot be repaired economically.
 - b. Any area of abrasion that has weakened the fabric beyond repair.
 - c. Any webbing that is cut, burned, or abraded beyond economical repair.
2. Hardware.

Check all plastic and metal hardware for dirt, cracks, breaks, and proper function. See section B.
3. Zippers.

Check all zippers for broken coils, missing or broken sliders and for proper function. See section B.
4. Any writing, drawings, etc. on pack; dispose of unit.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Test hardware by fastening and unfastening. The hardware should function easily with little force being applied and no difficulty in the release.
2. Open and close to test zippers. The zipper should operate smoothly through its full length.

C. Refurbishing Procedures

1. Assemble complete pack by attaching NFES #0590 (pack, belt), NFES #1529 (2 each case, canteen), and NFES #1557 (harness) to NFES #1530 (belt, equipment).
2. Check all plastic fasteners and hardware and then place in NFES #1559 (pack).
3. Replace nonfunctioning hardware.

D. Retesting Criteria

Retest all replacement hardware. See section B.

E. Cleaning Procedures

1. Allow any mud and loose dirt to dry, then remove using a stiff-bristle brush.
2. Remove light oil using a solution of warm water and mild detergent and a brush. Rinse with clear water, let dry.
3. Soak in water-soluble biodegradable degreaser for 30 minutes. Brush with a bristle brush, rinse thoroughly, and hang to dry.
4. Or, pretreat with water-soluble biodegradable degreaser, steam clean, and hang to dry.
5. DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.

F. Repackaging

Package 10 each in carton NFES #2007, 24 inch by 16 inch by 16 inch (NSN 8115-00-292-0123).

G. Storage and Shelf Life Checks

None at this time.

See appendix K for information on available water-soluble biodegradable degreasers.

ITEM: PACK, PERSONAL GEAR

NFES #1855

A. Initial Inspection/Disposal Criteria

1. Fabric and webbing.
 - a. Any hole, cut, tear, fray, or burn that cannot be repaired economically.
 - b. Any area of abrasion that has weakened the fabric beyond repair.
 - c. Any webbing that is cut, burned, or abraded beyond economical repair.
2. Hardware.

Check all plastic and metal hardware for dirt, cracks, breaks, and proper function. See section B.
3. Zippers. Check all zippers for broken coils, missing or broken sliders, and for proper function. See section B.
4. Any writing, drawings or etc. on pack; dispose of unit.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Test hardware by fastening and unfastening the item at least three times. The hardware should function easily with little force being applied and no difficulty in the release.
2. Open and close zipper to test. The zipper should operate smoothly through its full length.

C. Refurbishing Procedures

1. Replace nonfunctioning hardware.

D. Retesting Criteria

Retest all replacement hardware as specified in section B.

E. Cleaning Procedures

1. Allow any mud and loose dirt to dry, then remove using a stiff bristle brush.
2. Remove light oil using a solution of warm water and mild detergent and a brush. Rinse with clear water, let dry.
3. Remove heavy oil by soaking in water-soluble biodegradable degreaser for 30 minutes; high pressure wash or steam clean and hang to dry.
4. Pretreat with a water-soluble biodegradable degreaser, steam clean or high pressure wash, and hang to dry.
- 5. DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.**

F. Repackaging

Store 10 packs in carton 18 inch by 14 inch by 18 inch.

G. Storage and Shelf Life Checks

None at this time.

See appendix K for information on available water-soluble biodegradable degreasers.

Storage and Refurbishing Standards

ITEM: PACKBOARD, MOLDED PLYWOOD W/SHOULDER STRAPS

NFES #0140

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage.
2. Check for cracks in plywood.
3. Check shoulder straps and buckles.
4. Check rope and grommets.
5. Check fabric for cuts, tears, holes, burns, etc.
6. Check for broken or damaged tie down hooks.

B. Tests

None.

C. Refurbishing Procedures

1. Sand and paint chipped and rough spots in plywood.
2. Replace ropes, straps, or other defects.
3. Replace tiedown rope if bad or missing. (50 foot)

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Packboard should be washed and cleaned of foreign matter such as mud, dirt, and grease.
2. Hang or set aside until packboard is completely dry.

F. Repackaging

1. Local cache option for repackaging.
2. Pack 10 packboards per carton.

G. Storage and Shelf Life Checks

None at this time.

ITEM: PACKSACK, NYLON, W/STRAPS

NFES #0744

A. Initial Inspection/Disposal Criteria

1. Fabric and webbing.
 - a. Any hole, cut, tear, fray, or burn that cannot be repaired economically.
 - b. Any area of abrasion that has weakened the fabric beyond repair.
 - c. Any webbing that is cut, burned, or abraded beyond repair.
2. Hardware.

Check all plastic and metal hardware for dirt, cracks, breaks, and proper function.
3. Zippers.

Check zipper (new style) for broken coils, missing or broken sliders, and proper function.
4. Check for writing or any drawings made with markers that cannot be removed.

B. Tests

1. Test hardware by fastening and unfastening. The hardware should function easily with little force being applied and release with ease.
2. Open and close zipper to test. The zipper should operate smoothly through its full length.
3. To test spring lock (new style) make sure spring works properly and cord passes through spring lock with ease.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, and broken seams.
2. Replace nonfunctioning hardware.

D. Retesting Criteria

Retest any zipper or hardware that has been replaced.

E. Cleaning Procedures

1. Allow any mud and loose dirt to dry, then remove using a stiff-bristle brush.
2. Remove light oil using a solution of warm water and mild detergent and a brush. Rinse with clear water, let dry.
3. Soak in a solution of a water-soluble biodegradable degreaser for 30 minutes. Brush with a bristle brush, rinse thoroughly, and hang to dry.
4. Or, pretreat with a water-soluble biodegradable degreaser, steam clean, and hang to dry.
5. Old style may be washed in a commercial washing machine.
- 6. DO NOT MACHINE WASH OR DRY. DO NOT USE BLEACH TO CLEAN FABRIC.**

F. Repackaging

Package 20 each in carton (cache option) and label accordingly.

G. Storage and Shelf life Checks

None at this time.

See appendix K for information on available water-soluble biodegradable degreasers.

Storage and Refurbishing Standards

ITEM: PAD, SLEEPING, GRAY 3/8" by 23" by 75"

NFES #1566

A. Initial Inspection/Disposal Criteria

1. Check for rips, cuts, stains, mildew, dampness.
2. Determine if cost effective to refurbish.

B. Tests

None.

C. Refurbishing Procedures

See section E.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. If pad is wet, expose to sun or other heat source until dry.
2. Brush with stiff-bristle brush to eliminate dirt or other foreign matter.
3. Blow off remaining dust or fine dirt particles with high-pressure air hose or vacuum.

F. Repackaging

Repack 50 each in original carton if serviceable or use NFES #0134 carton, sleeping pad, 76 inch by 22 inch by 20 inch, (NSN 8115-01-381-6529).

G. Storage and Shelf Life Checks

None at this time.

ITEM: POLE, RIDGE, 14' X 16' TENT

NFES #0089

A. Initial Inspection/Disposal Criteria

- 1. Visual inspection indicating use or broken and/or missing parts. NFES #0082 consists of four parts and NFES #0089 consists of six parts per pole.
- 2. Structural failure, bent pole—dispose of damaged pieces (salvage usable parts).

B. Tests

Put together to ensure that all pieces fit properly and there is no unseen damage.

C. Refurbishing Procedures

- 1. Replace missing or damaged parts.
- 2. Clean if dirty.
- 3. Repaint if necessary.

D. Retesting Criteria

Assemble again to ensure all pieces fit correctly.

E. Cleaning Procedures

Completed in section C.

F. Repackaging

Package in commercial carton, Style RSC, Type CF, class domestic, grade 275, size 4 1/2 inch by 6 1/2 inch by 42 1/2 inch.

G. Storage and Shelf Life Checks

None at this time.

16-ft ridge pole consists of the following:



Storage and Refurbishing Standards

ITEM: POLE, UPRIGHT

NFES#0083

A. Initial Inspection/Disposal Criteria

1. Visual inspection for use or broken and/or missing parts.
2. Structural damage, bent pole—dispose after salvaging usable parts.

B. Tests

Extend pole to see if pole telescopes freely.

C. Refurbishing Procedures

1. If top pin is bent or broken, replace with a steel pin.
2. Replace adjuster pins and cables when missing.
3. Clean if necessary.
4. Repaint if necessary to prevent rust or corrosion.

D. Retesting Criteria

Inspect to ensure that all parts function correctly once refurbishing is complete.

E. Cleaning Procedures

See section C.

F. Repackaging

Package 6 each in commercial carton, Style RSC, Type CF, class domestic, grade 275, size 4 1/2 inch by 6 1/2 inch by 42 1/2 inch.

G. Storage and Shelf Life Checks

None at this time.

ITEM: POLYVINYL BAG, PRACTICE FIRE SHELTER, M-2002

NFES #2681

A. Initial Inspection/Disposal Criteria

1. Inspect the bag for cracks or tears, if there is any evidence of damage the bag should be removed from service.
2. Inspect the Velcro pull strip for damage.
3. Inspect pull strap for damage.
4. Inspect all Velcro for holding capability.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on the available repair facilities.

B. Tests

None.

C. Refurbishing Procedures

1. If any parts are damaged, repair as possible using FF thread.
2. Any damage not repairable requires entire assembly to be removed from service as components are not available separately.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean with a damp cloth.

F. Repackaging

If not part of the Practice Fire Shelter, Complete, M-2002, pack 100 bags in a commercial carton, Style RSC, Type CF, class domestic, grade 275, sized to fit.

G. Storage and Shelf Life Checks

None.

Storage and Refurbishing Standards

ITEM: PUMP, BACKPACK, OUTFIT, COMPLETE

NFES #1149

A. Initial Inspection/Disposal Criteria

1. See Refurbishing Standards for Bag, Backpack Pump (Old Style)
2. See Refurbishing Standards for Bag, Backpack Pump; NFES #1197.
3. See Refurbishing Standards for Pump, Single Action; NFFES #0151.

NOTE: Combine 1 each NFES #1197 or 1 each of the old style bag and 1 each of NFES #0151 to make 1 complete unit of NFES #1149.

B. Tests

Connect and disconnect male and female hose connectors to verify they are working properly.

C. Refurbishing Procedures

1. Assemble complete unit, including NFES #0495, (strap, replacement, backpack pump), NFES #1197 (bag, backpackpump w/ 2 liners and couplings), and NFES #0151 (pump, single action).
2. See section A for applicable standard(s).
3. Replace male and/or female hose connectors if not functioning properly.

D. Retesting Criteria

If either male or female hose connector was replaced, see section C.

E. Cleaning Procedures.

See section A.

F. Repackaging

1. Pack 6 each NFES #1197 (Bag, Backpack Pump) and 6 each NFES #0151 (Pump, Single Action) in NFES #2007 (24 inch by 16 inch by 16 inch) (NSN (8815-00-292-0123) carton. Label as NFES #1149.
2. Pack 6 each Old Style Bag and 6 each Pump, Single Action in NFES #2007 (24 inch by 16 inch by 16 inch) (NSN 8815-00-292-0123) carton. Label as NFES #1149.

G. Storage and Shelf Life Checks

None at this time.

ITEM: PUMP, FIRE, LIGHTWEIGHT

NFES #0124, #0253

A. Initial Inspection/Disposal Criteria

Check local Job Hazard Analysis for proper personnel protection equipment required when working on this item.

1. Evidence of use (dust, oil, starter seal broken).
2. Evidence of damage.
3. Return to stock if not used and date last tested (DLT) does not exceed 12 months.

B. Tests

1. Repair to recommended manufacturer's standard, using local repair procedures.
2. Test for performance.
3. Clear fuel from fuel line.
4. Tie off starter rope to handle to determine field use. Use plastic snap seal.
5. If pump is not economically repairable, it should be disposed of using agency policies.

C. Refurbishing Procedures

1. Refurbished pumps should run and meet the pump performance standards set by the operator's manual and should be in good condition, i.e., no leaks, cracks, or broken parts. If not, send to an established repair shop ensuring the shop has the refurbishing standards and appropriate repair and instruction manual.
 - a. Clean off dirt, oil, and grease. (Use degreaser if needed.)
 - b. Check for identification marking, property, and serial numbers, cache identification sticker, and any other required stickers.
 - c. Ensure that water and dirt are removed from inside pump.
 - d. Grease pump as necessary.
 - e. Allow pump to dry.

D. Retesting Criteria

1. After the pump is repaired, it should be run tested to ensure that it meets performance standards.
 - a. Start engine to check for proper operation.
 - b. Check pump for proper performance output.

E. Cleaning Procedures

Completed in section C.

F. Repackaging

Ensure that pump is drained of water.

G. Storage and Shelf Life Checks

Ensure that DLT does not exceed 12 months.

Storage and Refurbishing Standards

ITEM: PUMP, MARK III

NFES #0148

Check local Job Hazard Analysis for proper personnel protection equipment required when working on this item.

A. Initial Inspection/Disposal Criteria

1. Evidence of use (dust, oil, starter seal broken).
2. Evidence of damage.
3. Return to stock if not used and date last tested (DLT) does not exceed 12 months.
4. Ensure inspection tag is current.

B. Tests

See section C.

1. Repair to recommended manufacturer's standard, using local repair procedures.
2. Test for performance.
3. Clear fuel from fuel line.
4. Tie off starter rope to handle to determine field use. Use plastic snap seal.
5. In event that the pump is not economically repairable, it shall be disposed of using local policies.

C. Refurbishing Procedures

1. Rubber plugs and bumpers on all starters.
2. Test pumps at 1/4-inch nozzle and at shutoff. MK III should be a minimum of 230 psi.
3. Use loss of prime method to test over speed.
4. Keep decals legible.
5. Do not paint frame on Mark III.
6. Paint over speed reset button yellow.
7. Replace muffler if neck is cracked.
8. Affix hearing protection mandatory stickers.
9. Paint exposed metal on cowling and pump.
10. Check buffer and buffer coupling holes, replace if needed
11. Check head and piston for carbon buildup regularly.
12. Replace head or cylinder if two or more fins are broken.
13. Cracks in cowling overhead are okay.
14. Replace spark plug protector ("sparky") if ripped or there is a hole in the top.
15. Ensure that each pump has a fuel mix sticker and a cache owner sticker.
16. See refurbishing standards for: Tank, Gasoline, 5 Gallon, Pump Adapted, NFES #0218.

D. Retesting Criteria

Completed in sections B and C.

E. Cleaning Procedures

Local cache option.

F. Repackaging

Make sure pump is drained of water.

G. Storage and Shelf Life Checks

Ensure that DLT does not exceed 12 months.

ITEM: PUMP, SINGLE ACTION

NFES #0151

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage.
2. Check for buns.
3. Check for cracks.
4. Bad threads.

B. Tests

Place hose in water and pump handle to validate that the pump works properly. If it is defective, check supply hose on pump assembly for obstructions and tight connections, bent push rods, and clogged tips.

C. Refurbishing Procedures

1. If pump pressure is still not sufficient, remove pump unit and replace “O” rings.
2. Check quick connection on pump for proper seating.
3. Check hose connection to pump for tightness; if loose, use a hose clamp.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Wash and clean all items of foreign matter, such as mud, dirt, and grease. Clean in dishwashing detergent with brush or scouring pad as needed.
2. Rinse thoroughly.
3. Lubricate slide with appropriate lubricant.

F. Repackaging

Local cache option for repackaging.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: PUMP, VOLUME, TRASH

NFES #0683, #1222

Check local Job Hazard Analysis for proper personnel protection equipment required when working on this item.

A. Initial Inspection/Disposal Criteria

1. Pressure wash pump. Use a degreaser if necessary.
2. Inspect unit for obvious damage to body or frame.
3. Inspect for oil leaks, dirty air filters, and condition of spark plug.

NOTE: Dispose of contaminated fuel according to hazardous materials regulations in your area.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on available repair facilities.

B. Tests

1. Before starting pump.
 - a. Change engine oil.
 - b. Clean air filter.
 - c. Fill pump with water.
2. Start pump and look for items that need repair.

NOTE: See the owner's manual for specified pump.

- a. Engine smoking.
- b. Running rough.
- c. Missing.
- d. Adjust carburetor as needed.

C. Refurbishing Procedures

1. Pump should run properly and discharge a specified amount of water.

NOTE: See appropriate owner's manual for specifications and troubleshooting guide relating to your specific unit.

If taken to local repair shop, ensure that they have the appropriate owner's manual and troubleshooting guide.

2. Drain fuel from tank and fuel lines. Start pump to ensure all fuel has been run out of unit.
3. Check to make sure all identification (serial numbers, property numbers, or other cache identification numbers) is securely fastened to pump.

D. Retesting Criteria

If pump has not been run in past 12 months, pump must be started and run to ensure that the pump is working properly.
(See section C.)

E. Cleaning Procedures

Clean off dirt and oil. Use degreaser if needed.

F. Repackaging

Use nylon tie rap to tie off starter rope to determine field use.

G. Storage and Shelf Life Checks

See section D if unit has been stored for 12 months.

ITEM: RAKE, COLLAPSIBLE LEAF

NFES #0659

A. Initial Inspection/Disposal Criteria

1. Inspect for damaged/missing tines.
2. Inspect for damage to handle sliding-locking mechanism.
3. Inspect all welds to see if cracked or broken.
4. Inspect grips for tears/loss of grips.
5. Inspect nuts and bolts to make sure they are in place (2 each).
6. Inspect pin in locking mechanism.

B. Tests

1. Check slide mechanism to see if moves freely and does not bind up when expanding tines of rake.
2. Expand tines and check all tines to see if secure and stable.

C. Refurbishing Procedures

1. Clean with water, let stand and dry.
2. Repair/replace nuts, bolts, and pins as needed.
3. Replace rubber handles.

D. Retesting Criteria

See section B.

E. Cleaning Procedures

1. Damp wipe with mild detergent solution to remove dirt, mud, and grease.
2. Let stand and dry.
3. Lubricate slide mechanism with WD 40 or like solution.

F. Repacking

Place 10 each in carton 8 inch by 20 inch by 50 1/2 inch or equivalent.

G. Storage and Shelf Life Checks

None at this time.

The manufacturer of this item is:

Mercedes Textiles Ltd.

16633 Hymus Blvd.

Kirkland, QC, Canada

H9H 4R9

Phone: 514-697-0817

Fax: 514-697-5297

Web site: <http://www.mercedestextiles.com/english>

Various nuts, bolts, and locking pins may be procured at your local hardware store

Storage and Refurbishing Standards

ITEM: REDUCERS

**NFES #0009, #0010, #0417, #0418
#0733, #2229, #2230**

A. Initial Inspection/Disposal Criteria

Check for obvious damage.

1. Cracks.
2. Bad threads.
3. Tail gaskets—stiff, damaged, or missing.

B. Tests

None.

C. Refurbishing Procedures

Replace tail gaskets if stiff, damaged, or missing.

Check male threads. If they are damaged try using a triangular file to remove burrs, dings, etc.

D. Retesting Criteria

None.

Recheck damaged threads by fitting with appropriate female fitting. If not smooth fit, dispose of item.

E. Cleaning Procedures

1. Clean in dishwashing detergent with a brush or scouring pad or high-pressure wash.
2. Rinse thoroughly.
3. Stand upright to drain and dry.

F. Repackaging

1. Package 10 each (NFES #0009, #0010, #0418, and #0733) in 8 inch by 4 inch by 4 inch carton (NSN 8115-00-290-3365).
2. Package 10 each (NFES #0417, #2229, and #2230) per local cache options.

G. Storage and Shelf Life Checks

None at this time.

ITEM: REGULATOR, PROPANE

NFES #0930

A. Initial Inspection/Disposal Criteria

1. Visual inspection for loose, defective fittings.
2. Check regulating handle to ensure tightness and smooth operation.
3. Ensure that screws holding halves together are present and tight.

B. Tests

1. Connect to air line adapter and activate air.
2. Turn regulator control from “OFF” to “ON” position to ensure proper functioning.

C. Refurbishing Procedures

1. Wipe off dirt with damp cloth or blow off with air compressor.
2. Clean fitting threads with wire brush.
3. Replace fittings if worn or missing.

D. Retesting Criteria

None.

E. Cleaning Procedures

See section C.

F. Repackaging

Local cache option for repackaging.

G. Storage and Shelf Life Check

None at this time.

A. Initial Inspection/Disposal Criteria

1. Inspect seams of polyvinyl plastic bag for thread breaks and polyvinyl material for any breaks, tears, or holes.
2. Verify that red pull tabs are unbroken and securely attached to hook and pile fastener tape.
3. Verify that NOT FOR FIRE USE labels are firmly stitched to hook and pile fastener tape.
4. Remove shelter from polyvinyl bag, unfold, and inspect for tears or other signs of wear.
5. Check attachment of tie down straps to the shelter cloth.

B. Tests

Open and close hook and pile fastener tape. It should be free of foreign matter and provide a secure closure for the practice fire shelter in its polyvinyl bag.

C. Refurbishing Procedures

1. If one or both red pull tabs on fastener tape are broken, or if polyvinyl has breaks, tears, or holes, replace with a new polyvinyl bag (NFES #2409).
2. If the shelter is undamaged and tie down straps are securely in place, refold shelter, place in polyvinyl bag, and reattach fastener tape. If cloth is torn or otherwise in a condition that makes it unusable as a training tool, replace with a new practice fire shelter (NFES #2408).
3. Validate user's instructions are in pocket.

D. Retesting Criteria

None.

E. Cleaning Procedures

The only cleaning necessary will be to the practice fire shelter carrying case (NFES #2410).

1. Allow any mud or loose dirt to dry, and remove with a stiff-bristle brush.
2. Remove light oil with a solution of warm water and mild detergent and brush. Rinse with clear water and let dry.
3. Remove heavy oil by pretreating with water-soluble biodegradable degreaser, or with a detergent and water solution and brush, or power wash. Rinse with clean water and let dry.

DO NOT USE BLEACH!

F. Repackaging

Pack 10 refurbished practice fire shelters in a close fitting commercial carton, Style RSC, Type, I class domestic, grade 275, size 16 inch by 10 inch by 12 inch.

G. Storage and Shelf Life Checks

Do not store in same area as Shelter, Fire, NFES # 0169.

See appendix K for information on water-soluble biodegradable degreasers.

ITEM: SHELTER, FIRE, PRACTICE, COMPLETE, M-2002

NFES #2678

A. Initial Inspection/Disposal Criteria

1. The Complete Practice Fire Shelter should consist of the following components:
 - a. Practice Fire Shelter M-2002 - See Shelter, Fire, Practice, M-2002
 - b. Practice Fire Shelter Polyvinyl Bag, M-2002 - See Case, Carrying, Fire Shelter, Practice, M-2002
 - c. Practice Fire Shelter Carrying Case M-2002 - See Polyvinyl Bag, Fire Shelter, Practice, M-2002
 - d. Liner, Fire Shelter Carrying Case, M-2002 - See Liner, Fire Shelter Carrying Case, M-2002

NOTE: The cache manager shall determine when repair is economical. This decision will depend on the available repair facilities.

B. Tests

None.

C. Refurbishing Procedures

See procedure for appropriate component.

D. Retesting Criteria

None.

E. Cleaning Procedures

See procedure for appropriate component.

F. Repackaging

Pack 10 refurbished complete practice fire shelters in a commercial carton, Style RSC, Type CF, class domestic, grade 275, sized to fit.

G. Storage and Shelf Life Checks

None.

Storage and Refurbishing Standards

ITEM: SHELTER, FIRE, PRACTICE, M-2002

NFES #2679

A. Initial Inspection/Disposal Criteria

Unfold practice fire shelter and inspect for tears, ripped seams, punctures.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on the available repair facilities.

B. Tests

None.

C. Refurbishing Procedures

1. If undamaged, refold according to instructions.
2. If repair is necessary, use material from discarded practice fire shelter and FF nylon thread.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean polyvinyl bag with damp cloth.

F. Repackaging

If not part of the Fire Shelter, Complete, Practice, M-2002, pack 10 practice fire shelters in a commercial carton, Style RSC, Type CF, class domestic, grade 275, sized to fit.

G. Storage and Shelf Life Checks

None.

ITEM: SHELTER, FIRE, COMPLETE, M-2002

NFES #0925

A. Initial Inspection/Disposal Criteria

1. Should consist of Fire Shelter M-2002 in polyvinyl bag, Carrying Case M-2002, and Liner M-2002.
2. Fire Shelter in polyvinyl bag - See Shelter, Fire, M-2002
3. Carrying Case - See Case, Carrying, Fire Shelter, M-2002
4. Liner - See Liner, Fire Shelter, M-2002

NOTE: The cache manager shall determine when repair is economical. This decision will depend on the available repair facilities.

B. Tests

None.

C. Refurbishing Procedures

See procedure for appropriate component.

D. Retesting Criteria

None.

E. Cleaning Procedures

See procedure for appropriate component.

F. Repackaging

Pack 10 refurbished complete fire shelters in a commercial carton, Style RSC, Type CF, class domestic, grade 275, sized to fit.

G. Storage and Shelf Life Checks

None.

Storage and Refurbishing Standards

ITEM: SHELTER, FIRE, M-2002

NFES #0926

A. Initial Inspection/Disposal Criteria

1. DO NOT OPEN POLYVINYL BAG FOR INSPECTION.
2. Inspect polyvinyl bag for cuts, puncture, torn seams, if the bag has any that may affect the integrity of the bag or the shelter, remove shelter from service (see #6 below).
3. Inspect that the red quick-opening tear strip is unbroken and it is sealed to the bag the entire length, pull rings should be unbroken, if not, remove shelter from service (see #6).
4. Look through bag at shelter for tears along seams. If any tears evident, or if sufficient gray discoloration of the interior of the polyvinyl bag to obscure interior inspection, remove shelter from service and use for training or discard.
5. If there is any doubt about the condition of the shelter or polyvinyl bag, REMOVE FROM SERVICE.
6. Due to the high cost of these shelters, rather than discard shelters that show damage to the polyvinyl bag but not to the shelter itself, it is recommended that these shelters be stored until sufficient shelters are available for rebagging to be economical.

B. Tests

None.

C. Refurbishing Procedures

None. Any damage to the Fire Shelter renders it unusable and it cannot be refurbished, however damage to the polyvinyl bag may allow the shelter to be rebagged.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean polyvinyl bag with damp cloth.

F. Repackaging

If not part of the Fire Shelter, Complete, M-2002, pack 10 fire shelters in a commercial carton, Style RSC, Type CF, class domestic, grade 275, sized to fit.

G. Storage and Shelf Life Checks

None.

ITEM: SHIRTS, FLAME RESISTANT

**NFES #0511, #0512, #0522, #0569, #0570,
#0577 to #0580, #2078, #2079**

A. Initial Inspection/Disposal Criteria

1. Any holes, cuts, tears, or torn seams not economical to repair.
2. Any buttonholes with frayed or broken stitching.
3. Any missing or tack buttons.
4. Any hook and pile fastener on sleeves and pockets that does not provide adequate closure.

NOTE: The cache manager shall determine when repair is economical. The decision will depend on available repair facilities.

B. Tests

Open and close hook and pile fasteners. They should provide an adequate and secure closure.

C. Refurbishing Procedures

1. Repair any hole, cut, tear, or torn seam by darning or patching, duplicating the original construction. See note in section A.
2. Over stitch any frayed buttonhole using a buttonhole or zig-zag stitch that has 50 to 60 stitches per buttonhole.
3. Replace damaged hook and pile fastener tape with tape of the same length, width, and quality as the original. See note in section A.
4. Use Nomex® (Aramid) thread and materials for all repairs.

D. Retesting Criteria

Test all replacement hook and pile fasteners after sewing in place, as specified in section B.

E. Cleaning Procedures

See appendix B for Nomex® laundering instructions.

DO NOT USE BLEACH TO CLEAN FABRIC.

F. Repackaging

Package 50 each of same size in carton NFES #2007, 24 inch by 16 inch by 16 inch (NSN 8115-00-292-0123).

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: SHROUD, NECK AND FACE, WILDLAND FIREFIGHTERS

NFES #1274

A. Initial Inspection/Disposal Criteria

1. Any holes, cuts, tears, burns, or torn seams that cannot be repaired economically.
2. Any hook and pile fastener missing or that does not provide adequate closure.

NOTE: The cache manager shall determine when repair is economical. This decision will depend on the available repair facilities.

B. Tests

Open and close the hook and pile fasteners to ensure that they provide and adequate and secure closure.

C. Refurbishing Procedures

1. Repair holes, cuts, tears, burns, and torn seams by darning, patching, or by duplicating the original construction (see note in section A).
2. Replace damaged hook and pile fastener tape with tape of the same length, width, and quality as the original (see note in section A).

D. Retesting Criteria

Test all replacement hook and pile fasteners and zippers after sewing in place, as specified in section B.

E. Cleaning Procedures

See appendix B for Nomex® laundering instructions.

DO NOT USE BLEACH TO CLEAN FABRIC.

F. Repackaging

1. Lay with inside up, fold both sides towards middle, fastening hook and loop fasteners.
2. Pack 20 shrouds in carton to be determined.

G. Storage and Shelf Life Checks

None at this time.

See appendix K for information on water-soluble biodegradable degreasers.

ITEM: SPOUT, GAS, FLEXIBLE, 16", STEEL

NFES #0210

A. Initial Inspection/Disposal Criteria

1. Visual inspection for obvious damage.
 - a. Bent or crushed sections in flexible portion, dispose of unit.
 - b. Missing, cracked, or stiff tail gasket on bottom of spout.
 - c. Missing screen on pouring end.
2. Visual inspection of spout for obstructions.
3. Check locking flange to ensure it is in working condition. If not, dispose of unit.

B. Tests

Using a solvent, check spout for leaks.

C. Refurbishing Procedures

1. If possible, replace tail gasket if missing, cracked, or stiff.
2. If possible, replace screen. (Try to salvage screens from disposed items.) If unable to replace screen, dispose of unit.
3. Remove any obstructions that may be in spout.
4. Clean screen and threads on screen cap.
5. Can be washed using a pressure washer.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean completely with solvent or high-pressure wash. (Use in a well-ventilated area.)
2. Stand on end or lay unit down to drain and dry.
3. Make sure spout is completely dry before repacking.

F. Repackaging

1. Local cache option for carton.
2. Pack 10 each in carton.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

**ITEM: SWIVEL, CARGO, 3,000-POUND CAPACITY
SWIVEL, CARGO, 6,000-POUND CAPACITY**

**NFES #0526
#0286**

A. Initial Inspection Disposal Criteria

1. Review for structural damage.
2. Inspect hook and latch before storage.
3. Ensure that latch is not distorted or bent. Safety gates (latches or keepers) that have become bent or distorted no longer help the sling load from inadvertently coming off the hook.
4. Inspect for cracks, nicks, wear, gouges, and deformation.

B. Tests

1. See appendix H.
2. Make sure the spring will force the latch against the tip of the hook.
3. Excessive lateral movement of the swivel hook may indicate bearing wear. Return to manufacturer for inspection.
4. Inspect “swinging” gate to be sure it moves freely and without obstructions.

C. Refurbishing Procedures

1. If safety gate (latch or keeper) is bent or distorted, replace the damaged latch with hook latch replacement kit.
2. Inspect ring/pear ring for binding, ensure that nut is secure with pin in place.
3. Remove from service and return to manufacturer for inspection any swivel whose rotating swivel body or hook shows any cracks or gouges.
4. Lubricate with a lithium-base grease of medium consistency.

NOTE: Never repair, alter, rework, or reshape a hook or swivel. Return to the manufacturer for repair.

D. Retesting Criteria

None.

E. Cleaning Procedures

Wipe clean, paint as needed.

F. Repackaging

1. Pack 10 each NFES #0528 in carton (cache option) and label accordingly.
2. Pack 5 each NFES #0286 in carton (cache option) and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

**ITEM: TABLE, MESS 4 PERSON W/BENCHES
TABLE, FOLDING**

**NFES #1390, #2698
#2698**

A. Initial Inspection/Disposal Criteria

1. Check for table surface damage.
2. Check for broken or bent legs.
3. Check for rough cutting surface edges.
4. Check for missing items and supports.
 - a. If suitcase table, and the damaged area cannot be repaired, dispose of the table.
 - b. If folding table, and legs or top cannot be repaired, dispose of the unit.

B. Tests

None.

C. Refurbishing Procedures

1. For plywood mess table, replace any missing or broken parts with 3/4-inch birch plywood and refinish.
2. For metal/plastic suitcase mess table, repair damage area by welding, pop riveting or by gluing.
3. Folding table, try to repair legs and top and if possible straighten any dents and miscellaneous damage to metal folding tables.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. High pressure wash or wipe tables with household cleaner suitable for the table surface.
2. Remove any foreign matter on tables, such as gum.
3. Let table stand to dry.

F. Repackaging

For suitcase mess table, band case and place in proper location.
For folding tables, collapse and place in proper location.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: TANK, PORTABLE, 300 GALLON
TANK, PYRAMID, LIQUID STORAGE 150 GALLON

NFES #0220
NFES #0221

A. Initial Inspection/Disposal Criteria

1. Rips or holes greater than 3 inches.
2. Separating of seams.

B. Tests

Fill with air and check for holes.

C. Refurbishing Procedures

1. Fill with water, air, and check for holes.
2. If leaks are observed, glue and patch area, then refill after glue dries.
3. Clean with soapy water and air dry.

D. Retesting Criteria

Refill with air after patching to ensure patch is secure.

E. Cleaning Procedures

Clean with soapy water then air dry.

F. Repackaging

1. Ensure that tank is dry.
2. Package 1 each in carton NFES #2006; 23 inch by 19 inch by 10 inch (NSN 8115-00-139-0722).

G. Storage and Shelf Life Checks

None at this time.

ITEM: TANK, GASOLINE, FIVE GALLON, PUMP ADAPTED

NFES #0218

A. Initial Inspection/Disposal Criteria

1. Check for fuel and dispose of properly.

NOTE: Dispose of contaminated fuel according to hazardous material regulations in your area.

2. Check for leaks or separation along seams.
 3. Check all threads on connector for serviceability.
 4. Check gasket on cap. Replace if missing, cracked, or stiff.
 5. Check for rust, if found, dispose of tank.

B. Tests

Visual checks only.

C. Refurbishing Procedures

1. Drain all existing fuel and purge.
2. Use an air hose to dry the interior of the container and verify that no grit and or dirt material has dried within female opening of quick disconnect coupling.
3. Turn upside down with lids off or open to dry.
4. Inspect vent hole to ensure it is clean and serviceable.
5. Wipe down outside of container and repaint if necessary.

D. Retesting Criteria

None.

E. Cleaning Procedures

See section C.

F. Repackaging

Local cache option for repackaging.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: TANK, COLLAPSIBLE, 1,000 GALLON	NFES #0588
TANK, COLLAPSIBLE, 1,200 GALLON	#0090
TANK, COLLAPSIBLE, 1,500 GALLON	#0589
TANK, COLLAPSIBLE, 1,800 GALLON	#0668
TANK, COLLAPSIBLE, 3,000 GALLON	#0568
TANK, COLLAPSIBLE, 4,800 GALLON	#6030
TANK, COLLAPSIBLE, 6,000 GALLON	#6031

A. Initial Inspection/Disposal Criteria

1. Segregate by NFES #.
2. Check for obvious punctures, cuts, burns, damaged hose couplings, drain plugs, etc.

B. Tests

1. Determine that all plugs are present and in good serviceable condition.
2. Secure tank to forklift with a chain of proper size to bear the weight of the tank. Mark all punctures, cuts, etc., while forklift or hoist suspends tank. This allows light to be seen through any obvious problem areas.

C. Refurbishing Procedures

1. Repair or replace any damaged plugs or couplings.
2. Clean entire tank with soapy water inside and out. Rinse well with clear water from high-pressure washer.
3. Allow to air dry on both sides.
4. Patch or repair any damaged areas previously noticed.

D. Retesting Criteria

1. Suspend tank again so that any holes can be spotted while looking towards light.
2. Refer to section C. If holes are found, patch and recheck.

E. Cleaning Procedures

See section C.

F. Repackaging

1. Fold or roll tank as tightly as possible, secure with plastic banding or rope to keep from unrolling.
2. Local cache option for repackaging and labeling.
3. Suggest using NFES #0500 for packing NFES #0589, #0668, #0568.

G. Storage and Shelf Life Checks

None at this time.

ITEM: TANK, FOLDING, 1,000 GALLON
TANK, FOLDING, 1,500 GALLON

NFES #0661
#0664

A. Initial Inspection/Disposal Criteria

1. Frame broken or bent beyond repair. Dispose of frame.
2. Liner seam has separation. Dispose of liner.
3. Liner has tears larger than 3 inches. Dispose of liner.
4. More than 12 patches on liner. Dispose of liner.
5. Two or more grommets are missing in succession and new grommets cannot be used, due to damage of area. Dispose of liner.

B. Tests

Verify hinges operate smoothly.

C. Refurbishing Procedures

1. Straighten frame.
2. Check welds for cracks and separation. Repair as needed.
3. Remove rust, paint as needed.
4. Lubricate hinges with appropriate lubricant.
5. Check liner seam to verify no separations exist.
6. Check for holes and tears, patch, or shoe goo small holes.
7. Check liner to ensure that it is properly attached to frame through each grommet. The use of cable ties or 1/4-inch nylon rope is recommended. Ensure that ties and ropes are secure. No damage or fraying. Replace or tighten as necessary. When using cable ties, use one per grommet and utilize large cable ties at corner and midpoints. Use smaller ties in all other grommets. When using rope, secure one end to the frame. Then using a lacing motion, go through the grommet, then over the frame and back through the next grommet. Continue this motion until entire liner is attached to frame. Secure end.
8. Fold the tank ensuring that liner is not pinched during process. Only a minimum, if any, amount of liner is to extend outside the metal frame.

D. Retesting Criteria

None.

E. Cleaning Procedures

Use warm soapy water and scrub brushes to clean the frame and liner. A steam cleaner can be used in conjunction with brushes.

F. Repackaging

1. Once folded and stenciled:
 - a. Band 1,000-gallon tank near both ends.
 - b. Band 1,500-gallon tank in middle and at both ends.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: TANK, PROPANE, FUEL, LPG, 20# TANK (5 GALLON)

NFES #0491

A. Initial Inspection/Disposal Criteria

1. Visual inspection for rust, dents, punctures, broken valves, and valve handle. Look for weak or broken handle.
2. Confirm test date on propane tank (must be recertified, [hydrostatic testing] 12 years from manufacturer date and every 5 years after the first recertification).
3. Verify handle type to ensure that tank meets current specifications for “OPD” valve.
See appendix L for information.

B. Tests

1. Apply soapy water to valve area.
2. Watch for bubbles indicating leaks.
3. Tag immediately for repair or remove from service.

C. Refurbishing Procedures

1. Repair or replace defective valves and broken handles.
2. Power wash tank, let dry, and repaint if necessary.
3. Ensure warning labels are visible and replace if necessary.
4. Install plastic cap or plug in valve opening if missing.
5. All repairs will be done by an authorized facility.
6. Ensure valve is in “OFF” position before packaging.

D. Retesting Criteria

Check valve to ensure it is in “OFF” position before issuing.

E. Cleaning Procedures

Completed in section C.

F. Repackaging

1. Place on pallets and shrink wrap or tie with cord to ensure tanks do not fall or tip over.
2. Store in secured (no smoking) area; tanks will vent fumes when they get hot.
3. Attempt to store out of sun.

G. Storage and Shelf Life Checks

Refer to Health & Safety Handbook, OSHA, NFPA, and local direction.

ITEM: TEES, HOSELINE, ALL

NFES #0230, #0731, #1809, #2240

A. Initial Inspection/Disposal Criteria

1. Check for obvious damage.
2. Check for buffs.
3. Check tail gasket.
4. Ensure that 1-inch valve is seated properly (NFES #0230).

B. Tests

None.

C. Refurbishing Procedures

Replace gasket if missing, cracked, or stiff.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean in dishwashing detergent with a brush or scouring pad.
2. Rinse thoroughly.
3. Stand upright to dry.

F. Repackaging

Pack 10 each NFES #0230 in carton (cache option) or 60 each in carton (cache option) and label accordingly.

Pack 10 each NFES #0731 in carton (cache option) or 60 each in carton (cache option) and label accordingly.

Pack 10 each NFES #1809 in carton (cache option) or 60 each in carton (cache option) and label accordingly.

Pack 10 each NFES #2240 in carton (cache option) or 60 each in carton (cache option) and label accordingly.

G. Storage and Shelf Life Checks.

None at this time.

Storage and Refurbishing Standards

ITEM: TENT, WALL, 14' x 16'

NFES # 0084

A. Initial Inspection/Disposal Criteria

1. Nonstandard item.
2. Rips and tears (uneconomical to repair).
3. Mildew present.

NOTE: The cache manager will determine when repair is economical. This decision will depend on available repair facilities and replacement parts.

B. Tests

None.

C. Refurbishing Procedures

1. Completely unfold tent on clean, dry floor or work area so that any defects (tears, burns, mildew, etc.) will be visible.
2. Sweep off entire tent with stiff-bristle broom.
3. Repair any rips, tears, or other defects at this time if possible. If repairs cannot be made easily and cost effectively, continue to clean tent and tag it for repair. Replace missing or damaged guy ropes (1/4 inch by 8 foot manila rope) and ridge lines (1/4 inch by 12 foot manila rope) and replace missing or damaged grommets with proper size grommets.
4. Wash tent as necessary.
5. Let dry and fold tent with guy ropes in the center of folding.

D. Retesting Criteria

None.

E. Cleaning Procedures

See section C.

F. Repackaging

Place 1 each tent in carton NFES #0523 and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

ITEM: TENT, 2 PERSON

NFES #0077

A. Initial Inspection/Disposal Criteria

CHECK TENTS IMMEDIATELY UPON RECEIPT AT CACHE FOR MOISTURE. WET TENTS WILL MOLD QUICKLY; SOME MOLD SMELLS ARE IMPOSSIBLE TO REMOVE.

1. Tent body and fly.
 - a. Any tears, holes, burns, or unraveled seams that are not economically repairable.
 - b. Any mold or other stains.
 - c. Any zipper that does not provide adequate closure.
 - d. Any missing stretch cords or plastic hooks missing on rain fly.
2. Poles or stakes.
 - a. Cracked or broken poles.
 - b. Cracked or broken hinge joints.
 - c. Bent, broken, or mushroomed tops of stakes.

NOTE: The cache manager will determine when repair is economical. This decision will depend on available repair facilities, and replacement parts.

B. Tests

1. Set up the tent with the fly; check hinge joints for smooth operation.
2. Open and close all zippers ensuring adequate closure.
3. Check stretch cords and plastic clips for cracks and frays.

C. Refurbishing Procedures

1. Repair holes, tears, and seams.
2. Replace damaged zippers.
3. Replace nonfunctioning hardware.
4. Remove dirt from stakes with wire brush, straighten and file off burrs.

D. Retesting Criteria

1. Set up tent with the fly. Check hinge joints for smooth operation.
2. Open and close all zippers ensuring adequate closure.

E. Cleaning Procedures

1. For dirt and light stains, use warm soapy water. Wipe or brush out stain, rinse with clean water, and air dry.
2. For heavy stains, machine wash warm, permanent press. Air dry. A steam cleaner on low will also work.
 - a. Provide enough weight in tent so that winds will not blow tent away.

F. Repackaging

- Place clean tent into tent bag and secure.
- Pack 6 each tents in carton (cache option) and label accordingly.

G. Storage and Shelf Life Checks

- Check periodically for dampness.

Storage and Refurbishing Standards

**ITEM: TIP, APPLICATOR - 3 GPM
TIP, APPLICATOR - 15 GPM**

**NFES #0735, #0736
#0736**

A. Initial Inspection/Disposal Criteria

Check for obvious damage:

1. Check for buns.
2. Check for tail gasket (correct or not correct). Replace if needed.
3. Check for cracks.
4. Bad threads.
5. Look through tip; if clogged, clean out. Take out disk to clean out on spray tips.

B. Tests

1. Attach to hose.
2. Turn on water and ensure that adequate flow and pattern are attained.

C. Refurbishing Procedures

None.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Wash and clean all items of foreign matter (i.e., mud, dirt, and grease).
2. High-pressure wash or clean in dishwashing detergent with a brush or scouring pad as needed.
3. Do not soak for extended periods of time or the detergent will corrode the aluminum.
4. Rinse thoroughly.
5. Stand upright to drain water and dry.

F. Repackaging

Place 10 each NFES #0735 in carton (cache option) or 60 each in carton (cache option) and label accordingly.
Place 10 each NFES #0736 in carton (cache option) or 60 each in carton (cache option) and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

ITEM: TOOL, AXE, SINGLE BIT
TOOL, AXE, BOYS

NFES #0707
#0352

Check local Job Hazard Analysis for proper personnel protective equipment required when refurbishing this item.

A. Initial Inspection/Disposal Criteria

1. Obvious damage to head, cutting edges.
2. Large chips in blade.
3. Cracked head eye.
4. Dispose if any modifications to head, such as rivets through side of head to hold handle.

B. Tests

1. Head.
 - Blades have not been tapered or rounded to point that tool cannot be sharpened properly.
See cache memo 02-7, appendix M.
2. Handle.
 - a. Twisted, bent, or open-grain handle.
 - b. Cracks, or suspect based on sound of hammer rap on end of handle. Sharp ringing sound is good. Dull thud sound is suspect, or pressure application to side of handle.
 - c. Head loose on handle.
 - d. Tape residue, or other residue (tar, sap, etc.).
 - e. Head is loose and/or contains metal wedges.

C. Refurbishing Procedure

1. Head.
 - a. Clean head.
 - b. Sharpen tool to specifications according to tool sharpening gauge.
CAUTION—Tool should never be ground to the degree that the metal temperature rises high enough to remove temper, i.e., blue or burned edges.
 - c. Ensure that blade corners are square.
 - d. Paint tool head with rust inhibitor.
2. Handle.
 - a. Visually check handle.
 - b. Sand handle if it is rough, chipped, dinged, or has any type of residue that did not come off during sanding.
 - c. When replacing handle, shape eye for a snug fit. Use high impact plastic or wood-type wedges with appropriate type of epoxy.
 - d. The bottom of the tool head should be within 3/8 inch to 5/8 inch of the shoulder of the handle.
 - e. Cut excess off handle, flush with tool head after inserting wedge into handle.
 - f. Wipe handle with rag and linseed oil.

NOTE: Metal wedges can be added only in the field as an emergency measure for field refurbishing.

D. Retesting Criteria

None.

E. Cleaning Procedures

See section C.

Storage and Refurbishing Standards

F. Repackaging

1. For NFES #0707 (no sheath available).
Package 10 each in carton NFES #0338; 37 inch by 18 inch by 8 inch (NSN 8115-00-139-0673).
2. For NFES #0352 install leather sheath NFES #0359.
Package 10 each in appropriate size carton (until an appropriate size is found).

G. Storage and Shelf Life Checks

Per local cache requirements to ensure proper serviceability of tools.

ITEM: TOOL, COMBINATION

NFES #1180

A. Initial Inspection/Disposal Criteria

Check local Job Hazard Analysis for proper personnel protective equipment required when refurbishing this item.

Obvious structural damage to pick, hoe blade or both that cannot be repaired by replacing components.

1. Pick replacement:
 - a. If bent or twisted.
 - b. If shorter than 4 1/2 inches long in extended position.
 - c. If cracks exist around hinge bolt hole or if hinge bolt hole is enlarged.
2. Hoe blade replacement:
 - a. If there are cracks or looseness in the area of the hinge leg rivets.
 - b. If hinge leg bolt hole is enlarged or cracked.
 - c. If shorter than 6 inches. Measure from turn step to blade tip.
3. Handle replacement:
 - a. Cracked, bent, twisted, or has open grain.
 - b. Has been shortened (except for detachable handle smokejumper version, which has a 4-inch shorter handle).
 - c. Has a nonstandard handle. Order replacement handles from GSA; NSN 5120-01-296-3592. Use a number 6 by 1-13/16-inch long steel rivet that can be purchased from many well stocked retail and wholesale hardware outlets.

B. Tests

1. Extend hoe blade and pick at right angles to tool handle.
2. Tighten friction nut (wear gloves). Move blade and pick up and down and further tighten friction nut. Refer to: Combi Tool Maintenance Instructions, March 1989, MTDC Publication 89-9.
3. Repeat process to ensure that the blade and pick can be maintained tight by the friction nut.
4. If friction nut does not turn freely, flush with water. Blow clean with air gun. (Wear safety glasses).
5. If tool head cannot be tightened, check hinge leg surface contact with friction nut. Remove hinge leg bolt, grind blade or pick hinge legs as needed so they meet flush with friction nut. Refer to MTDC 89-9.
6. Replace friction nut if defective.

C. Refurbishing Procedures

1. Head.
 - a. Clean head and friction nut. See Section B.
 - b. Sharpen both blade and pick at 45 degree angle per hand tool.
 - c. Optional finish: paint hoe blade and pick with a rust inhibitor.
2. Handle.
 - a. Clean handle.
 - b. Tighten handle in ferrule by peening, as described in MTDC 89-9.
 - c. Sand handle if chipped, dinged, rough, or has tape or other residues.
 - d. Optional finish: wipe with linseed oil.

D. Retesting Criteria

None.

E. Cleaning Procedures

See Section B.

Storage and Refurbishing Standards

F. Repackaging

1. Modify and install plastic sheath (NSN 8465-00-001-6474). Modification instructions are contained in Equip Tips The Combi-A New Firefighting Hand Tool, February 1988, available from MTDC.

Order sheaths from:

Defense Personnel Support Center
2800 South 20th Street
Philadelphia, PA 19101-8419
Route Identifier S9T.

2. Package 10 each in carton NFES #0384, 46 inch by 11 inch by 8 inch (NSN 8115-01-307-2951).

G. Storage and Shelf Life Checks.

Per local cache requirements to ensure proper serviceability of tools.

ITEM: TOOL, COUNCIL

NFES #1807

Check local Job Hazard Analysis for proper personnel protective equipment required when refurbishing this item.

A. Initial Inspection/Disposal Criteria

1. Inspect handles for cracks, splinters, and warping.
2. Check cutting teeth for cracks, excessive wear.
3. Check for loose rivets.
4. Check mounting head for cracks, loose handles.

B. Tests

1. Apply pressure on handle, checking for cracks or splinters overlooked in visual inspection.
2. Hand check each cutter tooth for loose rivets.

C. Refurbishing Procedures

1. Replace broken, cracked, or splintered handles.
2. Replace broken or cracked tooth, flat surface inside.
3. Tighten loose rivets.
4. Grind on even bevel, use sickle stone.
5. Retain square point on cutter teeth.

6. DO NOT ROUND CORNERS.

- a. Paint toolhead with rust inhibitor.
7. Keep handle smooth with fine sandpaper.
 8. Additional standards in Firefighter's Guide.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Clean head with fine wire brush.
2. Clean handle with damp cloth.

F. Repackaging

1. Oil cutting edge.
2. Sheath with NFES #1854 McLeod sheath.
3. Package 10 each in carton NFES #0305; 56 inch by 20 inch by 11 inch; (NSN 8115-00-139-0690).

G. Storage and Shelf Life Checks

Per local cache requirements to ensure proper serviceability of tools.

Storage and Refurbishing Standards

ITEM: TOOL, FIRE SWATTER

NFES #1868

Check local Job Hazard Analysis for proper personnel protective equipment required when refurbishing this item.

A. Initial Inspection/Disposal Criteria

1. Inspect handle, flapper, and metal that connect the two parts.
2. Dispose of if handle is cracked or broken, flapper has large chunks missing, or is badly weathered.

B. Tests

1. Push down on handle to check for strength, cracks.
2. Look down length of handle to check for warping.
3. Ensure that connection between handle and flapper is in good condition.

C. Refurbishing Procedures

1. Check handle for roughness.
2. Sand down handle until smooth if necessary.
3. Visually inspect flapper condition.

D. Retesting Criteria

None

E. Cleaning Procedures

Wire brush and wash any mud and residue off handle and flapper.

F. Repackaging

1. Cache option for repacking swatters in bundles of 5 or 10 and plastic wrap the handles into group.
2. Store in this condition (at this time tool is not boxed).

G. Storage and Shelf Life Checks

Per local cache requirements to ensure proper serviceability of tools.

ITEM: TOOL, HOE, ADZE

NFES #1396

Check local Job Hazard Analysis for proper personnel protective equipment required when refurbishing this item.

A. Initial Inspection/Disposal Criteria

1. Modification to head, such as rivets through side of head to hold handle.
2. Cracked, damaged, or improper length of handle. Dispose of handle.
3. Nonstandard handle. Dispose of handle.
4. Tool head bent, twisted, or cracked.

B. Tests

1. Heads are within specification. Not taped or rounded beyond sharpening to gauge standards.
2. Head is not twisted or bent.
3. Handle is tight. Check by pulling tool head away from handle.
4. No metal wedges in handle.

C. Refurbishing Procedures

1. Check handle tightness. If loose, drive the handle into the head using a 4-pound blacksmith hammer and pound on the long planed side of toolhead. Use wooden wedges between handle and toolhead to provide more area of wood for proper tightness. When tight, drive nails into handle on underside of toolhead to lock head into position, one nail to each side of handle on the long plane of head. Handle is to be flush and is not to exceed 3/8-inch protrusion from toolhead.
2. With head tight, sand blast the head to remove all foreign objects, such as dirt, burrs, rust, etc.
3. Sharpen grubbing edge to specifications according to tool sharpening gauge. Ensure that blade corners are square. Remove all burrs with a hand file. Check with template gauge.

CAUTION: Tool should NEVER be ground to the degree that the metal temperature rises high enough to remove temper, i.e., blue or burned edges.

4. Check handle for proper length, cracks, and chips.
5. Sand handle if it is chipped, dinged, rough, or has other residue.
6. With handle, smooth, apply linseed oil to handle only. Remove all excess oil.
7. Apply rust inhibitor to the toolhead.

D. Retesting Criteria

Recheck handle tightness.

E. Cleaning Procedures

1. Remove all excess linseed oil from handle.
2. Check toolhead for any contaminants, i.e., dirt, metal filings, etc.

F. Repackaging

1. Apply protective sheath to blade edge. (Sheath is to be made by cache warehouse person using rejected fire hose.)
2. Package 10 each in carton NFES #0338; 37 inch by 18 inch by 8 inch (NSN 8115-00-139-0673).

G. Storage and Shelf Life Checks

Per local cache requirements to ensure proper serviceability of tools.

Storage and Refurbishing Standards

ITEM: TOOL, McLEOD

NFES #0296

Check local Job Hazard Analysis for proper personnel protective equipment required when refurbishing this item.

A. Initial Inspection/Disposal Criteria

1. Obvious damage to cutting edge, rake fingers, and handle.
 - a. Broken blade.
 - b. Loose head.
 - c. Missing or severely bent fingers.
 - d. Short or nonstandard handle.

B. Tests

1. Head.
 - a. Blade to be at least 10 to 14 inches wide from handle base.
 - b. Handle base not tilted, bent, or distorted.
 - c. Blade ends have not been rounded or severely tapered so that they cannot be ground to specifications.
 - d. Proper angle of cutting edge as per tool sharpening gauge NFES #0510.
2. Handle.
 - a. Check that handle is straight.
 - b. Check for cracks, chips, or open grain.
 - c. Head loose on handle (loose or missing rivets).
 - d. Tape residue, or other residue (tar, sap, etc.).

C. Refurbishing Procedures

1. Head.
 - a. Remove dirt and grime from head with wire brush or hose.
 - b. Square up blade if necessary.
 - c. Paint toolhead with rust inhibitor.
 - d. Sharpen cutting edge 1/8-inch wide at 50° angle. Ensure that blade corners are square.
 - e. Check large nut on head and tighten or replace as needed.
2. Handle.
 - a. Sand handle if it is chipped, dinged, rough, or has any type of residue.
 - b. Wipe handle with rag and linseed oil.

D. Retesting

None.

E. Cleaning Procedures

See section C.

F. Repackaging

1. Install plastic sheath NFES #1854.
2. Package 10 each in carton NFES #0305; 56 inch by 20 inch by 11 inch; (NSN 8115-00-139-0690).

G. Storage and Shelf Life Checks

Per local cache requirements to ensure proper serviceability of tools.

ITEM: TOOL, PULASKI**NFES #0146**

Check local Job Hazard Analysis for proper personnel protective equipment required when refurbishing this item.

A. Initial Inspection/Disposal Criteria

1. Obvious structural damage to cutting edges or head.
2. Dispose of tool if modifications have been made to head, such as rivets through side of head to hold handle.

B. Tests/Inspections

1. Head.
 - a. Head is within specifications as per gauge.
 - b. Grubbing end is not bent/twisted.
 - c. Blade or grubbing hoe ends have not been tapered, or rounded to point the tool cannot be sharpened to meet gauge standards.
2. Handle replacement.
 - a. Twisted, bent, or open grain.
 - b. Cracks, or suspect based on sound of hammer rap on end of handle (sharp ringing sound is good; dull thud sound is suspect), or pressure application to side of handle.
 - c. Head is loose and/or contains metal wedges.
 - d. Handle has been shortened.
 - e. Nonstandard handle.

C. Refurbishing Procedures

1. Head.
 - a. Clean head.
 - b. Sharpen tool to specifications as per tool sharpening gauge NFES #0510. Ensure that blade corners are square.

CAUTION: Tool should NEVER be ground to the degree that the metal temperature rises high enough to remove temper, i.e., blue or burned edges.

- c. Optional finish-paint toolhead with a rust inhibitor.
2. Used handles.
 - a. Clean handle.
 - b. Sand handle if it is chipped, dinged, rough, or has tape or other residues.
 - c. Optional finish-linseed handles.
 3. New handles.

Local replacement-utilize NFES #1857 handle with plastic wedge or wood wedges secured using epoxy of appropriate type.
 4. Metal wedges can be added only in the field as an emergency measure for field refurbishing.

D. Retesting Criteria

None

E. Cleaning Procedures

See section C.

F. Repackaging

1. Install plastic sheath NFES #0257.
2. Package 10 each in carton NFES #0338; 37 inch by 18 inch by 8 inch; (NSN 8115-00-139-0673).

G. Storage and Shelf Life Checks

Per local cache requirements to ensure proper serviceability of tool.

Storage and Refurbishing Standards

ITEM: TOOL, SHOVEL

NFES #0171

Check local Job Hazard Analysis for proper personnel protective equipment required when refurbishing this item.

A. Initial Inspection/Disposal Criteria

1. Obvious damage to cutting head, step plate, and handle.
2. Loose head, severely rounded, distorted or bent blade.
3. Blade less than 3 3/4 inch from center to edge on both sides.
4. Blade has been modified by improper grinding or filing, such as modification of step plate.
5. Short or nonstandard handle.

B. Tests/Inspections

1. Head.
 - a. Blade distortion or bent.
 - b. Blade to be at least 7 1/2 inch wide.
 - c. Shank not bent or handle base tilted.
 - d. Blade tip that has been severely rounded.
2. Handle.
 - a. Check that handle is straight.
 - b. Check for cracks, chips, or open grain.
 - c. Tape residue, or other residue (tar, sap, etc.).

C. Refurbishing Procedures

1. Head and handle.
 - a. Wash and wipe dry.
 - b. Sand handle if it is rough, chipped, dinged, or has any type of residue.
 - c. Sharpen cutting edge using tool sharpening gauge NFES #0510.

Caution: Tool should NEVER be ground to the degree that the metal temperature rises high enough to remove temper, i.e., blue or burned edges.

- d. Paint toolhead with rust inhibitor.
- e. Wipe handle with rag and linseed oil.

D. Retesting Criteria

None.

E. Cleaning Procedures

See section C.

F. Repackaging

1. Install plastic sheath NFES #1853.
2. Package 10 each in carton NFES #0337; 55 inch by 12 inch by 11 inch; (NSN 8115-00-139-0689).

G. Storage and Shelf Life Checks

Per local cache requirements to ensure proper serviceability of tools.

ITEM: TORCH, DRIP

NFES #0241

A. Initial Inspection/Disposal Criteria

1. Tank is dented to point leakage occurs.
2. Lock ring will not seal due to thread damage.
3. Salvage usable component parts.

B. Tests

CAUTION: Remove any residual fuel before testing and dispose of according to local hazardous materials regulations.

Visually inspect tank for cracks, splits, and obvious damage that may cause tank to leak.

C. Refurbishing Procedures

1. Steam clean or wash with mild degreaser soap, rinse with clean water, check for and remove any scab deposits inside tank.
2. Replace igniter if screen is ruptured, crushed, or tiller is burned out or carbonized. Some carbonization can be cleaned with wire brush.
3. Tighten screw that holds igniter and screen in place.
4. Ensure that discharge plug and chain are attached to tank cover assembly.
5. Install discharge plug into tank cover assembly.
6. Thoroughly dry all components with clean rag and air hose.
7. Insert spout into tank and tighten lock ring.

D. Retesting Criteria

None, other than section B, if required.

E. Cleaning Procedures

See section C.

F. Repackaging

Package 1 each in 8 inch by 8 inch 16 inch carton. (NSN 8115-00-079-8693).

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: VALVE, AUTO CHECK AND BLEEDER

NFES #0228

A. Initial Inspection/Disposal Criteria

Visually inspect.

1. Inspect for missing parts (valves, plugs, and gaskets).
2. Inspect handle.
3. Inspect threads.

B. Tests

1. Pressure testing.
 - a. Install valve on test pump.
 - b. Fill with water; close handle.
 - c. Attach caps or nozzle for testing.
 - d. Test for leaks at 250 psi.
 - (1) Check for leaks around female coupling.
 - (2) Check for leaks around male flange.
 - (3) Check for leaks under top of handle shaft.
 - (4) Check for leaks on bottom end of handle shaft.
 - (5) Check for leaks in casing.
 - (6) Repair if valve is found defective.
 - (7) Ensure that the check valve (flapper) is operational.

C. Refurbishing Procedures

Replace missing or damaged parts (O-ring, gasket, and handle).

D. Retesting Criteria

Retest after repair.

E. Cleaning Procedures

1. Wash and clean all items of foreign matter, such as mud, dirt, and grease.
2. Rinse thoroughly.
3. Stand upright to drain and dry.
4. Lubricate with appropriate dry lubricant such as graphite.
 - a. Female coupling.
 - b. Wipe off excess.

F. Repackaging

Package 10 each in carton (cache option) and label accordingly.

G. Storage and Shelf Life Check

None at this time.

ITEM: VALVE, PRESSURE RELIEF, 1-1/2" NH-F

NFES #0229

A. Initial Inspection/Disposal Criteria

Visually inspect.

1. Inspect for missing parts.
2. Inspect handle.
3. Inspect threads.

B. Tests

1. Pressure testing.
 - a. Install valve on test pump.
 - b. Close handle.
 - c. Attach cap or nozzle for testing.
 - d. Test for leaks at 250 psi.
 - (1) Check for leaks around female coupling.
 - (2) Check for leaks under top of handle shaft.
 - (3) Check for leaks on bottom end of handle shaft.
 - (4) Check for leaks in casing.

C. Refurbishing Procedures

Replace missing or damaged handle.

D. Retesting Criteria

Retest after repair. See section B.

E. Cleaning Procedures

1. All items will be washed and cleaned of foreign matter, such as mud, dirt, and grease.
2. Rinse thoroughly.
3. Stand upright to drain and dry.

F. Repackaging

Package 10 each in carton (cache option) and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

ITEM: VALVE, SHUTOFF, BALL

NFES #1201, #1207, #0738

A. Initial Inspection/Disposal Criteria

Check for obvious damage:

1. Check for buffs.
2. Check tail gasket.
3. Must turn freely.
4. Fire damage.

B. Tests

1. Tail gasket:
 - a. Replace if missing.
 - b. In good condition, not cracked or stiff.
 - c. Must be seated properly.
2. Install valve on test pump.
3. Close valve and turn on water to valve.
4. Open valve to expel air then close valve.
5. Turn on pump to 250 psi.
 - a. NFES #1201 and NFES #1207.
 - b. NFES #0738 test at 100 psi.
6. Check for leaks.
 - a. Around the tail gasket.
 - b. At the handles.
 - c. If valve leaks, dispose through local procedures.

C. Refurbishing Procedures

Replace cracked or missing tail gasket.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. Wash and clean all items of foreign matter, such as mud, dirt, and grease.
2. High pressure wash, or clean in a dishwashing detergent with brush or scouring pad as needed.
3. Do not soak for extended periods of time or the detergent will corrode the metal.
4. Rinse thoroughly.
5. Stand upright with barrel in open position to drain water and dry.

F. Repackaging

Pack 10 each in 8 inch by 8 inch by 16 inch carton (NSN 8115-00-079-8693) and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

ITEM: VALVE, WYE

NFES #0259, #0231, #0272

A. Initial Inspection/Disposal Criteria

Check for obvious damage:

1. Handles.
 - a. Bent, if it has a slight bend, replace the handle.
 - b. Broken.
 - e. Missing.
 - d. Too tight.
 - e. Too loose.
 - f. Expansion pins coming out or missing.
 - g. Handles positioned properly.
 - h. Correct handle, left and right.
 - i. Burrs.
2. Male flange, lockring, and setscrews:
 - a. Damaged threads.
 - b. Missing.
 - c. Smooth, flat surface on flange.
 - d. Burrs.
 - e. Loose.
3. Female coupling:
 - a. Coupling spins freely; if not check for wear, replace bearings.
 - b. Tail gasket is present.
 - c. No rough burrs.
4. Casting (body):
 - a. Fire damage, look for further damage, "O" rings.
 - b. Corrosion.
 - c. Cracks.
 - d. Burrs.
5. Plastic sphere
Inspect sphere while turning handle; if pitted or rough, replace.

B. Tests

1. Pressure Testing: (NFES #0259 & NFES #0231 test at 250 psi for 3 minutes)
(NFES #0272 test 100 psi for 3 minutes)
 - a. Install valve on test pump.
 - b. Close handles.
 - c. Turn on water to valve.
 - d. Open handle to expel air.
 - e. Turn on pump and check valve for leaks.
 - (1) If valve is found to be defective, repair as needed.
 - (2) Retest after repair.

C. Refurbishing Procedures

Replace worn, cracked, or missing "O" rings or tail gasket.

D. Retesting Criteria

Retest if "O" rings or gaskets are replaced according to section B.

Storage and Refurbishing Standards

E. Cleaning Procedures

1. Wash and clean all items of foreign matter, such as mud, dirt, and grease. High pressure wash or clean in a dishwashing detergent with brush or scouring pad as needed. Do not soak for extended periods of time or the detergent will corrode the metal.
2. Rinse thoroughly.
3. Stand upright with handles in half open position to drain water and dry.
4. Lubricate with appropriate type of lubricant.

F. Repackaging

- Package 10 each NFES #0231 in carton (cache option) and label accordingly.
- Package 10 each NFES #0259 in carton (cache option) and label accordingly.
- Package 20 each NFES #0272 in carton (cache option) and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

**ITEM: VALVE, FOOT, 1-1/2" NH-F W/TRAINER
VALVE, FOOT, 2" NPSH W/STRAINER**

**NFES #0212
NFES #0906**

A. Initial Inspection/Disposal Criteria

1. Visually inspect.
2. Inspect for missing parts (screws, screen, and adaptor when required).
3. Inspect for damaged threads and gaskets.

B. Tests

Ensure that valve assembly functions.

C. Refurbishing Procedures

Repair or replace missing parts.

D. Retesting Criteria

None.

E. Cleaning Procedures

1. All items will be washed and cleaned of foreign matter, such as mud, dirt, and grease.
2. Rinse thoroughly.
3. Stand upright to drain and dry.

F. Repackaging

Package 10 each in carton (cache option) and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

Storage and Refurbishing Standards

**ITEM: WYE, CONNECTION
WYE, SIAMESE**

**NFES #0839
NFES #0883**

A. Initial Inspection/Disposal Criteria

1. Check for damage.
2. Tail gasket.
3. Buffs.
4. Damaged threads.
5. Body.

B. Tests

1. Clean threads.
2. Cap male ends.
3. Attach to test pump. Test at 200 psi.
4. Check for leaks.
5. Discard if leaking.

C. Refurbishing Procedures

Replace worn, cracked, or missing tail gasket. Replace tail gaskets if missing, cracked, or stiff.

D. Retesting Criteria

Retest if tail gasket was replaced.

E. Cleaning Procedures

1. Wash to remove all mud, dirt, and grease. High pressure wash or clean in a dishwashing detergent with a brush or scouring pad as needed.
2. Do not soak. Detergent may corrode metal.

F. Repackaging

Package 10 each NFES #0839 in carton (cache option) and label accordingly.
Package 10 each NFES #0883 in carton (cache option) and label accordingly
Package 20 each NFES #0739 in carton (cache option) and label accordingly.

G. Storage and Shelf Life Checks

None at this time.

Appendix A

**UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE**

SAFETY ALERT

REPLY TO: 6700, 5160

SUBJECT. CHAIN SAW CHAPS

AREA OF CONCERN: RECALL & INSPECTION OF CHAIN SAW CHAPS

DISCUSSION: Missoula Technology & Development Center (MTDC) recently discovered three pair of chain saw chaps that were manufactured with ballistic nylon cloth instead of the required Kevlar cloth. Appropriately manufactured chain saw chaps consist of a nylon duck outer shell, with two layers of woven Kevlar and two layers of Kevlar felt. Three pair of chaps found at MTDC have the two layers of woven Kevlar replaced with ballistic nylon cloth. Chain saw chaps manufactured to specification (two layers of woven Kevlar and two layers of felted Kevlar in a sandwich construction) protect the user to a chain speed of 3,300 feet per minute (fpm) whereas the defective chaps manufactured with the ballistic nylon and Kevlar felt construction protect to a chain speed of 2,450 (fpm).

ACTION: Identify chaps suspected of containing ballistic nylon felted Kevlar construction.

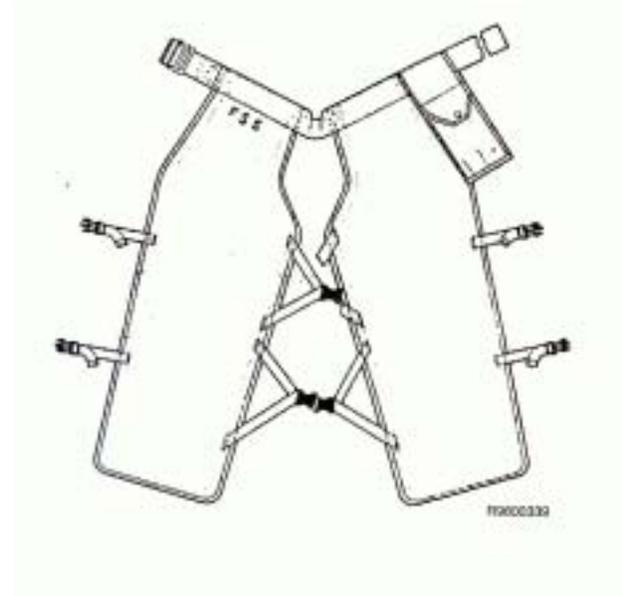
PROCEDURES: Chaps manufactured with the ballistic nylon, felted Kevlar construction, were manufactured under two possible General Services Administration (GSA) contracts. The contract periods ran from September 1987 to August 1988 and September 1988 to August 1989. The contract numbers are GS-07F-17206 and GS-07F-17862. The label with the contract # is attached to the chaps on the waist belt centered between the right and left legs on the inside. These two contracts are the last chaps that were manufactured through GSA in which the 2 inch metal belt buckle was required. Chaps with unreadable contract numbers and metal 2 inch belt buckles may also be defective.

THE ONLY CHAPS TO BE RETURNED TO NIFC FOR INSPECTION ARE:

- #1. Those marked with either of the two contract numbers.
- #2. If the contract number is unreadable those with a 2 inch metal belt buckle.

Inspect your inventory of chain saw chaps and identify chaps that have either of the two contract numbers, or have unreadable contract numbers with 2 inch metal belt buckles. Ship chaps to: NIFC CACHE, 3833 S. Development Avenue, Boise, ID 83705-5346, ATTN: CHAPS. At NEFC the chaps will be inspected. If they contain ballistic nylon your defective chaps will be replaced. The NIFC CACHE will set up an inspection procedure in which your defective chaps will be replaced and good chaps returned ASAP so not to impact your field activities.

If you have questions or comments contact George Jackson at MTDC, 406-329-3967, FAX 406-329-3719, DG: ROIA, Internet, mtdcfire@montant.com.



December 1988

Inspecting and Repairing Your Chain Saw Chaps

Forest Service
U.S. Department of Agriculture
Equipment Development Center
Bldg. 1, Fort Missoula
Missoula, Montana 59801

9800339

8267 2505

Since 1965 the Forest Service has provided chaps for chain saw operators. The chaps have prevented thousands of serious injuries by protecting against chain saw kickback and other chain contacts.

The chaps were redesigned in 1981 to improve protection and comfort.

This guide explains how to inspect, clean, and repair these new chaps so they will provide years of protection and comfort.

How the Chaps Protect

The chaps protect by offering cut resistance that slows and stops the chain. Added protection is provided if the pad material is pulled into the drive sprocket, jamming it.

Redesigned chaps offer protection against chain speeds up to 3,300 feet per minute (fpm). This compares to 2,200 fpm for the older model.

The chaps' nylon duck shell resists water, oil, and abrasion. Water or oil penetrating into the pad material increases chap weight but does not affect their protective qualities.

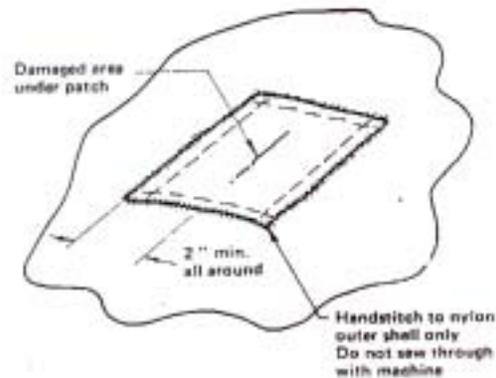
The pads consist of two layers of woven Kevlar and two layers of felted Kevlar between a shell of nylon duck. Kevlar is an aramid fiber like Nomex, but with more fire resistance. When the chaps are exposed to temperatures above 500 °F, the nylon shell can melt but the chaps themselves are not flammable.

The chaps should be properly adjusted and worn snug—not tight or loose—to keep them positioned correctly on the legs. Proper fit and correct length—2 inches below boot tops—maximize protection.

Inspection

Inspect the nylon shell closely for spot melting caused by resting an overly hot muffler against the chaps.

Look for small surface cuts. These occur when resting the chain on the chaps or stopping the chain with the chaps. These telltale cuts are warnings of near misses or improper use. Never allow a moving chain to touch the chaps—even briefly.



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Care and Cleaning

Take care of your chaps. Don't wrap them around the saw bar while carrying your saw. Store chaps away from the saw and gas and oil when traveling.

Keep your saw clean. This will reduce the oil buildup on your chaps. Inspect your chaps periodically for oil, and keep them as oil-free as possible. This reduces flammability and surface slickness, and gloves and clothing stay cleaner.

To remove heavy oil, as well as stubborn dirt and stains, treat first with a dry cleaning solvent like perchloroethylene. Follow with a spray cleaner or detergent and water. Brush with a bristle brush. Rinse thoroughly in warm water. Hang to dry. Do not bleach or machine dry.

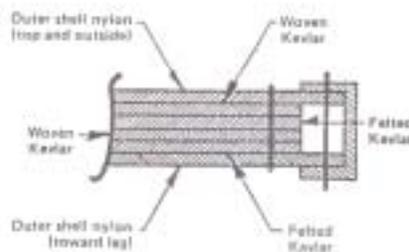
Remove light oil and less persistent stains by washing chaps by hand in warm water and detergent. Use a scrub brush.

To clean off mud or loose dirt, allow it to dry, then remove with a stiff bristle brush. If stains remain, wash as recommended above.

Repairs

Repair melt holes and cuts as soon as possible. Repair techniques depending on whether damage is restricted to the outer layer of green nylon duck or involves the yellow Kevlar too.

If only the nylon is burned or cut through, make a nylon patch that extends at least 2 inches beyond the edges of the damage. Fold the patch under 1/2 inch and handstitch this folded edge to the nylon.



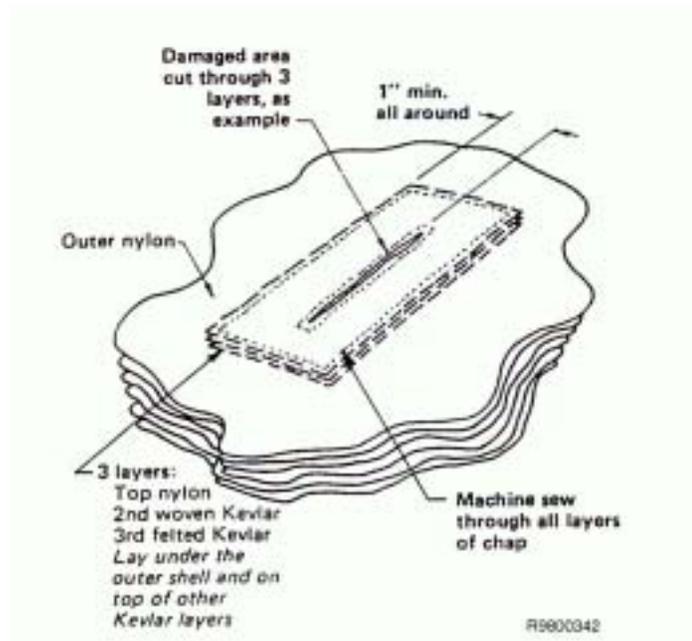
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Appendix A

Handstitching is better than using a sewing machine. When all layers are sewn together, chap protection drops from chain speeds of 3,300 fpm to 2,700 fpm because loosely held pads protect better.

Deeper cuts that involve the Kevlar material must be repaired with a patch equal to the number of layers cut and must be machine sewn. If three layers are cut, the patch must contain these three layers.

Make the patch big enough to extend 1 inch beyond the damaged area. Insert the patch under the nylon, then sew on all four sides and along the cut in the nylon shell.



The extra material in the patch area increases protection, but the protection in the area immediately around the patch drops to 2,700 fpm due to stitching through all layers.

Get patch materials from a pair of previously damaged chaps.

Chain saw cuts are twice as likely on the left side of the body as the right. If, for example, two pairs of chaps are removed from service due to left leg damage, the straps and belt can be removed from one right leg, turned over, and stitched into place as a new left leg on the second pair. This repair is less costly than buying a new pair of chaps.

Extensive repairs should be made by experienced sewing machine operators using industrial machines. Many districts and forests have these sewing machines. Contact a Forest Service source, or contract for repairs with a commercial tent and awning company.

When to Remove Chaps From Service

We recommend no more than five patches per leg (only two of which should be cuts of more than three layers). If any cut into the pad has pulled out material that doesn't easily lay back into place, remove the chaps from service.

Take the chaps out of service if an cut exceeds 7 inches or if the chaps have been cut completely through.

In summary, remove chaps from service when:

1. Either leg has more than five patches.
2. There are more than two patches over three layers deep on one leg.
3. Any cut exceeds 7 inches.
4. Material torn out can't be smoothly put back into place.
5. All layers have been cut through.
6. Other damage occurs that looks beyond safe repair.

With proper care, handling, and repair, your chaps will last many years. If special problems or questions arise, contact the Missoula Equipment Development Center for technical help.

Appendix B

DuPont Customer Service can provide the following laundering instructions. Contact them at 1-800-931-3456, or write them at:

DuPont Company
Nomex® Customer Service
PO Box 278
McBee, NC 29101

The following is from the DuPont publication on laundering:

- a. Tests show that (commercial and industrial detergent) formulations designed for use at a temperature of 140 °F (60 °C) or less adequately clean NOMEX® and provide the best fabric color retention.
- b. Garments of NOMEX® must be adequately rinsed to remove residual wash chemicals.
- c. In some instances, tumble dry conditioning is the only finishing necessary for garments of Nomex®.”

In addition to these guidelines:

- a. Select temperatures to maintain color fastness except as necessary to clean heavily soiled items.
- b. The use of commercial cold-water process may be used in remote or field locations as necessary.
- c. Garments heavily soiled with petroleum products may require dry-cleaning.

**FOR MORE INFORMATION,
PLEASE CALL 1-800-453-8527 OR WRITE:**

DuPont
Advanced Fibers Systems
Chestnut Run Plaza
Laurel Run Building
Wilmington, DE 19880-0705

We believe that this information is the best currently available on the subject. It is offered as a suggested starting point for experimentation you may care to undertake in this area. It is subject to revision as additional knowledge and experience are gained. DuPont makes no guarantee of results and assumes no obligation or liability whatsoever in connection with the information. Those intending to use recommendations contained in this publication concerning equipment, processing techniques or chemical products should first satisfy themselves that the recommendations are suitable for their use and meet all appropriate safety and health standards. This publication is not a license to operate under, or intended to suggest infringement of, any existing patents.

Rapidly advancing knowledge of new, long term toxic effects of many chemicals has emphasized the need to reduce human exposure to many chemicals to the lowest practicable limits. Special hazards with respect to chemicals mentioned in this bulletin that were known to us at the time of publication have been noted in the text or in footnotes, but we do not suggest or guarantee that other hazards do not exist. We strongly recommend that processors seek and adhere to manufacturer's or supplier's current instructions for handling each chemical they use.

Replaces and updates Bulletin 33-12, 7/78
B-71647 Rev. 3/97 Printed in U.S.A.



Nomex®
Only by DuPont

SECTION I: INTRODUCTION TO NOMEX® ARAMID FIBER

GENERAL INFORMATION

Garments of NOMEX® aramid fiber have been used for more than 30 years for protection against fire-related personal injury. During this time, the line of NOMEX® products has been expanded and improved to include products made from fiber blends, such as blends of NOMEX® with KEVLAR® and static-dissipative fibers. The family of NOMEX® aramid fibers now includes:

- 100% NOMEX® T-450, which is used in its natural, undyed state or dyed for sewing thread;
- NOMEX® III, a blend of NOMEX® and KEVLAR®;
- NOMEX® IIIA, a blend of NOMEX®, KEVLAR® and a static-dissipative fiber; and
- Producer-colored NOMEX®, which is supplied in a blend with KEVLAR® and may also be supplied with a static-dissipative fiber.

The introduction of new, low-temperature detergent formulations has resulted in improved washfastness for garments of NOMEX®. Accordingly, DuPont has modified its recommended procedures for laundering garments of NOMEX®. The revised procedures outlined in this bulletin are designed to remove flammable contaminants and maximize garment life.

Properly dyed and finished garments of NOMEX® are inherently flame resistant. No laundry procedures are known to remove the flame resistance of NOMEX®. However, thermal protection can be compromised by the presence of flammable contaminants on the garment, or on the fabric from which it is made. Even though garments of NOMEX® are inherently flame resistant, flammable contaminants on the garments can ignite and burn until consumed, thus increasing heat transfer to the wearer.

Laboratory tests have shown that the procedures recommended in this bulletin are effective in removing oil-based soils from garments while minimizing the impact on colorfastness and wear life. Users of textile items made of NOMEX® should ensure that the techniques they use achieve similar results.

This bulletin is intended to provide general recommendations on conditions and products for laundering garments of NOMEX®. Throughout the remainder of this bulletin, all variations of NOMEX® and blends of NOMEX® will be referred to as NOMEX®. The products and conditions described in this bulletin performed well in laboratory evaluations; other conditions and products may provide equivalent results. To achieve the best results for specific applications, assistance should be obtained from chemical suppliers for the chemicals used.

SECTION II: COMMERCIAL LAUNDERING GARMENTS OF NOMEX® ARAMID FIBER

SORTING AND WASH WHEEL LOADING

Garments of NOMEX® should be washed separately from other articles to avoid contamination with lint of flammable fibers. In addition, to avoid possible staining of light-colored garments, dark-dyed garments of NOMEX® should be sorted and washed separately from very light shades or undyed articles.

To ensure thorough cleaning, washer loads for garments of NOMEX® should be approximately ⅓ the weight of loads recommended by the wash wheel manufacturer for 100% cotton goods. However, because garments of NOMEX® generally weigh less than their all-cotton counterparts, no significant loss in the number of garments processed per wash cycle should be experienced.

WASHING SUPPLIES

A source list for laundering products is presented in Appendix I. Laboratory tests have shown these products to be effective; other products also may provide acceptable results.

Detergent

Many commercial and industrial detergent formulations have been evaluated in the laboratory for their cleaning effectiveness and impact on washfastness. Tests show that formulations designed for use at a temperature of 140°F (60°C) or less — such as high-surfactant, low-alkalinity products — adequately clean NOMEX® and provide the best fabric color retention. Color loss after 200 launderings in a commercial wash wheel using these formulations has been found to be minimal. The use of soaps for laundering NOMEX® is not recommended due to the potential formation of insoluble scums with hard water. Soap scums may be flammable and could adversely affect the thermal protective performance of the garment.

Alkalinity (pH)

The detergents listed in Appendix I have pH values ranging from 9 to 11 and have been found to effectively lift dirt and oil from the NOMEX® fiber. The use of higher wash temperatures and detergent formulations with higher alkalinity will improve cleaning; however, these harsher conditions can negatively impact the colorfastness of the garments. Users must choose appropriate laundering conditions to maintain the desired balance between garment cleanliness and color retention.

Bleach

Only oxygen-based bleach is recommended for use on garments of NOMEX® — *chlorine bleach should not be used*. Although chlorine bleach will not affect the inherent flame resistance of NOMEX®, it may cause strength and color loss in garments over time.

Sour

When laundering items of NOMEX®, the use of a sour after thorough rinsing helps ensure that any remaining traces of alkalinity are neutralized.

Softeners, Anti-Static and Wicking Agents

The following wash wheel supplies perform useful and often highly desirable functions when applied to the load in the last operation:

- *Fabric softeners* impart a softer “hand” to the fabric and assist in wrinkle removal when articles of NOMEX® are tunnel or tumble dried.
- *Anti-static* reduce the effects of nuisance static electricity, such as clinging and lint pick-up. Nuisance static is fairly common with textiles, especially in low-humidity environments. Under normal conditions, garments of NOMEX® IIIA do not require the use of anti-static because NOMEX® IIIA contains a proprietary static-dissipative fiber.

*Some chemicals when added to garments may have a negative impact on thermal protection. The impact of fabric softeners, wicking agents and anti-static should be evaluated at the intended use level prior to routine use.

NOTE: Although certain anti-statics can provide a high degree of static control when properly applied in the wash wheel, they cannot ensure safety in situations where a discharge of static electricity could create a hazard to life or property, such as in an explosive or highly flammable environment. For this reason, it is important that personnel and equipment be properly grounded for maximum safety.

- *Wicking agents** help fabrics adsorb and spread moisture. Experience suggests that these characteristics contribute to comfort in warm, humid environments by helping to rapidly dissipate perspiration, thereby taking full advantage of the cooling effect of evaporation.

Non-Durable Water and Oil Repellents

Water and oil repellency may be a desirable feature in some industrial applications. If the original fabric has not been treated with a repellent, water and oil repellency can be obtained by using sprays or laundry-applied chemicals. Laboratory tests have shown that fluorocarbon sprays, such as Winsol® Fireline Water Repellent, and laundry additives, such as ZONYL® 6991, when applied according to manufacturers' recommendations, will impart water and oil repellency to garments of NOMEX® with minimal effect on the thermal protection of the garment. These materials will cause liquids to bead on the fabric surface and minimize wicking into the fabric. They will not, however, prevent liquids from being forced through the open structure of the fabric.

For example, ZONYL® 6991 may be applied in conjunction with AVITEX® DN without reducing its anti-static activity. However, the wicking action of the AVITEX® DN will be compromised due to the repellency imparted by the ZONYL® 6991. The use of these or other chemicals should be evaluated with respect to the particular oils and/or solvents encountered to determine if they meet the required chemical and thermal protective performance criteria. In addition, because these water repellents may wear away or wash out, re-treatment may be necessary, especially after garment cleaning.

*Some materials when added to garments may have a negative impact on thermal protection. The impact of fabric softeners, wicking agents and anti-statics should be evaluated at the intended use level prior to routine use.

WASHING PROCEDURES

General Wash Formulas

The formulas in Appendices II and III have been developed to wash garments of NOMEX®. Within the limits of these general procedures, modifications should be made to meet the needs of particular types of wash loads and other specific quality standards. To achieve desired results, assistance should be obtained from chemical suppliers.

Wash Temperatures

The detergents listed in this bulletin are primarily designed to work at 140°F (60°C). At this temperature, these surfactant-based formulas effectively lift oily soil while maximizing color retention. For heavily stained and oily garments of NOMEX®, a higher temperature wash formula may be required for adequate cleaning. The use of higher temperature formulas will not affect the inherent flame resistance of the garments or their overall wear life. However, higher wash temperatures or alkalinity levels may adversely affect garment colorfastness. Where color loss is a concern, dry cleaning is an alternative method of removing heavy soil and may be preferable to repeated high-temperature washing.

Prevention of Soil Redeposition

To improve soil removal and minimize soil redeposition in heavily soiled loads, a "multiple add" procedure is recommended. Adding washing supplies to the suds cycle ensures that the concentration is kept high enough to keep the soil in suspension.

Rinsing

Garments of NOMEX® must be adequately rinsed to remove residual wash chemicals. Rinse cycles should be continued until the pH of the rinse closely approaches that of the water supply. To minimize washer-induced wrinkles, water temperature should be reduced in each succeeding rinse cycle until the last operation (sour), where it should be 90°F (32°C) or lower.

Souring

Residual alkalinity in garments of NOMEX® can cause skin irritation and other problems. To ensure that all traces of wash chemical alkalinity are neutralized, sour can be added to the final rinse cycle in the wash wheel. Garments should not be rinsed further after the sour is added. Overuse of sours should be avoided because it will result in highly acidic fabrics. Any standard or buffered sour is acceptable for use with garments of NOMEX®.

Softeners, Anti-Static and Wicking Agents

Generally, softeners and anti-statics are not permanently affixed to fabrics. Instead, they should be applied in the last wash wheel operation, then reapplied at the end of each subsequent wash cycle. Most are compatible with sours and can be applied in the sour bath. When applying any proprietary laundry product in the wash wheel, it is essential to seek the supplier's advice on its exact use and possible effect on the flammability and thermal protection of the garment.

Although the use of anti-statics may not be required with garments of NOMEX® IIIA, the "feel" and wickability of such garments can be improved with softeners and wicking agents. For example, tests have shown that AVITEX® DN softens fabrics of NOMEX®, reduces static propensity and significantly improves wicking, without adversely affecting thermal protection.

When using AVITEX® DN, the following should be noted (see Appendices II and III):

- AVITEX® DN does not permanently attach itself to the NOMEX® fiber; therefore, it must be reapplied or "added on" at the end of each wash cycle.
- AVITEX® DN is compatible with sours and can be conveniently applied during the souring step.
- AVITEX® DN tends to foam profusely. To control this foaming action, a very small amount of an effective anti-foam agent can be applied to the bath.
- As with sours, garments should not be rinsed after AVITEX® DN is applied.
- When applying AVITEX® DN, the cycle time should be extended to ensure complete and uniform distribution on the garments.

- Within the limits recommended, AVITEX® DN does not adversely affect the thermal protective performance of garments of NOMEX®.
- The "add-on" of AVITEX® DN is a function of both the concentration in the final cycle and the percentage of "wet pickup" (the moisture retained after the final cycle and extraction).
- AVITEX® DN add-on can be improved by raising the concentration in the final rinse and/or increasing the percentage of wet pickup.
- The amount of AVITEX® DN added to the wheel should not be reduced for partial loads. Always add AVITEX® DN in the amount calculated for a full load, unless the water level in the final bath cycle has been reduced.
- Contamination of the AVITEX® DN supply by detergents should be avoided because it can destroy the anti-static property. Keep the supply container closed to avoid evaporation and drying out. Gelling or thickening of the AVITEX® DN indicates product alteration or deterioration. In such cases, the supply should be replaced.

CAUTION: When using AVITEX® DN, avoid contact with the eyes or skin. In the event of contact with the eyes, flush the eyes thoroughly with water for at least 15 minutes and consult a physician. In the event of skin contact, wash thoroughly with soap and water. For detailed use instructions, consult the DuPont Material Safety Data Sheet for AVITEX® DN.

Effective softening, static suppression and wicking are achieved with garments of NOMEX® when AVITEX® DN is applied, as recommended, to give a calculated 0.50% to 0.75% add-on, based on the dry weight of the garment. Achieving the desired add-on depends on a number of factors that vary with different laundry procedures. Appendix IV provides definitions of the essential terms employed and gives two examples of how to calculate the amount of AVITEX® DN softener necessary to achieve the desired add-on. Appendix V contains a chart that can be used when the percentages of wet pickup and wheel volumes are known.

AVITEX® DN tends to cause foaming, which may overrun the wash wheel. Excessive foaming reduces agitation and will retard or prevent the uniform distribution of the softener/anti-stat in the wheel. If foaming is excessive, it can be controlled by adding approximately 0.005% of Dow Corning® Antifoam 1430 to the wheel when the softener/anti-stat is added. This level of antifoam is equivalent to approximately 0.67 oz/100 gal. (5 g/100 L) of liquid in the wash wheel. Silicone anti-foams can result in water treatment problems because they are not easily biodegradable. Check manufacturers' recommendations before using these products.

Repellents

Some fabrics are treated with water repellents during the manufacturing operation prior to the fabrication of garments. These treatments may last for many cleanings, but are not considered permanent. Other repellents are available that can be applied during or after laundering to previously untreated garments, or to previously treated garments that have lost their repellency. Repellent applications will reduce moisture wicking and can make garments that come in contact with the body less comfortable in hot, humid weather. In addition, repellent chemicals may be flammable. Before applying any repellent, it should be evaluated to determine if it will impact the thermal protective performance of the garment.

Repellents can reduce the penetration of oils, solvents and water through the fabric by causing them to bead up on the fabric surface. The level of repellency depends on the type and level of the material being applied, as well as the characteristics of the soils coming into contact with the garment. Fabrics used in industrial work or laboratory garments are not designed to be chemical or liquid barriers. Thus, where exposure to hazardous materials must be prevented, an appropriate chemical barrier suit must be worn.

Winsol® Fireline Water Repellent is available as an aerosol spray or in bulk form. It is an example of a repellent that can be sprayed onto the surface of a clean, dry garment. It must be applied in a well-ventilated area, and the solvent must be allowed to evaporate before garment use. This material will wash out com-

pletely after several launderings and must be reapplied to maintain repellency. The amount applied should be the minimum required to obtain the desired repellency. Repellency can be determined by applying a drop of liquid (water, oil or solvent) to the fabric surface to determine whether it wicks into the fabric or beads on the surface. Not all liquids will be repelled. Contact the manufacturer for applicability and impact on fabric flammability.

Another repellent, ZONYL® 6991, is applied in the final wash wheel rinse and is exhausted onto the fabric by adjusting the pH and increasing the water temperature. Garments must be hot-air dried after application for this repellent to be effective. Under the conditions shown in Appendix VI, approximately 80% of the material added to the final rinse will be exhausted onto the garments. An initial level of 2% to 3% on the dry weight of the garment is required for noticeable repellency of water or motor oil. ZONYL® 6991 may or may not be removed during the cleaning process, depending on the procedures used. Additional repellent should not be added during subsequent cleaning cycles unless indicated by a repellency test. Buildup or application of excessive levels of repellents can increase the level of flammable material and compromise the thermal protective performance of the garment. Use for specific applications should be evaluated prior to general adoption.

If AVITEX® DN is normally used for static control, it should be added with ZONYL® 6991 in the final rinse. If AVITEX® DN is added earlier in the wash procedure, it can be removed during further rinsing. The same holds true for ZONYL® 6991.

DRYING AND FINISHING

General Guidelines

Garments of NOMEX® can be rapidly dried and finished with good appearance using several methods. Economic savings are possible if drying and finishing are combined into one step, as with the wet-to-dry tunnel method.

No matter which method is chosen, every effort should be made to avoid introducing hard-set and unnecessary wrinkles during washing or extraction. For best results,

garments should not be bugged. However, if bugging is necessary, the bags should not be filled to more than half their capacity to ensure that the garments have adequate freedom of movement. Similarly, the wash wheel should not be overloaded. After the break and aids cycles, the water temperature should gradually be reduced through several rinse cycles to avoid introducing "thermal shock" wrinkles, which can be very difficult to remove. The final operation (sour) should be carried out at a temperature of 90°F (32°C) or lower.

Garments should not be fully extracted unless they are to be pressed. If an extraction is used as a preliminary step to other finishing methods, garments should be cold and subjected only to very brief and light hydraulic or centrifugal pressure. Extraction will reduce softener add-on by diminishing water carry-over; thus, a higher softener concentration in the final rinse will be required to achieve the desired add-on.

Tumble Dry Conditioning/Finishing

In some instances, tumble dry conditioning is the only finishing necessary for garments of NOMEX®. Tumble dry conditioning also can be done prior to dry-to-dry tunnel finishing or pressing. Adequate tumbling action is necessary for good wrinkle removal; therefore, tumble dryers should not be overloaded. Garments will dry rapidly and satisfactorily at exhaust air temperatures between 140°F (60°C) and 160°F (71°C). Garment temperature measured in the basket should not exceed 280°F (138°C). Excessive shrinkage and color loss can occur if higher temperatures are encountered. Tumbling without heat for an additional 10 minutes at the end of the drying cycle will cool the garments and help avoid dryer-induced wrinkles. To avoid set-in wrinkles, garments should not remain in a hot tumbler when it is not in motion, nor should they be folded or stacked.

Wet-to-Dry Type Tunnel Drying/Finishing

With this method, wet garments from the wash wheel are hung on hangers, placed on a conveyor and passed through a tunnel containing forced air supplied at 300°F (149°C) dry bulb and 190°F (88°C) wet bulb. Garments subjected to this combination of heat and air movement dry and finish wrinkle free and ready to wear. Garment temperature should not exceed 280°F (138°C). After exiting the tunnel, garments should hang freely and should not be compressed against other garments until they have cooled to below 100°F (38°C).

Dry-to-Dry Type Tunnel Drying/Finishing

After being conditioned in a tumble dryer, garments can be hung on hangers and rapidly and continuously conveyed through an abbreviated finishing cabinet. Steam, heat and forced air agitation minimize wrinkles and allow processing in a short period of time.

Pressing

If pressing is required, a steam-heated hot head press is recommended with a steam pressure of 80 psig (325°F [163°C]) and a steam/bake/vacuum cycle of 5/10/5 seconds. If an electrically heated hot head is used, a temperature of 375°F (191°C) should be used for 20 seconds as a starting point. Garments should be examined for glazing and dye sublimation before adopting these methods on a commercial basis.

SECTION III: HOME LAUNDERING GARMENTS OF NOMEX® ARAMID FIBER

GENERAL GUIDELINES

Garments of NOMEX® can be washed and dried by any conventional home method, followed by hand ironing if necessary. No special technology is needed for home laundering garments of NOMEX®. However, home procedures may not remove the last traces of very heavy, widespread or ground-in soils, which may be flammable and could adversely affect the thermal protective performance of garments of NOMEX®.

If home laundering does not remove contaminants or contaminant build-up, garments can be periodically dry cleaned or commercially laundered. When garments are contaminated by hazardous materials, only commercial or on-site laundering or dry cleaning should be used with the appropriate wastewater treatment techniques.

The following procedures can help provide optimum cleaning:

Sorting

Garments of NOMEX® should be sorted and washed separately from other garments to prevent contamination with lint of flammable fibers.

Pretreating

Stains, as well as deep soil lines on the collars and cuffs of garments, are more readily removed if pretreated. Stains should be pretreated at the earliest opportunity and sufficient time allowed for the pretreatment material to penetrate and loosen the soil. The heavily soiled or stained areas should be rubbed with a full-strength, heavy-duty liquid detergent or any off-the-shelf laundry pretreatment product.

Preparing the Wash Load

Before laundering garments of NOMEX®, pockets should be emptied, pants cuffs cleaned out and zippers closed.

Load Size

When laundering garments of NOMEX®, it is important not to overload the machine. To ensure a cleaner wash and avoid setting wash wrinkles, the load size must permit clothes to move freely through the wash water and rinse cycle. Regardless of the machine's rated capacity in pounds, bulk — not weight — should be the limiting factor.

Wash Water Temperature

Moderate soil levels may be removed adequately at normal wash water temperature settings. Heavily soiled and stained garments of NOMEX® require a higher water temperature setting.

Detergents

Synthetic, heavy-duty liquid laundry detergents are recommended for washing garments of NOMEX®. These "designed" products do a superior job of removing soils and are less likely than soap to form sticky deposits of lime soap curds, which are difficult to rinse out. Fatty-based soaps should not be used. Under-use of detergent results in poor soil removal and frequently causes suspended soils to redeposit on the clothes. Failure to use a sufficient amount of detergent is the single greatest cause of inadequate home cleaning.

Water and Water Conditioners

For best results, an adequate supply of "soft" water is required for home laundering garments of NOMEX®. "Hard" water contains minerals, such as calcium and magnesium salts, that combine with fatty-based soaps to form insoluble films, scum or curd. These insoluble contaminants are difficult to rinse from fabrics, may be flammable and could adversely affect the thermal protective performance of garments if not adequately removed. Soap is not recommended, but if it is used in hard wash water (more than approximately 7 grains/gal., 120 mg/L, or 120 ppm), a nonprecipitating-type water conditioner should be added. Softening the water reduces soap consumption and improves the quality of washing.

Bleaches

Only oxygen-based bleaches should be used on garments of NOMEX® — chlorine bleach should not be used. Although chlorine bleach will not affect the inherent flame resistance of NOMEX®, it may cause strength and color loss in garments over time.

*Fabric Softeners and Anti-Static**

Under normal conditions, garments of NOMEX® IIIA do not require the use of anti-static because NOMEX® IIIA contains a proprietary static-dissipative fiber. Nevertheless, numerous washer- and dryer-applied fabric softeners are available for use in home laundry equipment. These products improve the “feel” of items of NOMEX® and can reduce the nuisance effects of static electricity — such as lint pick-up and clinging — that are often experienced with textiles. However, they are not as effective as industrial anti-statics applied in the wash wheel.

NOTE: Anti-static additives cannot ensure safety in situations where a discharge of static electricity could create a potential hazard to life or property. If garments of NOMEX® will be worn in an area where explosive or highly flammable materials are present, it is important that personnel and equipment be properly grounded for maximum safety.

Tumble Drying

Garments of NOMEX® will have a smoother appearance when tumble dried instead of being line or drip dried. To ensure maximum removal of wrinkles, tumble dryers should not be overloaded.

Drying time varies with the nature and size of the load. Garments of NOMEX® dry faster than all-cotton garments of the same weight. When tumble dried at the medium- or high-temperature setting, a properly sized load usually dries in approximately 20 minutes.

Machines designed to give the best automatic wash-and-wear or durable-press performance are programmed so that the blower fan and clothes drum continue to operate five to 10 minutes after the heater turns off. This provides a cool-down period for the garments and helps minimize wrinkles. Tumble dryers with this capability usually feature a control dial or push button with a “Wash-and-Wear” or “Durable Press” setting that provides the proper temperature and a cool-down cycle.

Ironing

If garments of NOMEX® need touch-up pressing, a steam or dry iron may be used at the medium setting.

*Most dryer sheets and some liquid fabric softener products contain diethers from the manufacturer stating their product should not be used on children's sleepwear or FR garments. If used in home laundry applications, products with no diethers should be selected.

SECTION IV: DRY CLEANING GARMENTS OF NOMEX® ARAMID FIBER

GENERAL GUIDELINES

There are times when dry cleaning garments of NOMEX® is desirable for economic reasons or because greases and oils cannot be adequately removed during home or commercial laundering. Garments of NOMEX® can be satisfactorily dry cleaned in any conventional commercial dry cleaning system. With heavily soiled garments, using a two-bath cycle may improve soil removal and minimize redeposition. Garments of NOMEX® should be cleaned separately from articles of other materials to avoid contamination with lint of flammable fibers. The practice of maintaining a clean solvent supply must be observed.

No special technology exists for applying anti-static treatments to garments of NOMEX® during dry cleaning. Some suppliers to the dry-cleaning industry offer anti-static treatments for dresswear that also can be used with uniforms of NOMEX®. If equipment is available, dry-cleaned garments of NOMEX® also can be treated with AVITEX® DN softener from a water solution, as described in the commercial laundering section of this bulletin.

SECTION V: REMOVING SPOTS AND OTHER NON-STANDARD CONTAMINANTS FROM GARMENTS OF NOMEX® ARAMID FIBER

GENERAL GUIDELINES

Properly dyed and finished garments of NOMEX® are flame resistant. However, flame resistance can be compromised by the presence of flammable contaminants on the garment, or on the fabric from which it is made. Paint, heavy oily soils or other flammable materials encountered in an industrial environment can pose a hazard if not removed from the garment. In addition, these contaminants are unsightly and detract from the professional appearance of a high-quality garment.

For work assignments where employees are routinely exposed to paint, epoxy or other difficult- or impossible-to-remove contaminants, the use of flame-retardant disposable coveralls as overgarments should be considered. This will minimize the cleaning task and prolong the life of the garment of NOMEX®. When accidental exposures occur, the contaminant should be removed as soon as possible before it sets in or dries. And, the contaminated garment should be clearly identified so the cleaning facility can spot clean the garment before routine laundering or dry cleaning.

The NOMEX® fiber is resistant to most chemicals typically used to launder, dry clean or spot clean garments, including special laundry detergent/solvent emulsifier formulations designed to remove paint, tar, adhesives and other difficult-to-clean stains. These special formulations can be used as either spot cleaners or as laundry or dry-cleaning additives. As an added precaution, they should be checked for compatibility with fabric of NOMEX® before any contaminant removal is attempted. The chemical supplier's spotting and cleaning procedure recommendations should be followed.

Because these formulations may contain flammable solvents, garments should be cleaned by standard cleaning methods after spot cleaning. When chemical additives are used in laundering or dry cleaning, garments should be thoroughly rinsed to ensure the removal of any residual flammable solvents.

Several technical bulletins describing the resistance of NOMEX® to various chemicals are available through the DuPont Product Information Center (800-441-7515) or the DuPont Aramid Telemarketing Group (800-453-8527).

APPENDIX I: SOURCE LIST FOR LAUNDERING PRODUCTS*

Product/Trademark	Detergent Vendor
Alert	Ecolab, Textile Care
Dynalite/Force	370 Wabasha Street
Innovator Ultra Liquid	St. Paul, MN 55102
Innovator Ultra Powder	(800) 553-8683
Factor Plus®	Diversity Fabriclife
Liquid Factor® I	4480 Lake Forest Drive
Liquid Factor® II	Cincinnati, OH 45242
	(800) 862-8883
Surpass 2	U.N.X., Inc.
	P.O. Box 7206
	Greenville, NC 27835-7206
	(919) 756-8616
Choice	Washing Systems, Inc. (WSI)
	1865 Summit Road
	Cincinnati, OH 45237
	(800) 272-1WSI (272-1974)

Product/Trademark	Softeners/Anti-Static Vendor
AVITEX® DN	DuPont Company
	Specialty Chemicals
	1007 Market Street
	Wilmington, DE 19898
	(800) 441-9442

Product/Trademark	Antifoam Vendor
Dow Corning®	Dow Corning
Antifoam 1430	PHAC Customer Service
	P.O. Box 0994
	Midland, MI 48686-0994
	(800) 362-6373

Product/Trademark	Water/Oil Repellents Vendor
Winsol® Fireline	Winsol Laboratories
Water Repellent	1417 N.W. 51st Street
	Seattle, WA 98107
	(800) 782-5501
ZONYL® 6991	DuPont Company
	Specialty Chemicals
	1007 Market Street
	Wilmington, DE 19898
	(800) 441-9442

*NOTE: Listing of products in this appendix does not indicate a DuPont endorsement. Other products not listed in this appendix also may be acceptable laundering products for garments of NOMEX® aramid fiber. Other products that have not been tested but that belong to the same class of low temperature, low alkalinity, high surfactant-based products also may provide acceptable results.

APPENDIX II: SUGGESTED WASH PROCEDURE FOR LIGHTLY SOILED GARMENTS OF NOMEX® ARAMID FIBER*

Operation	Water Level, in. (cm)	Water Temp., F (C)	Time, min.	Supplies**/100 lb (45 kg) of Garments
Break	6 (15)	140 (60)	15	2.5 lb (1.1 kg) recommended detergent
Rinse	10 (25)	140 (60)	3	
Rinse	10 (25)	135 (57)	3	
Rinse	10 (25)	120 (49)	3	
Rinse	10 (25)	105 (41)	3	
Rinse	10 (25)	90 (32)	3	
Sour	6 (15)	Cold	10	1-4 oz. ammonium silicofluoride
Softener/Anti-Stat (optional)				AVITEX® DN™

*Load weight to 3/4 of its rated capacity.

**See Appendix I for laundry supplies.

***If used, apply 0.50% to 0.75% on weight of dry fabric, as described in test and Appendices IV and V.

APPENDIX III: SUGGESTED WASH PROCEDURE FOR HEAVILY SOILED GARMENTS OF NOMEX® ARAMID FIBER*

Operation	Water Level, in. (mm)	Water Temp., F (°C)	Time, min.	Supplies**/100 lb (45 kg) of Garments
Break	6 (15)	160 (71)	20	2.5-3 lb (1.1-1.4 kg) recommended detergent
Flush	8 (20)	160 (71)	3	
Suds	6 (15)	160 (71)	10	1.25-1.5 lb (0.5-0.7 kg) recommended detergent
Rinse	10 (25)	160 (71)	3	
Rinse	10 (25)	160 (71)	3	
Bleach	10 (25)	150 (66)	5	oxygen-based bleach only
Rinse	10 (25)	150 (66)	3	
Rinse	10 (25)	135 (57)	3	
Rinse	10 (25)	120 (49)	3	
Rinse	10 (25)	105 (41)	3	
Sour	6 (15)	Cold	10	1-4 oz. ammonium silicofluoride AVITEX® DN™
Softener/Anti-Stat (optional)				

Load wheel to 3/4 of its rated capacity.

**See Appendix I for laundry supplies.

*If used, apply 0.50% to 0.75% on weight of dry fabric, as described in text and Appendices IV and V.

APPENDIX IV: APPLICATION OF AVITEX® DN SOFTENER/ANTI-STAT

Definitions

• **Add-On** — The calculated percentage of AVITEX® DN added to the dry weight of the goods. (AVITEX® DN is not substantive to NOMEX® aramid fiber. This calculation assumes that none of the "as received" formulation is lost due to evaporation during the drying cycle.)

• **Wet Pickup** — The percentage of liquid¹ carried by the goods that contains AVITEX® DN after the final cycle of the wash wheel.

$$\% \text{ Wet Pickup} = \frac{\text{wet weight} - \text{dry weight}}{\text{dry weight}} \times 100$$

• **Solution Concentration** — The percentage of AVITEX® DN in the final cycle of the wash wheel.

$$\% \text{ Solution Concentration} = \frac{\text{AVITEX}^{\circ} \text{ DN added, gal. (or L)}}{\text{total water in wheel, gal. (or L)}} \times 100$$

Discussion

Add-on is related to solution concentration and wet pickup in the following manner:

$$\% \text{ Add-on} = \frac{\% \text{ solution concentration} \times \% \text{ wet pickup}}{100}$$

When two of these three factors are known, the third can be easily calculated. Generally, the amount of add-on is set at the desired level. Then, with a known wet pickup, the needed solution concentration (i.e., AVITEX® DN) can be calculated. AVITEX® DN is added to the wash wheel to give this concentration and the subsequent calculated add-on.

Example 1

Given:

Wash Wheel: Open pocket, 42 in. x 96 in. (107 cm x 244 cm), 400 lb (181 kg) capacity

Load: 300 lb (136 kg) garments of NOMEX® III aramid fiber

Water Level: 6 in. (15 cm) running, loaded

Total Water in Wheel: 160 gal. (606 L)

Plant Process: Wash/light extract/variable dry finish

Wet Weight Pickup: 55% (determined after extraction; see definitions)

Problem:

Using this information, determine:

- (1) The wash wheel solution concentration needed to give a calculated add-on of 0.5% of AVITEX® DN; and
- (2) The amount of AVITEX® DN that must be added to the wash wheel to give this solution concentration.

Solution:

$$\% \text{ Add-On} = \frac{\% \text{ solution concentration} \times \% \text{ wet pickup}}{100}$$

$$\frac{1}{\% \text{ solution concentration}} = \frac{\% \text{ wet pickup}}{\% \text{ add-on} \times 100}$$

$$\% \text{ Solution Concentration} = \frac{\% \text{ add-on} \times 100}{\% \text{ wet pickup}} = \frac{0.5 \times 100}{55} = 0.91$$

¹Based on the dry weight of the goods.

²As the goods enter the final drying operation, wet pickup depends on a number of factors, including whether or not the goods are extracted and, if so, how much? Wet pickup must be determined for each laundry procedure and, like other variables, must be substantiated if the laundry process is altered significantly.

³Varies with running water level in wheel. Must be determined by actual measurement, or calculated from the equipment manufacturer's specifications. Include water required to saturate clothes, as well as "free" water typically given to solids.

The wash wheel contains a total of 160 gal. (606 L) of water. The number of gallons (liters) of AVITEX® DN softener that must be added to give a 0.91% concentration can be approximated by using the following formula:

$$\text{AVITEX}^{\circ} \text{ DN} = \frac{\text{total water} \times \% \text{ solution}}{\text{concentration}} = \frac{160 \text{ gal. (606 L)}}{x 0.91} = 1.46 \text{ gal. (5.5 L)}$$

Example 2

Given:

Wash Wheel: Open pocket, 42 in. x 96 in. (107 cm x 244 cm), 400 lb (181 kg) capacity

Load: 300 lb (136 kg) garments of NOMEX® III aramid fiber

Water Level: 6 in. (15 cm) running, loaded

Total Water in Wheel: 160 gal. (606 L)

Plant Process: Wash/hang/wet-to-dry tunnel finish

Wet Weight Pickup: 95% (determined at entrance to tunnel finisher)

Problem:

Using this information, determine:

- (1) The solution concentration needed to give an add-on of 0.5% of AVITEX® DN; and
- (2) The amount of AVITEX® DN that must be added to the wash wheel to give this solution concentration.

Solution:

$$\% \text{ Add-On} = \frac{\% \text{ solution concentration} \times \% \text{ wet pickup}}{100}$$

$$\frac{1}{\% \text{ solution concentration}} = \frac{\% \text{ wet pickup}}{\% \text{ add-on} \times 100}$$

$$\% \text{ Solution Concentration} = \frac{\% \text{ add-on} \times 100}{\% \text{ wet pickup}} = \frac{0.5 \times 100}{95} = 0.53$$

The wash wheel contains a total of 160 gal. (606 L) of water. The number of gallons (or liters) of AVITEX® DN needed to give a 0.53% concentration can be approximated by using the following formula:

$$\text{AVITEX}^{\circ} \text{ DN} = \frac{\text{total water} \times \% \text{ solution}}{\text{concentration}} = \frac{160 \text{ gal. (606 L)}}{x 0.53} = 0.85 \text{ gal. (3.2 L)}$$

APPENDIX V: SOFTENER/ANTI-STAT ADDITIONS CHART

Use the chart below to obtain an add-on of 0.50% of AVITEX® DN softener/anti-stat after determining the percentage of wet pickup of garments and the total number of

gallons (or liters) of water in the wheel. The gallons (or liters) of AVITEX® DN to add to the wheel can be found at the intersection of the appropriate columns.

Wet Pickup, %**	Total Water in Wheel,* gal. (L)				
	30 (114)	50 (189)	100 (379)	200 (757)	300 (1,136)
30	0.50 (1.9)	0.83 (3.1)	1.50 (5.7)	3.33 (12.6)	5.00 (18.9)
40	0.38 (1.4)	0.62 (2.3)	1.25 (4.7)	2.50 (9.5)	3.80 (14.4)
50	0.30 (1.1)	0.50 (1.9)	1.00 (3.8)	2.00 (7.6)	3.00 (11.4)
60	0.25 (0.9)	0.42 (1.6)	0.83 (3.1)	1.70 (6.4)	2.50 (9.5)
70	0.21 (0.8)	0.36 (1.4)	0.71 (2.7)	1.40 (5.3)	2.10 (8.0)
80	0.18 (0.7)	0.31 (1.2)	0.63 (2.4)	1.25 (4.7)	1.80 (6.8)
90	0.17 (0.6)	0.28 (1.1)	0.56 (2.1)	1.10 (4.2)	1.70 (6.4)
100	0.15 (0.6)	0.25 (0.9)	0.50 (1.9)	1.00 (3.8)	1.50 (5.7)
110	0.14 (0.5)	0.23 (0.9)	0.45 (1.7)	0.90 (3.4)	1.40 (5.3)
120	0.13 (0.5)	0.21 (0.8)	0.42 (1.6)	0.83 (3.2)	1.30 (4.9)
130	0.12 (0.5)	0.19 (0.7)	0.38 (1.4)	0.77 (2.9)	1.20 (4.5)
140	0.11 (0.4)	0.18 (0.7)	0.36 (1.4)	0.71 (2.7)	1.10 (4.2)
150	0.10 (0.4)	0.17 (0.6)	0.33 (1.2)	0.66 (2.5)	1.00 (3.8)

*Tables provided by wash wheel manufacturers typically give only the amount of water (1 gal. or 3.78 L) that must be added to a saturated moving load to bring the water level up to a specified height (1 in. or 2.54 cm). Add to this amount the amount of water required to saturate the load, usually estimated to be 0.3 gal/lb (2.5 L/kg) of goods in the wheel.

**See Appendix IV.

APPENDIX VI: EXHAUSTION PROCEDURE FOR ZONYL® 6991 APPLICATION*

Adding ZONYL® 6991 is the last procedure in the wash cycle. It should be added with agitation at water temperatures at or below 100°F (38°C). This procedure results in an exhaustion of approximately 80% of the active ingredients onto the fabric.

Guidelines for Application

- In the last rinse cycle, use either citric or acetic acid to adjust the pH of the water to between 4.5 and 5.5.
- After adjusting the pH, add ZONYL® 6991 with agitation at a water temperature of 100°F (38°C) or less.
- With continued agitation, raise the water temperature to a minimum of 120°F (49°C) and hold for five to 10 minutes. Higher water temperatures (up to 160°F [71°C]) will aid in the application of ZONYL® 6991.
- After application of ZONYL® 6991, drop the water bath and extract the garments. Do not rinse garments.
- After extraction, dry garments according to care instructions. For garments of NOMEX®, use a maximum stack temperature of 160°F (71°C). Drying is important to ensure proper performance of the ZONYL® 6991.

*Refer to the ZONYL® 6991 Technical Bulletin

Appendix C

NATIONAL INTERAGENCY FIRE CENTER

3833 South Development Avenue
Boise, Idaho 83705



9216 NFES (FA240)

September 12, 2002



**NATIONAL FIRE EQUIPMENT SYSTEM
CACHE MEMORANDUM NO. 02-10**



To: NFES: National Incident Support Caches

From: Paul Naman, NFES Representative - NIFC



Subject: Recall - Food, Meals Ready to Eat (MRE's) - NFES #1842

The Defense Logistics Agency (DLA) has announced they are recalling 74 pallets of MREs due to possible salmonella contamination of the non-dairy creamer packets. These MREs were distributed through DLA's Tracy Defense Depot, which is the sole distribution center for MREs supplied to GSA and the NFES. DLA has been unable to determine the date of distribution of these MREs. Although GSA's current inventory does not include any of the affected MREs, it is possible some may have been sold to NFES or other customers prior to the recall notification.



The MREs subject to recall were produced by the Wornick Company, McAllen, TX, case lot numbers 2126-006, Case A or B. This information is found on the end of each box of MREs. The potentially contaminated non-dairy creamers are marked "Jianas Brothers Packaging Co., Kansas City, MO."



Fire caches and other organizations with MREs should inspect all stocks to determine if they are subject to the recall. Boxes of MREs meeting recall criteria should be immediately removed from service and not be issued for consumption. Units with MREs subject to the recall should contact Linda Schurg, GSA, at (817) 978-3163 and provide information on the quantity found. Direction on the final disposition for recalled MREs will be provided as soon as it becomes available.



Questions regarding this information should be directed to Linda Schurg at the phone number above.

/s/ Paul E. Naman

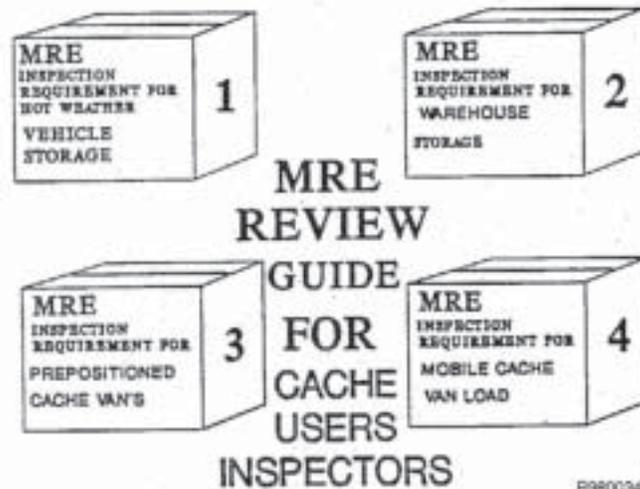
cc:

State Fire Management Officers - BLM
Regional Directors Fire and Aviation Management - USFS
Technology Development Centers - San Dimas, Missoula
Agency Directors - NIFC
Logistics Center - NICC
Ray Balli - GSA
Paul Solarz - USFS



INSPECTION OF MRE MEALS

1. The MRE ration is a complex composite of a variety of components that deteriorate at different rates, making overall shelf-life determination based on remaining shelf-life alone unrealistic, and virtually impossible.
2. The enclosed guides cover visual inspection procedures which provide a basis for FOOD SERVICE inspection of the MRE rations.



MRE STORAGE LIFE BASED ON STORAGE TEMPERATURE

SUSTAINED TEMPERATURE (DEGREES F)	ESTIMATED SHELF-LIFE MONTHS
120	1
110	5
100	18
90	30
80	48
70	66
60	84
less than 50	96

Source DIA Pub DPSC 4155.2 Table (P)

MRE meals (Ready-to-Eat) Hot Weather Vehicle Storage Shelf-Life Awareness



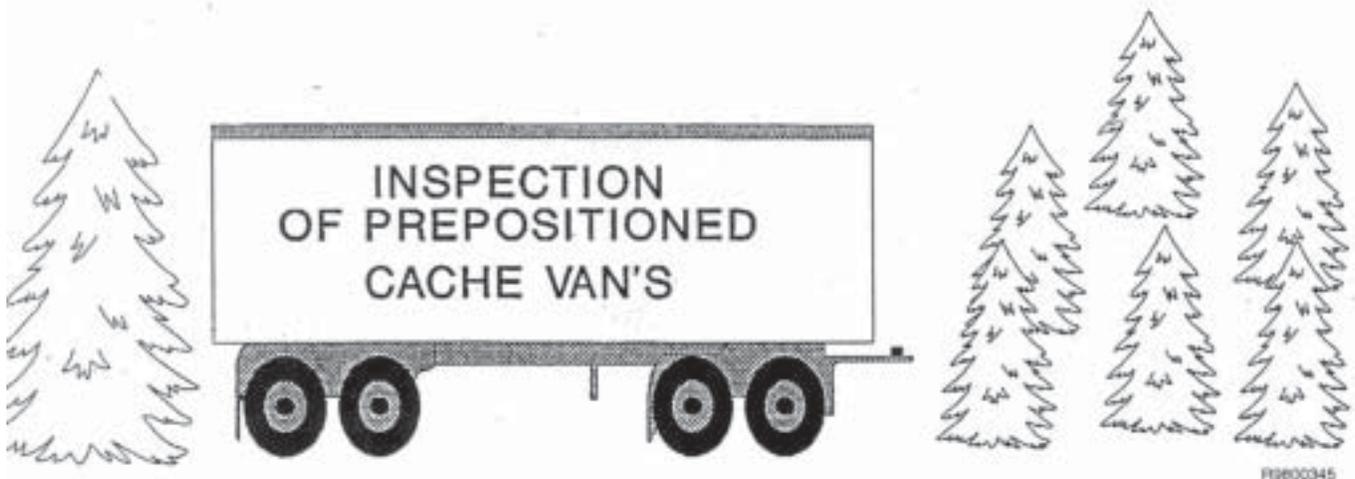
When MRE are stored in fluctuating temperature the Shelf-Life of the MRE will change. The storage of MRE within a vehicle storage compartment will increase the storage temperature of the MRE meal based on its fluctuating outside temperature range which will reduce the storage life of that MRE meal. See the attached temperature Shelf-Life chart which is based on constant storage temperature.

It is recommended that MRE being stored in vehicles be stored in an insulated type storage container i.e., ice chest, or equal to, the use of an insulated container within the vehicle storage compartment will lower the storage temperature, and keep it constant and increase the MRE storage life and product quality.

MRE stored in vehicle must be inspected and checked for heat damage. The inspection of vehicle stored MRE and the frequency of inspection will be based on where the vehicle is staged and the outside temperatures.

The inspection frequency is the users call. The inspector will be looking for damage to the MRE storage container, or storage pouch. If the pouch shows sign of GAS puffiness or foul odor, a defect has occurred and the meal should be replaced. The defective meal will be destroyed and rendered unusable and placed in wet garbage container.

The inspection of Preposition Mobile Cache Vans



The inspection of PREPOSITION Mobile Cache Vans and MRE meals. Vans that have not been issued during Fire Season will be rotated back to the issue CACHE for inspection and review. The Cache will verify Shelf-Life items, MRE meals. The inspection will be a visual inspection. The inspector will be looking for container damage and sign of rodent or insect infestation within the MRE storage container and VAN. The inspector will also be looking for sign of leakage and foul odor coming from the MRE storage case container. He will also be looking at Shelf-Life items.

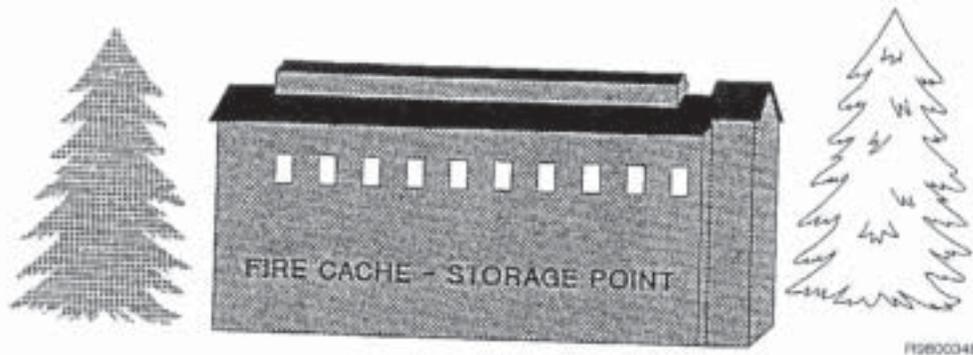
All MRE containers that are suspect will be removed and the container will be opened. The inspector will perform a visual inspection of each meal within the suspect container. The inspector will be looking for damage to the meal storage pouch if the pouch shows sign of GAS puffiness or foul odor, a defect has occurred. The suspect meal and its MRE container data and the MRE meal number which showed sign of damage will be noted on the attached MRE Quality control inspection report form. The inspector will verify all MRE containers within the van for the suspect production lot and contract data and have those containers RE-IDENTIFIED as NRFI. The containers will be marked to prevent issue and a copy of the MRE Quality control inspection report form will be attached to each container. The suspect MRE will be returned into CACHE inventory as (Not-ready-for-issue) NRFI. The defective MRE will be replaced. The defective Van Base Unit will be returned to the GA CACHE for inspection.

A new Base Unit will be dispatched to the preposition location.

The suspect MRE container(s), meal(s) will be held in a secure area to prevent issue pending disposition. The inspector will complete the MRE Quality control inspection report form and document the problems found.

The inspector will provide the Fire CACHE with the inspection document. The Fire Cache will contact the Army Veterinary Inspection Service for inspection of the suspect MRE meals.

The inspection of Fire CACHE Warehouse MRE meals:



The inspection of CACHE MRE meals will be a visual inspection of the MRE storage case container at time of receipt and issue. The inspector will be looking for container damage and sign of rodent or insect infestation within the MRE storage container. The inspector will also be looking for sign of leakage and foul odor coming from the MRE storage case container.

MRE containers that are suspect will be removed and the container will be opened. The inspector will perform a visual inspection of the damaged case and each meal. The inspector will be looking for damage to the meal storage pouch if the pouch shows sign of GAS puffiness or foul odor a defect has occurred. The suspect meal and its MRE container data and the MRE meal number which showed sign of damage will be noted on the attached MRE Quality control inspection report form. The inspector will verify all MRE containers STOCKED for that production lot and contract data and have those containers RE-IDENTIFIED as NRFI. The containers will be marked to prevent issue and a copy of the MRE Quality control inspection report form will be attached to each container. The suspect MRE will be returned into CACHE inventory as (Not-ready-for-issue) NRFI. The defective MRE will be replaced by the CACHE as required.

The suspect container(s) will be held in a secure area to prevent issue pending disposition from the MRE item manager.

The inspector will complete the MRE Quality control inspection report form and forward the original and one copy to the SZ Cache for review and action.

Appendix D



United States Department of Agriculture
Forest Service

Technology &
Development Program

April 1992

6700

9267-2323-MTDC

Maintaining and Inspecting Your Hardhat

Dick Mangan, Program Leader

Perhaps no single item of personal protective equipment is as widely used in natural resources work as the hardhat. Nearly every outdoor activity we perform—from trail maintenance to fire fighting, tree marking to surveying, inventorying cultural sites to maintaining campgrounds—requires workers to wear an approved hardhat to protect against impact and penetration injuries.

Components

The hardhat consists of two parts, the shell and the suspension system, which together protect the worker.

The shell is the rigid outer portion of the hardhat. It is commonly made from thermoplastics such as polycarbonate or polyphthalate, or thermoset materials such as fiberglass. Its main function is to protect against penetration or impact. Although it does offer some protection, the shell was not designed to protect the wearer from radiated heat, nor will it retain its original shape when exposed to temperatures above 300°F.

The suspension system fastens to the inside of the shell and is designed to help absorb the impact of a blow.

Inspection

To insure the protection of workers, it is essential that both the shell and the suspension system are inspected frequently for signs of wear and degradation.

Inspect the shell for dents, cracks, nicks, gouges, and any damage from impact, penetration, abrasion, rough handling, or wear.

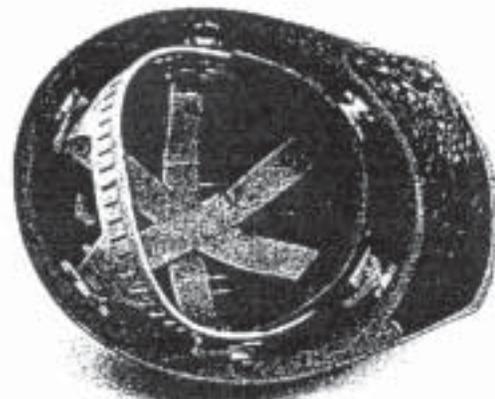
Replace any hardhat that shows signs of wear or damage.

Never drill holes in a hardhat for any reason.

Never use shells with metal parts or clips. They do not meet the electrical conductivity requirements of *ANSI Z-89.1 for Class B Hardhats*.



Hardhat shell.



Hardhat suspension system.

19800348

For additional information contact: Dick Mangan, Program Leader, Missoula Technology & Development Center, Bldg 1, Fort Missoula, Missoula, MT 59801 Phone: 406-329-3849; FTS 585-3849; FAX: 406-329-3719; DG-D. Mangan: R01A

Examine the suspension system closely for cracks, frayed or cut shell straps, torn headband or size adjustment slots, loss of pliability, or other signs of wear. Normal wear, hair and skin oils, and sweat all degrade the suspension system.

Remove and replace any suspension system that is worn or damaged.

Maintenance

Hardhats do not have a clearly defined service life. The conditions of use dictate when a hardhat must be replaced. Exposure to temperature extremes, sunlight, or chemicals like fire retardant or tree marking paint, shorten useful life. Hardhats subjected to such exposures should be thoroughly and frequently inspected.

Following these practices will help protect your hardhat and extend its service life:

Never store a hardhat in direct sunlight.

Never carry a hardhat in a pickup hat rack if this might expose it to direct sunlight for prolonged periods.

Never sit on a hardhat.

Never carry anything inside the hardhat while you are wearing it. For the hardhat to offer maximum protection, you must maintain clearance between the shell and your head.

Always replace any hardhat shell or suspension system that has been struck by a blow of any magnitude, even if there is no visible damage.

To remove dirt and stains from the shell or suspension system:

Scrub with a mild detergent.

Rinse thoroughly with warm (not hot water).

Wipe dry and carefully inspect shell and suspension

system for signs of wear and damage.

Here are two additional sources of information for caring for your hardhat:

An information sheet, *Industrial Head Protection—User Information Guide*, is available from the E.D. Bullard Co., Cythania, Kentucky, (800) 227-0423.

Proper Care and Use of MSA Protective Helmets is a video produced by Mine Safety Appliances (MSA) (412) 967-3139.

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**NATIONAL WILDFIRE
COORDINATING GROUP**

June 28, 1993

Memorandum

To: NWCG Members

From: Chair, NWCG

Subject: Protective Headgear (Hard Hats)

It has come to our attention that misunderstanding between some of our member agencies may exist about approved/recommended protective headgear. Some agencies (or regions within agencies) have adopted and fully implemented the current ANSI standards, while others may have adopted the standard but not fully implemented same due to procurement/fiscal timeframes. This has led, at least in one instance, to one agency's refusal of assistance by a cooperating agency resource, though both agencies met their own personal protective equipment policies which had been mutually agreed upon previously.

To mitigate future such misunderstandings, NWCG has agreed upon the following position regarding procurement and issuance of protective headgear. This will also help clarify concerns regarding penetration, deformation and/or melting of hardhats in wildland fire suppression activities.

The General Services Administration (GSA) catalog carries two distinctly different types of plastic hard hats on schedule. One is designated "Safety Helmet", and is intended to be worn by construction workers on construction sites in a normal temperature situation. The other is designated "Helmet, Safety, Wildfire", and is intended specifically for wildland fire suppression duty. It is required to withstand a temperature of at least 350 degrees F, far in excess of the 140 degrees at which human skin burns. This temperature requirement provides ample head protection to our employees any time they are exposed to excessive heat, whether directly or indirectly. The "Safety Helmet" does not meet the 350 degree requirement.

Additionally, both helmets must meet the ANSI Z89.1-1986 standard for the drop protection penetration test, while the "Helmet, Safety, Wildfire" must also meet the 20,000 volt electric nonconductor test (the construction type "Safety Helmet" does not). This ANSI standard precludes the use of the typical aluminum "ball cap" hardhats that have been in common use by our members.

For these reasons, the only protective headgear on GSA schedule acceptable for NWCG fire suppression duty use (within the timeframes below indicated) is the Safety Wildfire Helmet, or equivalent. It is listed in the GSA "Wildfire Protection Equipment and Supplies Catalog" as Number 8415-01-055-2265, and is yellow in color. A non-inclusive list of other helmets which meet the requirements include Bullard's Models FH911C, FH911CR, FH911H, and FH911HR, and MSA's Model 490-377 in various colors. Generally yellow is the preferred color, for easy visibility and conformity, but is not mandated.

NWCG agencies should phase out the use of all previously used hard hats (if they've not already done so), and replace them as soon as is financially practical. The effective life of a hard hat has been determined to be three years, so a

Appendix D

complete stock replacement should be phased in and completed by October 1, 1995, ensuring that construction-type or metal hard hats are no longer available for issue to employees.

If an agency, or region(s) within an agency, complies with this standard sooner, then it must provide approved "Safety Wildfire Helmets" to responding cooperating agency personnel who have not yet implemented this standard, prior to assignment to wildland fire incidents; or accept the lesser standard of the cooperating agency.

This NWCG position will assist in ensuring that our employees have the best available protective headgear, making it impossible to mistake construction type helmets for approved fire fighting helmets or take inappropriate headgear into fire suppression situations.

A handwritten signature in black ink, appearing to read "E. Anderson". The signature is fluid and cursive, with a long horizontal stroke at the end.

American National Standard for Personnel Protection
Protective Headwear for Industrial Workers-Requirements
ANSI Z89.1-1986

Appendix B
Recommendations and Precautions Concerning Helmet Use, Maintenance, and Testing

B1. Laces

Laces, if any, should always be tied securely with a square knot.

B2. Cleaning

Shells should be scrubbed with a mild detergent and rinsed in clear water approximately 60 degrees Celsius (140 degrees Fahrenheit). After rinsing, the shell should be carefully inspected for any signs of damage.

Removal of tar, paints, oils, and other materials may require the use of a solvent. Since solvents may attack and damage the shell, the manufacturer should be consulted with regard to an acceptable solvent.

B3. Painting

Caution should be exercised if shells are to be painted, since some paints and thinners may attack and damage the shell and reduce protection. The manufacturer should be consulted with regard to paints or cleaning materials.

B4. Periodic Inspection

All components, shells, suspensions, headbands, sweatbands, and accessories, if any, should be visually inspected daily for signs of dents, cracks, penetration, and any damage due to impact, rough treatment, or wear that might reduce the degree of safety originally provided. Any industrial helmet that requires replacement or the replacement of any worn, damaged, or defective part should be removed from service until the condition of wear or damage has been corrected.

B5. Limitation of Protection

Industrial protective helmets meeting the requirements of ANSI Z89.1-1986 are designed to provide optimum protection under average conditions. Users are cautioned that if unusual conditions prevail (for example, higher or lower extremes of temperature than those prescribed), or if there are signs of abuse or mutilation of the helmet or of any component, the margin of safety may be reduced.

Note: All items constructed of polymeric materials are susceptible to damage from ultraviolet light and chemical degradation, and safety helmets are no exception. Periodic examination should be made of all safety helmets and in particular those worn or stored in areas exposed to sunlight for long periods. Ultraviolet degradation will first manifest itself in a loss of surface gloss, called chalking. Upon further degradation the surface will craze or flake away, or both. At the first appearance of either or both of the latter two phenomena the shell should be replaced immediately for maximum safety.

B6. Sizes

Provisions should be made by the manufacturer of industrial protective helmets for testing large and small sizes as appropriate.

B7. Precautions

Because helmets can be damaged, they should not be abused. They should be kept free from abrasions, scrapes, and nicks and should not be dropped, thrown, or used as supports. This applies especially to helmets that are intended to afford protection against electrical hazards.

Industrial protective helmets should not be stored or carried on the rear-window shelf of an automobile, since sunlight and extreme heat may cause degradation that will adversely affect the degree of protection they provide. Also, in the case of an emergency stop or accident, the helmet might become a hazardous missile.

The addition of accessories to the helmet may adversely affect the original degree of protection. When precautions or limitations are indicated by the manufacturer, they should be transmitted to the wearer and care taken to see that such precautions and limitations are strictly observed.

B8. Safe Condition

Neither the impact resistance requirements (see 7.2) nor the electrical insulation requirement (see 7.1) should be construed to indicate the safe impact level or safe voltage to which the industrial worker may be subjected. The maximum voltage against which insulating safety headgear will protect the wearer depends on a number of variable factors, such as the characteristics of the electrical circuit and the equipment involved, the care exercised in maintenance of equipment, and weather conditions. Therefore, the safe and proper local use of insulating safety headgear is beyond the scope of ANSI Z89.1-1986.

WARNING: In addition to an inspection and maintenance program, employers should review with their employees some precautions concerning hard hat use and treatment. The following are some warnings that should be discussed:

- If the hard hat has been struck by a forcible blow of any magnitude, both the hard hat shell and suspension should be replaced immediately, even if no damage is visible.
- A conventional hard hat provides limited protection by reducing the force of falling objects striking the top of the shell. Protection from side impact and penetration is limited.
- The hard hat shell or suspension should never be altered or modified. Drilling holes in the shell for ventilation purposes must be prohibited at all times.
- Avoid contact of the hard hat with electrical wires.
- Hard hats should not be carried on the rear window shelf of an automobile or stored in direct sunlight. Exposure to extreme sunlight over time may cause degradation which can affect the degree of protection originally provided.
- Because hard hats can be damaged, they should not be abused. They should be kept free of abrasions, scrapes, and nicks and should not be dropped, thrown, or used as supports. Do not sit on a hard hat.
- Wearers should never carry or wear anything inside their hard hat. A clearance must be maintained between the shell and head for the protection system to work properly.
- Do not paint a hard hat prior to consultation with the manufacturer. Some paints and solvents may attack and damage the shell and reduce the degree of protection originally provided.
- As a general guideline, all new employees should be provided with a new unused, and unexposed hard hat. The practice of reissuing cleaned hard hats must be avoided. The cost of a hard hat is negligible when the potential for injury, lost time, health care cost, and liability are considered.

Industrial Head Protection User Information Guide

Hard Hats: Maintenance, Inspection, and Precautions

The hard hat is one of the most important pieces of equipment worn in the industrial workplace. Many workers have been saved from serious injury or even death because they were wearing a hard hat. To assist in your organization's head protection program, E.D. Bullard Company would like to share some observations on proper maintenance and inspection of industrial hard hats, as well as a few precautions. These comments apply to hard hats made by all manufacturers, not just Bullard.

A conventional hard hat consists of two components—the shell and the suspension—which work together as a system. Both components require periodic inspection and maintenance. It is recommended that employers conduct a regular head protection inspection, maintenance, and replacement program. Each program will vary according to the work environment at each job site location.

Hard Hat Shell

Thermoplastics (polyethylene, polycarbonate, and polyphthalate carbonate (PPC.) Lexan) and thermoset materials (fiberglass and phenoli-impregnated textiles) are commonly used to mold the shells of industrial hard hats. These materials have proven to be durable, reliable, lightweight, and provide effective protection. Given proper care and normal workplace conditions, a hard hat will have a reasonable service life.

The shell should be inspected routinely for dents, cracks, nicks, gouges, and any damage due to impact, penetration, abrasions, rough treatment, or wear that might reduce the degree of protection originally provided. Any hard hat that shows signs of worn or damaged parts should be removed from service immediately and replaced.

Although Bullard adds an ultraviolet inhibitor to hard hat shells, all hard hats are susceptible to damage from ultraviolet light, temperature extremes, and chemical degradation. Thus, users who work in environments with high degrees of exposure to sunlight, heat, cold, or chemicals should replace their hard hats more frequently than workers in other environments.

Degradation of thermoplastic material may be apparent when the shell becomes stiff, brittle, faded, dull in color, or exhibits a chalky appearance. With further degradation the shell surface may craze, flake, or delaminate. A hard hat should be replaced immediately at the first sign of any of these conditions.

The following is a simple field test that can be performed by an employee or supervisor to determine possible degradation of polyethylene shells:

Compress the shell inward from the sides about 1" with both hands and then release the pressure without dropping the shell. The shell should quickly return to its original shape, exhibiting a degree of elasticity. Compare the elasticity of the sample with that of a new shell. If the sample does not exhibit a similar degree of elasticity to that of a new shell or if it cracks due to embrittlement, it should be replaced immediately.

Hard Hat Suspension

The hard hat suspension system is just as important as the shell. Its main purpose is to help absorb the shock of a blow. Therefore, it must be in good condition at all times.

Like the shell, the suspension must also be inspected and replaced periodically. Over a period of time, the suspension will become worn and may become damaged.

Suspensions should be inspected closely for cracks, frayed, or cut shell straps, torn headband, or size adjustment slots, loss of pliability, or other signs of wear. These conditions can be caused by perspiration, hair oils, or normal wear.

Any suspension that is damaged must be removed from service and replaced immediately.

Cleaning

Hard hat service life can be extended by cleaning both the shell and the suspension. This should be part of the inspection and maintenance program. Scrub the shell and suspension with a mild detergent to remove dirt and stains. Rinse thoroughly with clean, warm water approximately 60 degrees Celsius (140 degrees Fahrenheit). After rinsing, wipe dry and carefully inspect once again for any signs of damage.

What is the useful life of a Hard Hat?

Users of industrial head protection devices must realize that these products do not have an indefinite useful life. E.D. Bullard Company recommends that a regular head protection replacement program be conducted by employers as a responsive solution to the task of addressing useful service life of hard hats.

Since the details of such a program must be developed based on work conditions at each job site, it is impossible to provide a specific time frame for hard hat replacement. As a general guideline many large corporations replace all employees' hard hats every five years, regardless of the hard hat's outward appearance.

Where user environments are known to include higher exposure to temperature extremes, sunlight, or chemicals, hard hats should be replaced automatically after two years use. This is based on information and hard hat samples returned to E.D. Bullard after being exposed to such conditions. It may be that in certain rare instances a hard hat should be replaced within less than two years.

The employer should have a policy of immediately replacing a hard hat if the employee (wearer) feels it is necessary.

Appendix E

SINGLE VISOR SPH-5 HELMET ASSEMBLY Fitting, Operation, and Maintenance Instructions

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Helmet Fitting And Operation	E-2
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INTRODUCTION AND GENERAL DESCRIPTION

This booklet provides operation and maintenance instructions, as well as an illustrated parts breakdown (IPB), for the GENTEX SPH-5® Single Visor Helmet Assembly (see Figure 1).

The SPH-5 is a lightweight helmet assembly providing head protection, noise reduction, and communication enhancement for helicopter personnel. It consists of an impact-resistant helmet shell, a Styrofoam energy-absorbing liner, a preformed thermoplastic liner (TPL®) that allows for custom-fitting if needed, a yoke-style retention assembly (including a chinstrap and a nape strap -- both adjustable), sound-attenuating earcups, a single visor assembly, and a communications assembly featuring a boom-mounted microphone and dual earphones. The helmet is available in two sizes: regular and X-large. (Other sizes are available. In addition, various visor assembly styles are available and are listed at the end of this booklet. Contact GENTEX Corporation for more information.)

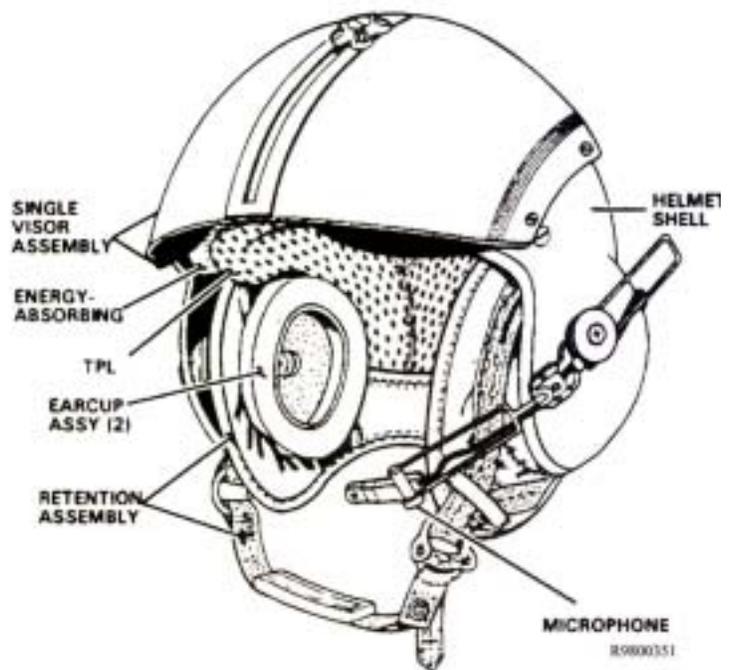


Figure 1. SPH-5 Helmet Assembly

Helmet sizing is based on head circumference. (Figure 2 shows how the crewmember's head is measured for circumference.) Below are sizing parameters.

HELMET SIZE	MAXIMUM HEAD CIRCUMFERENCE (INCHES)*
Regular	21.5 - 22.4
X-Large	greater than 22.4

* These are rule-of-thumb measurements. At times, the next larger or smaller size may be required to achieve a satisfactory fit.

* If your head circumference falls outside the measurements listed above (either larger or smaller), contact GENTEX Corporation for assistance.

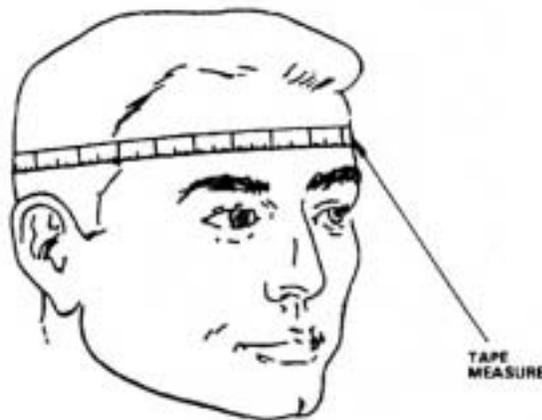
HELMET FITTING AND OPERATION

In this procedure, you will ensure that the helmet is properly fitted to the crewmember. You will also familiarize the crewmember with operation procedures, including donning and doffing the helmet (Steps 1 and 7 respectively), adjusting the nape strap (Step 2), fastening and unfastening the chinstrap (Steps 3 and 6 respectively), and operating the visors (Step 4).

1. Have the crewmember don the helmet as follows (see Figure 3):

CAUTION: Spread the helmet slightly - just enough to allow ease of donning.
Excessive spreading may damage the helmet.

- Grip the retention assembly below the earcups as shown in Figure 3, View A.
- Spread the sides of the helmet slightly and position the front edge firmly against the forehead as shown in Figure 3, View B.
- Roll the helmet back and down onto the head. Press the helmet firmly downward with both hands to ensure that the helmet is properly seated on the head and the ears are surrounded by the earcups. (The earcups can be rotated for optimum fit.)
- Check the distance between the eyebrows and the edge of the helmet shell; it should be approximately (but no more than) 3/4" for optimum field of view.



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Figure 2. Head Circumference for Helmet Sizing

WARNING: For helmet stability, always tighten the nape strap and the chinstrap as snugly as possible when wearing the helmet. Failure to do so may result in injury.

2. Have the crewmember tighten the rear of the retention assembly by adjusting the hook-and-pile closure and tightening the nape strap through the adjustment buckle. (See Figure 4.)
3. Have the crewmember fasten the chinstrap as follows:
 - a. If not already done, insert the snap end of the chinstrap through the D-ring on the right side (as worn) of the retention assembly and fasten the snap as shown in Figure 5, View A.
 - b. Feed the other end of the chinstrap through the D-rings on the left side of the helmet.
 - c. Split the D-rings, loop the chin strap end back through inner D-ring, and pull the chin strap through both D-rings as shown in Figure 5, View B.
 - d. Tighten the chinstrap to the desired tension. Once the desired tension is achieved, the chinstrap can be fastened and unfastened via the snap as shown in Figure 5, View A.
 - e. Check the helmet fit.

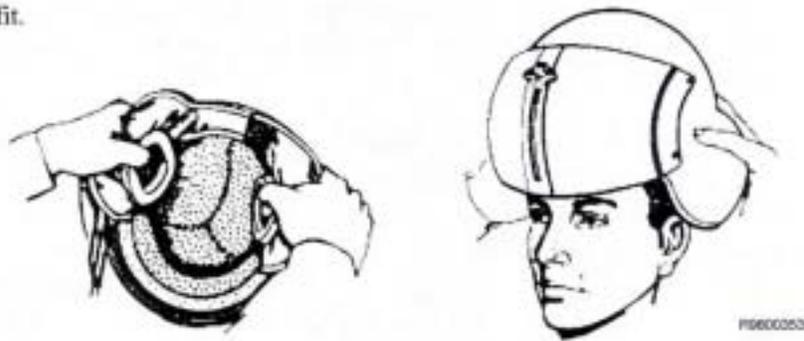


Figure 3. Donning Helmet

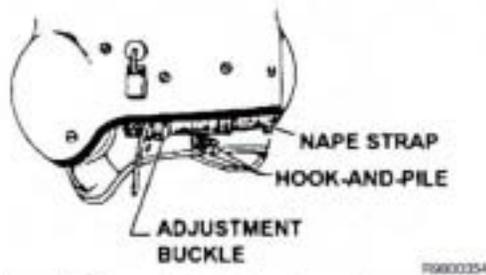


Figure 4. Rear of Retention Assembly



Figure 5. Adjusting Chinstrap

4. Have the crewmember lower and raise the visor as follows (to test operation and clearance):
 - a. Unlock the visor by turning the center lock knob counterclockwise as shown in Figure 6.
 - b. Rotate the visor by sliding the knob along the housing slot.
 - c. Lock the visor by turning the knob clockwise.
5. Evaluate the fit according to the following criteria:
 - a. The earcups should surround the ears completely.
 - b. The earseals should be compressed to the greatest degree possible without discomfort.
 - c. The overall fit should be comfortable; no hot spots or pressure points should exist.

NOTE: After evaluating the fit, you will unfasten the chinstrap and doff the helmet as instructed in Steps 6 and 7. If the helmet fulfills all of the criteria listed in Step 5, mark and store the helmet as required. If the earcups do not surround the ears completely, refer to "Adjustment #1: Earcup Centering." If the earseals are not sufficiently compressed, refer to "Adjustment #2: Earseal Compression." If the overall fit is too tight or too loose, or hot spots or pressure points exist refer to "Adjustment #3: TPL Custom-Fitting."

6. Have the crewmember unfasten the chinstrap by unsnapping the strap disengaging the strap through the right- hand (a worn) D-ring.
7. Have the crewmember doff the helmet as follows:

CAUTION: Spread the helmet slightly - just enough to allow ease of doffing. Excessive spreading may damage the helmet.

- a. Hook the thumbs in the earcups and spread the helmet at the earcup area.
- b. Roll the helmet upward and rearward as shown in Figure 7.
- c. Check microphone and earphone operation.
- d. Recheck the helmet fit.



Adjustment # 1: Earcup Centering

1. If the ears are not centered within the earcups, rotate the earcups within the retention assembly. Don the helmet, tighten the chinstrap, and recheck the earcup centering.
2. If the ears are not centered within the earcups after the earcups have been rotated, unfasten the chinstrap, doff the helmet, and remove the TPL as in Replacement Procedure 1, Step 1 (Page E-9). Have the crewmember don the helmet and hold it so that the edge of the helmet is approximately 3/4" above the eyebrows. With the helmet in this position, check the location of the earcups. If the earcups now completely surround the ears this indicates a need for TPL custom-fitting. Have the crewmember doff the helmet. Perform the TPL Custom Fitting Procedure. This should result in a proper fit of the helmet and the earcups.
3. If the ears are not centered in the earcups after the TPL has been removed, or you must raise or lower the helmet to achieve proper centering, you will have to adjust the retention straps upward or downward. To obtain access to these straps, you must remove the energy-absorbing liner and at least one earcup. Follow these steps:
 - a. Remove either earcup from the retention assembly as in Replacement Procedure 3, Steps 2 and 3 (Page E-11) .
 - b. Remove the energy-absorbing liner as in Replacement Procedure 1 Steps 3 and 4 (Page E-9).
 - c. Adjust the retention strap holes upward or downward as necessary. The front and center straps allow for upward or downward adjustment; the rear straps allow for forward or rearward adjustment. (See Figure 8.) Remove the attachment hardware. Apply one or two drops of white Weldwood glue #281 or equivalent to the first two threads of each screw and reinstall the hardware in the selected holes as needed.
 - d. Reinstall the energy-absorbing liner as in Replacement Procedure 1, Step 5 (Page E-9).
 - e. Reinstall the earcups as in Procedure 3, Steps 10-11 (Page E-11 and 12).
 - f. Reinstall the TPL as in Replacement Procedure 1, Step 7 (Page E-9).
 - g. Have the crewmember don the helmet and fasten the chinstrap. If the ears are now centered in the earcups, remove and store the helmet as required. If not, readjust the retention straps as necessary until the ears are centered in the earcups.

Adjustment #2: Earseal Compression

1. If the earseals are not sufficiently compressed, doff the helmet and tighten the helmet cross straps. Two cross straps are located behind each earcup; each cross strap has a loop. To tighten each cross strap, insert a finger into the loop and move the loop toward the bottom of the shell. (See Figure 9.) Don the helmet, tighten the chinstrap, and re-check the earseal compression.
2. If the earseals are not sufficiently compressed after the cross straps have been tightened, doff the helmet and add earcup spacer pads behind each earcup as required. The earcup spacer pad set supplied with each helmet consists of four pads (two 1/2" thick and two 1/4" thick) and pressure-sensitive pile fastener. Install the pads as follows:

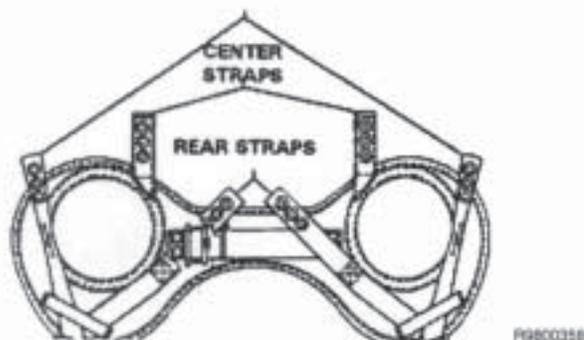


Figure 8. Retention Straps



Figure 9. Tightening Cross Straps

a. Peel the backing from one pressure-sensitive pile fastener and apply the adhesive side of the fastener directly to the back of one earcup. Repeat for the other earcup.

NOTE: Spacer pads may be installed whole or cut to any size or shape needed to increase or balance earcup compression. See Figure 10 for examples.

b. Attach spacer pad(s) to an earcup with the hook side of the pad facing the pile fastener on the earcup. Ensure that the fasteners are firmly attached. Repeat for the other earcup.

3. Don the helmet, tighten the chinstrap, and recheck the earseal compression. Add more spacer pads if needed until earseals are sufficiently compressed and a uniform, comfortable earcup fit is attained.

Adjustment #3: TPL Custom-Fitting

If the helmet does not fit properly, i.e. it has hot spots or pressure points or the fit is too tight or too loose, remove the helmet and custom-fit the TPL following the Custom-Fitting Procedure below.

Tools and Equipment Required

1. Oven - Capable of stabilized sustained temperature of 200°F ±5°F (93.3°C ± 2.8°C) with thermometer and internal volume of approximately 1.5 cubic feet or equivalent
2. Ruler
3. Timer or equivalent
4. Masking Tape

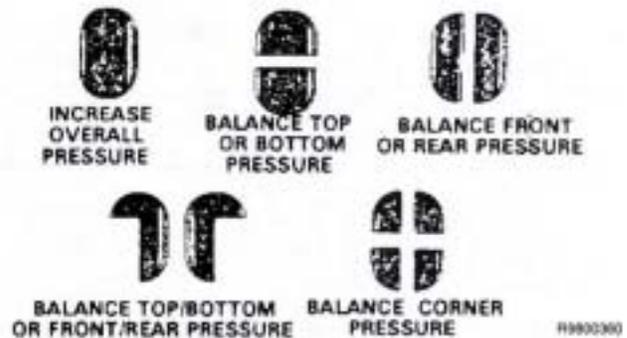


Figure 10. Earcup Spacer Pad Applications

STEP	RESULTS/REMARKS
1. Set oven rack to the lowest position; heat oven to 200°F ±5°F (93.3°C ± 2.8°C).	<ul style="list-style-type: none"> - Ensure oven stabilizes at approximately 200°F. - Preview Steps 5 through 10 so that they may be completed within 30 seconds.
2. Place TPL fabric side down in center of rack in heated oven.	<ul style="list-style-type: none"> - Do not remove TPL cover; heat as a unit.
CAUTION: Ensure That No Upper Burner Activates During Heating, or TPL Plastic Layers Will Melt.	
3. Allow oven to stabilize at temperature listed in Step 1 before starting timed sequence.	<ul style="list-style-type: none"> - In helmet, cover hook fasteners on rear of energy-absorbing liner with masking tape to ease TPL positioning
4. Heat TPL for approximately 10 minutes.	<ul style="list-style-type: none"> - Set timer, stopwatch, or equivalent. - Check TPL every two or three minutes to ensure plastic layers are not melting.
5. Remove TPL from oven.	<ul style="list-style-type: none"> - Describe procedure to crewmember being fitted. - Steps 5 - 10 should be completed within 30 seconds.

STEP	RESULTS/REMARKS
<p>WARNING: TPL Plastic Will Be Hot To Touch. Avoid Burning Hands. Wear Gloves If Necessary.</p>	
<p>6. Squeezing sides of TPL together to clear earcups, place TPL in helmet with label and holes facing front.</p>	
<p>7. Align TPL to protrude approximately 1/4" past energy-absorbing liner.</p>	<ul style="list-style-type: none"> - Ensure TPL is centered within the helmet. - Do not be concerned if rear of TPL extends beyond energy-absorbing liner.
<p>CAUTION: Hot TPL Plastic Layers Are Soft. When Performing Step 8, Do Not Press Too Hard In Any One Area; This Will Deform TPL.</p>	
<p>8. Position TPL crown into helmet.</p>	
<p>9. Have crewmember don helmet.</p>	<ul style="list-style-type: none"> - To ensure TPL does not bunch up in rear during donning, hold rear of TPL against energy-absorbing liner while crewmember dons helmet. (See Figure 11.)
<p>10. With hands on top of helmet press down until ears are centered in earcups. Hold for three to five minutes.</p>	<ul style="list-style-type: none"> - Ensure entire ear is surrounded by earcup; press helmet down further if necessary. - Chinstrap may be fastened to hold helmet in position. - Ensure helmet shell is centered comfortably on head. - Lower visors to check centering and nose clearance.
<p>11. Check distance between eyebrow and edge of helmet shell.</p>	<ul style="list-style-type: none"> - Distance should be approximately (but no more than) 1" for optimum field of view.
<p>12. Release pressure and remove helmet.</p>	<ul style="list-style-type: none"> - Remove tape from hook fasteners covered in Step 3. - Reposition TPL in helmet; ensure label and holes face front.
<p>13. Have crewmember don helmet.</p>	<ul style="list-style-type: none"> - Adjust earcups; tighten nape strap and chinstrap.
<p>14. Check fit.</p>	<ul style="list-style-type: none"> - Check for hot spots and pressure points. If none exist, remove and store helmet as required. If the helmet does not fit properly, remove TPL and repeat fitting procedure.

NOTE: The TPL cloth cover can be laundered or dry cleaned. Before removing cover in preparation for cleaning, note the direction in which the cover is facing. Note especially the "Y" seams on the cover; the double leg of the "Y" should face the front of the TPL and the single leg should face the rear. Replace the two-sided tape after cleaning, and install cover on layers in the proper direction.



Figure 11. Donning Helmet with Heated TPL

INSPECTIONS. Inspections consist of preflight and postflight inspections by the user, and periodic inspections by the technician.

Preflight Inspection. Prior to each flight, the user should inspect the helmet assembly to see that it is in good working order. This inspection should ensure that:

1. The helmet, liners and earcup assemblies have been fitted properly.
2. The chinstrap and nape strap are adjusted properly and the retention assembly is attached to the helmet with the screws tightened securely.
3. The visors operate properly and are clean and free of cracks or scratches.
4. All communication components have been installed properly and the earphones and microphone operate properly.
5. The overall condition of the helmet has been checked for serviceability.

Postflight Inspection. After each flight, the user should note any component malfunction or damage to the helmet resulting from operational use. Affected components should be replaced as specified in Table 1.

Periodic Inspection. Crewmembers are responsible for ensuring that their helmet assembly is clean and that all components are working properly. Periodic or scheduled inspections should occur at least every 180 days or as required. Refer to Table 1 for applicable procedures.

Table 1. Periodic Inspection

Component	Inspect For:	Applicable Procedure
Helmet Shell	Cracks, holes, warping. Cleanliness.	Remove all components; install components in replacement shell. Clean per instructions on the next page.
Energy-Absorbing Liner	Worn or loose hook fasteners. Gouges, cracks, indentations.	Remove liner as in Replacement Procedure 1, Page E-9. Replace fasteners; reinstall liner. Replace liner as in Replacement Procedure 1.
TPL	Torn or damaged areas. Loose bond at edges. Worn cover.	Replace TPL as in Replacement Procedure 1, Page E-9. Remove TPL as in Replacement Procedure 1; replace two sided tape attaching cloth cover to plastic layers; reinstall TPL. Remove TPL from helmet as in Replacement Procedure 1; replace TPL cover, reinstall TPL.
Earcup Assembly	Cracked cup, broken or missing tab, torn earseal, worn earphone holder or spacer pad, or failed earphone. Cleanliness.	Remove earcup as in Replacement Procedure 3, Page E-11, replace parts as necessary; reinstall earcup. Clean per instructions on the next page.
Retention Assembly (including nape strap and chin strap)	Frayed or torn fabric, loose stitching, corroded or bent buckles or snap. Cleanliness.	Replace as in Replacement Procedure 2, Page E-9. Clean per instructions on the next page.
Microphone, Boom, Swivel Assembly	Failed microphone; damaged or worn swivel or boom.	Replace assembly as in Replacement Procedure 4, Page E-12.
Microphone Cord	Connector	Cuts, cracks, deteriorated insulation, general damage.
Visor Assembly	Cracks, scratches, loose knobs. Cleanliness.	Replace as in Replacement Procedure 6, Page E-13. Clean per instructions on the next page.

CLEANING

Clean the components of the SPH-5 helmet assembly as follows:

Helmet shell and visor assembly (including visors, housing, track, spacers, and lock): Wipe with clean, soft cloth dampened with mild soap solution; rinse with clean water and allow to air dry.

Earcup cords, retention assembly: Wipe with damp cloth; allow to air dry thoroughly.

TPL cloth cover: Machine wash (gentle cycle) or hand wash with warm water and soap; allow to air dry.

TPL plastic layers: Hand wash with soap and water; allow to air dry.

REPLACEMENT PROCEDURE 1: ENERGY-ABSORBING LINER AND TPL

1. Squeezing the sides of the TPL together to clear the earcups as shown in Figure 1, remove the TPL from the helmet.
2. Remove at least one earcup from the retention assembly as in Replacement Procedure 3, Steps 1-3 (Page E-11).
3. Insert a flat-tip screwdriver or a tongue depressor between the energy-absorbing liner and the helmet shell in the front and rear and disengage the hook-and-pile fasteners holding the liner in place.
4. Apply slight pressure to the energy-absorbing liner from the rear and slide it out through the front of the helmet.

NOTE: Before you install the replacement energy-absorbing liner, ensure that its hook-fastener tabs are in place in the front and rear.

5. Install the replacement energy-absorbing liner by inserting the rear of the liner into the front of the helmet and applying slight pressure to position the liner in the helmet. Ensure that the hook-and-pile fasteners are engaged.
6. Reinstall the earcup(s) as in Replacement Procedure 3, Steps 10 - 11 (Page E-11 and 12).
7. Squeeze the sides of the TPL together to clear the earcups and attach the TPL to the energy-absorbing liner in the helmet. Ensure that the label and holes in the plastic layers (as well as the double leg of the "Y" seam on the cloth cover) are positioned toward the front of the helmet. Center the TPL in the energy-absorbing liner. The TPL should protrude approximately 1" past the front edge of the energy-absorbing liner.
8. Recheck the helmet fit.

REPLACEMENT PROCEDURE 2: RETENTION ASSEMBLY

1. Squeeze the sides of the TPL together and remove it from the helmet.
2. Remove the earcups from the retention assembly as in Replacement Procedure 3, Steps 1-3 (Page E-11).
3. Remove the energy-absorbing liner as follows as in Replacement Procedure 1, Steps 3 and 4 (Page E-9).



R9800362

Figure 12. Removing/Replacing TPL

NOTES

- Prior to removing attaching hardware from retention straps note which strap holes are used for attachment. These same holes must be used when installing new retention assembly.

- The front and center straps on both sides share attaching hardware with a helmet shell cross strap. The left rear strap shares hardware with the communications cord strain relief plate. When removing hardware from any of these points, note position and order of attachment to ensure correct installation (see Figure 13).

4. Remove the six screws (three each side), washers, and posts attaching the retention assembly to the helmet shell and remove the retention assembly from the helmet.
5. Align the straps of the replacement retention assembly within the helmet and install the retention assembly using hardware removed in Step 3. Applying Weldwood glue #281 to the first two threads of each screw, insert the screws through holes previously used. Tighten the screws securely, but do not overtighten.
6. Reinstall the energy-absorbing liner.
7. Reinstall the TPL.
8. Reinstall the earcups as in Replacement Procedure 3, Steps 10 - 11.
9. Recheck the helmet fit.

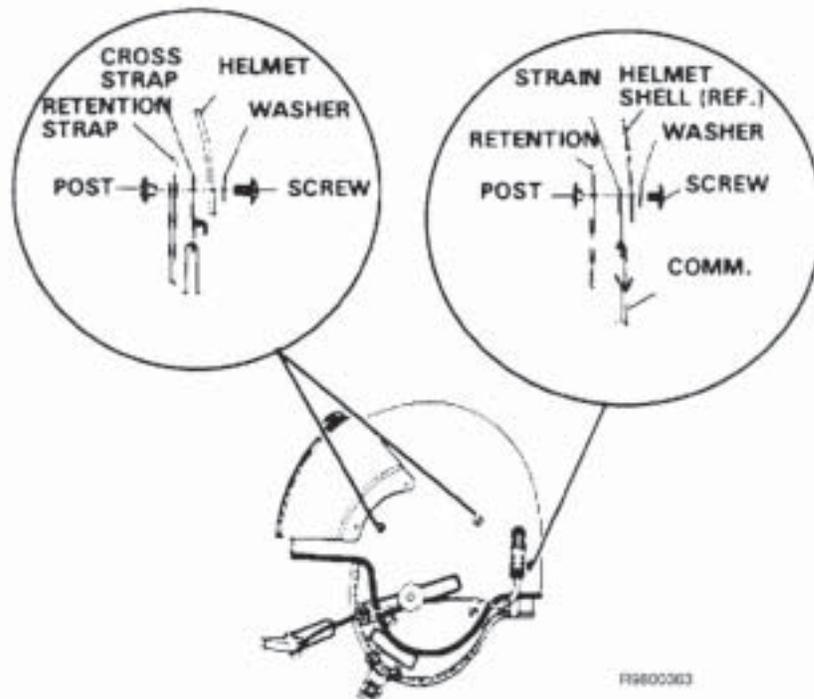


Figure 13. Retention Assembly Attachment

REPLACEMENT PROCEDURE 3: REPLACING EARCUPS AND EARPHONES

NOTE: Replacement of the earphone does not require earcup removal. If replacing the earphone only, perform Steps 4, 5, 7, 8 and 9.

1. Pull the earcup away from the cross straps; pull retention cloth back toward the shell to expose the raised tabs on the earcup edge.
2. Insert a small, flat-tip screwdriver between the earcup and the retention assembly as shown in Figure 14.
3. Work the screwdriver carefully around the edge of the earcup and lift the retention cloth over the earcup tabs until the earcup is free of the cloth.

NOTE: You may rotate the earcup slightly within the retention assembly to allow room for the screwdriver between the earcup and the retention assembly.

4. Carefully remove the earphone holder and the earphone from the earcup. (See Figure 15.)
5. Remove the earphone from the earphone holder. Remove the cord leads from the earphone using a jeweler's screwdriver or a hex wrench as required.
6. Remove the communications cord and the grommet from the earcup.
7. Insert the communications cord and the grommet into the replacement earcup. Attach the communications cord leads to the replacement earphone using a jeweler's screwdriver or a hex key as required.
8. Insert the earphone into the earphone holder, and insert both into the replacement earcup, ensuring the earphone holes are positioned toward the ear.
9. Install the earseal on the earcup (if not already installed) and the electrical tape over the earseal flange.
10. Position the earcup into the retention assembly so that the retention assembly is between raised tabs on earcup.



Figure 14. Earcup Removal

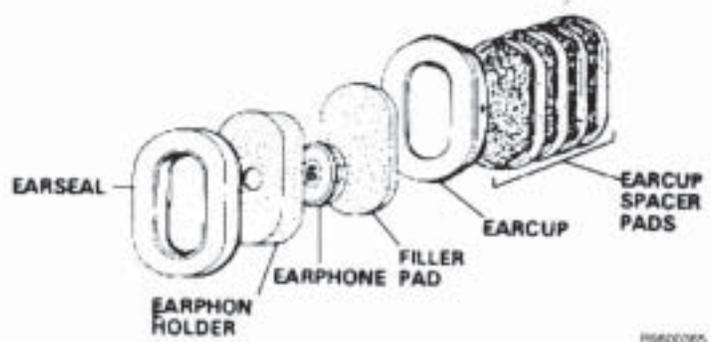


Figure 15. Earcup Assembly

11. Carefully insert screwdriver from outside the retention assembly as shown in Figure 16, and lift the retention cloth over the earcup tabs.
12. Repeat the procedure for the other earcup as required.
13. Check earphone operation
14. Recheck the helmet fit.

REPLACEMENT PROCEDURE 4: MICROPHONE/ BOOM/CORD ASSEMBLY

NOTE: The microphone, microphone cord, boom, and swivel (Figure 17) are replaced as one assembly in this procedure.

1. Unplug the microphone cord from the connector at the rear of the helmet.
2. Remove the center screw attaching the boom swivel to the helmet; remove the swivel knob, plastic spacer, microphone, boom, and cord.
3. Attach the replacement microphone, boom, and swivel assembly to the helmet with the center screw, and hand-tighten the swivel knob until secure.
4. Insert the microphone cord connector into the plug at the rear of the helmet.

REPLACEMENT PROCEDURE 5: COMMUNICATIONS CORD

1. Unplug the microphone cord from the connector at the rear of the helmet.
2. Cut the shrink tubing away from the connector using a razor blade or a knife .
3. Remove the connector and the two screws securing the bracket and the mounting plate to the helmet shell.
4. Remove the TPL and slide the energy-absorbing liner out as in Replacement Procedure 1, Steps 1, 3, and 4. This will provide access to the rear retention strap and the strain relief plate.
5. Remove the screw, washer, and post securing the rear retention strap and the cord strain relief plate from the left rear of the helmet (see Figure 18).
6. Carefully remove the earphone holders from the earcups and the earphones from the earphone holders. Remove the cord leads from the earphones using a jeweler's screwdriver or a hex wrench. Remove the cord from the earcups.
7. Remove the grommet and the communications cord from the helmet shell.
8. Insert the replacement cord through the grommet hole in the helmet shell and attach the grommet to the helmet shell.
9. Apply Weldwood glue #281 or equivalent to the first two threads of the screw removed in Step 5. Secure the cord in the strain relief plate and attach the strain relief plate and the retention strap to the helmet shell using this screw and the associated washer and post.
10. Feed the cord through the earcups and insert the grommet into the earcup.



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Figure 16. Earcup Replacement

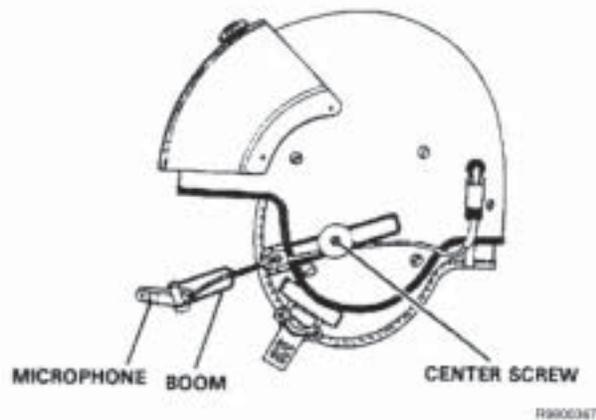


Figure 17. Microphone Assembly

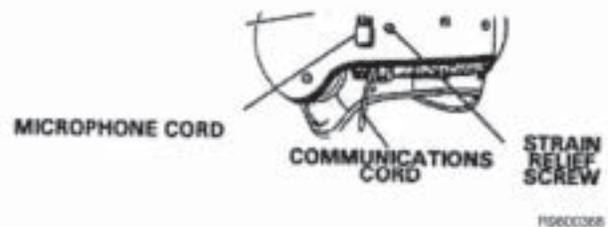


Figure 18. Communications Cord and Hardware

11. Attach the cord leads to the earphone, insert the earphone into the earphone holder, and insert both into the earcup. Ensure that the earphone holes point toward the ear.
12. Apply Weldwood glue #281 or equivalent to the first two threads of each screw removed in Step 3. Secure the connector bracket and the mounting plate to the helmet shell using these screws, and insert the connector into the bracket.
13. Install the shrink tubing on the connector as follows:
 - a. Cut a 3/4" - 1" length of shrink tubing.
 - b. Slide the tubing over the connector and the bracket.
 - c. Heat the tubing using a heat gun. Be careful not to overheat any one area.
 - d. Remove the heat as the tubing shrinks to the shape of the connector
 - e. Carefully trim the ends of the tubing as flush as possible with the ends of the connector and the bracket using a sharp knife or small scissors.
14. Install the energy-absorbing liner as in Replacement Procedure 1, Step 5 (Page 13). Ensure that the communications cord leads are routed under the liner.
15. Reinstall the TPL as in Replacement Procedure 1, Step 7.
16. Insert the microphone cord plug into the connector.
17. Check microphone and earphone operation.
18. Recheck the helmet fit.

REPLACEMENT PROCEDURE 6: VISOR ASSEMBLY

1. Remove the four screws (two on each side) attaching the existing visor assembly to helmet shell.
2. Remove the TPL and the energy-absorbing liner from the helmet as in Replacement Procedure 1, Steps 1, 3, and 4.
3. Remove the two center screws (one on each side) attaching the visor tracks and tapered spacers to the helmet shell.
4. Remove the existing visor posts from the helmet shell.

NOTES

- Be sure to install the spacers and tracks on the side of the housing (right or left) for which they were configured. When installed correctly, these parts will curve toward the center of the visor housing (see Figure 19).

- Spacers, track, screws, and posts are shown only on the left side of the visor housing in Figure 19. A similar configuration exists for the right side.

- Before installing screws, apply Weldwood glue #281 or equivalent to the first two threads of each screw.

5. Insert a 5-40 x 5/16 bind-head screw through the center hole of the right-side (as worn) visor track and the center hole of the tapered spacer.
6. From the inside of the helmet shell, insert a visor post upward through each of the three visor track holes in the helmet shell.
7. Position the screw, track, and spacer over the right side of the helmet and tighten the screw into the center post.

NOTE: It is recommended that you glue all six visor posts into the helmet shell with five-minute epoxy to prevent the posts from turning within the shell.

8. Repeat Steps 5, 6, and 7 for the left side (as worn).

NOTE: Before installing screws, apply Weldwood glue #281 or equivalent to the first two threads of each screw.

9. On the right side (as worn) of the visor housing, insert a 5-40 x 1/2 bind-head screw through the rear track hole and a 5-40 x 5/8 bind-head screw through the front track hole. Place the right-hand top track spacer on the screws and against the underside of the visor housing.
10. Repeat Step 9 for the left side (as worn) of the visor housing.

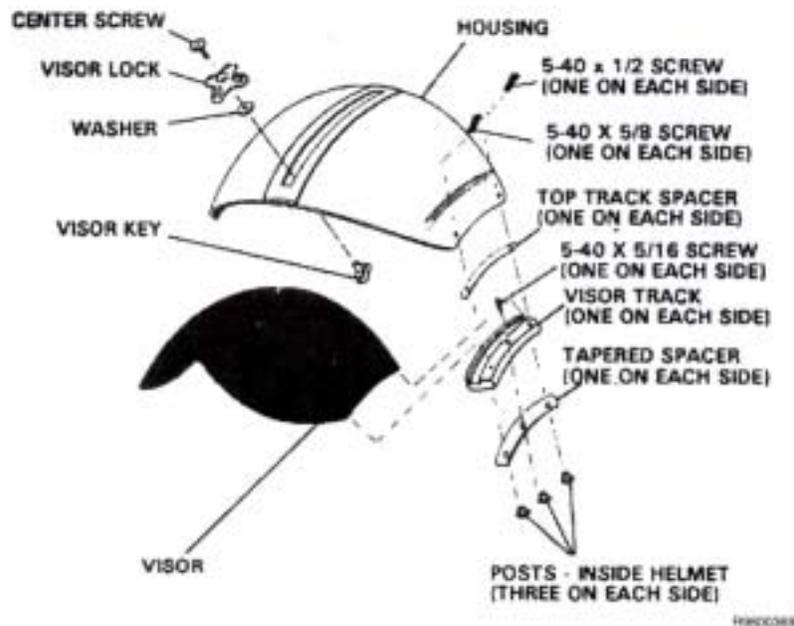


Figure 19. Visor Assembly (Exploded View)

11. Holding the spacers against the housing, position the visor housing over the tracks and spacers installed in Steps 5-8. Tighten the screws into the front and rear visor posts.
12. Slide the visor into the tracks. Insert the visor key through the housing slot and into the cutout in the visor; push the key down and rotate it a quarter turn counterclockwise to lock it into place. Place the washer and the visor lock over the visor key; tighten the visor lock. Install and tighten the center screw of the visor lock. (The center screw has a left-hand thread.)
13. Test the visor operation by using the visor lock. If the visor does not move freely, loosen the screws, hold the visor housing at the sides, and move the housing side to side as required to achieve smooth operation of the visor. Re-tighten the screws.
14. Reinstall the energy-absorbing liner as in Replacement Procedure 1, Step 5.
15. Reinstall the TPL as in Replacement Procedure 1, Step 7.
16. Check helmet fit.

OTHER VISOR STYLES AVAILABLE

Other SPH helmets are available in a variety of visor styles as shown in Figure 20:

- SPH-5 with dual visor assembly
- SPH-5 with direct-mount ANVIS dual visor assembly
- SPH-5 with quick-disconnect ANVIS dual visor assembly

Contact GENTEX Corporation for more information.

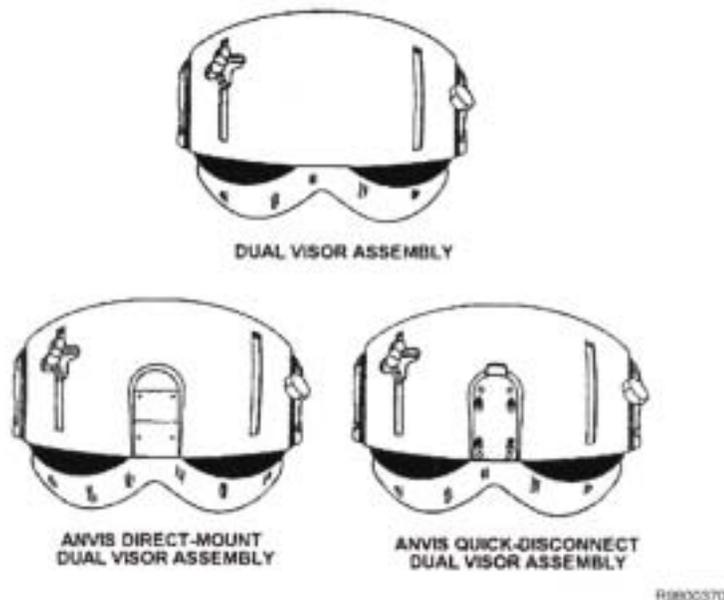


Figure 20. SPH-5 Visor Kits

ILLUSTRATED PARTS BREAKDOWN

This illustrated parts breakdown lists the most common repair parts for support of the SPH-5 Helmet. The parts listed are shown in Figure 21 below and Figure 22 on Page 24. The complete helmet assembly and part numbers are available from Gentex Corporation, Carbondale, PA., U.S.A., phone 717-282-3550, fax 282-8555. If your helmet configuration differs or if you need assistance, Call Air Crew Helmet Customer Service.

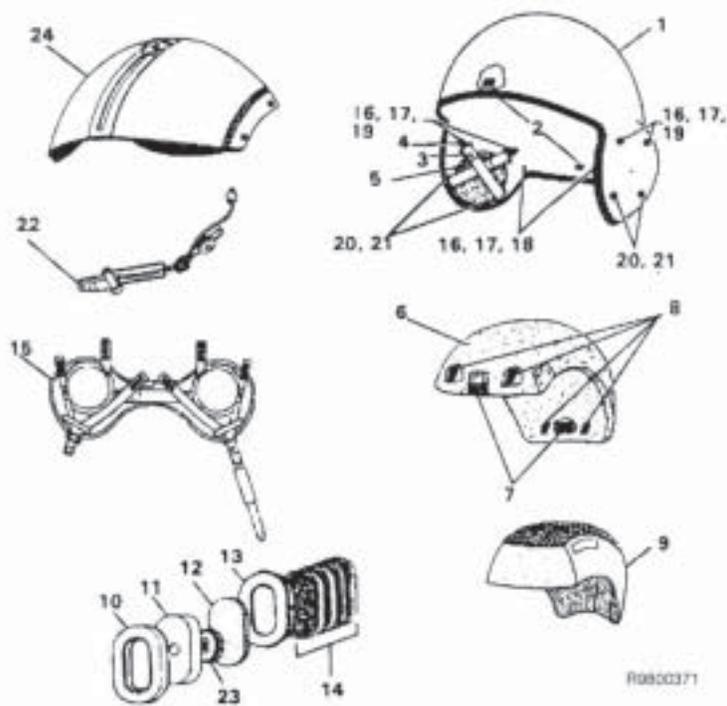


Figure 21. SPH-5 Helmet Assembly

FIG NO.	DESCRIPTION	QTY.	PART NO.
21	SPH-5 Helmet Assembly, Regular	1	REF
	SPH-5 Helmet Assembly, X-Large	1	REF
-1	Helmet Shell, White, Regular	1	91D8049-8
	Helmet Shell, White, X-Large	1	91D8050-8
-2	Pile Fastener, $\frac{1}{2}$ " x 1" (Attaches to Item 7)	2	85A7256-20
-3	Cross Strap, Earcup Tension	4	67B1732-1
-4	Adapter	4	69A2118
-5	Chafing Pad, Earcup	2	67A1777
-6	Energy-Absorbing Liner, Small	1	90D8014-1
	Energy-Absorbing Liner, Regular	1	85D7286-2
	Energy-Absorbing Liner, X-Large	1	85D7211-2
-7	Hook Fastener (Attaches to Item 2)	2	90B8021-2
-8	Hook Fastener (Attaches to Item 9)	4	85B7027
-9	TPL, Small	1	85D7087-31
	TPL, Regular	1	85D7087-4
	TPL, X-Large	1	85D7087-5
-10	Earpad Seal	2	88C7589
-11	Cushion, Earcup Insert	2	83C6573
-12	Filler Pad	2	81B6572-5
—	Earcup, Left (Not Shown)	1	85C7135-4
-13	Earcup, Right	1	71B2302
-14	Spacer Pad Kit	1	71B2302
—	Electrical Tape (Not Shown)	AR*	71949-1
-15	Retention Assembly, Black	1	90D8018-2
-16	Washer, Spring	10	76A3443
-17	Screw, 8-32 x $\frac{1}{2}$ " (Retention)	6	75A3093-9
-18	Post, 1/8" (Rear retention)	1	69A2104-2
-19	Post, 3/16" (Front retention)	5	69A2104-3
-20	Screw, 8-32 x 3/16, Black (Cross Strap, Bottom)	4	75A3093-5
-21	Post, 1/16 (Cross Strap, Bottom)	4	69A2104-1
—	Cord, Wired in Parallel, 25", U-174 CIP (Not Shown)	1	77C3523-1
-22	Microphone, Electret/Boom/Cord Assembly	1	78B4161-2
-23	Earphones, 600-ohm	2	78A3981
-24	Single Visor Assembly (See Fig. 23 for breakdown)	1	76A3257-1
—	Instruction Booklet	1	TP0056

FIG NO.	DESCRIPTION	QTY.	PART NO.
22	Single Visor Assembly	REF	76A3257-1
-1	Visor Housing, White	1	73D2539
-2	Visor Track, Left-hand, Black	1	61C846-2L
—	Visor Track, Right-hand, Black (Not Shown)	1	61C8462R
-3	Tapered Spacer, Black	2	65A1490-1
-4	Track Spacer, Top, Black	2	65A1555-3
-5	Visor Lock Assembly, Black	1	79C4440-2
-6	Visor Lens, Neutral	1	72C2535
-7	Bind Head Screw, 5-40 x $\frac{1}{2}$, Black	2	75A3096-25
-8	Bind Head Screw, 5-40 x $\frac{5}{8}$, Black	2	75A3096-33
-9	Bind Head Screw, 5-40 x $\frac{5}{16}$, Black	2	75A3096-13
-10	Post	6	69A2094

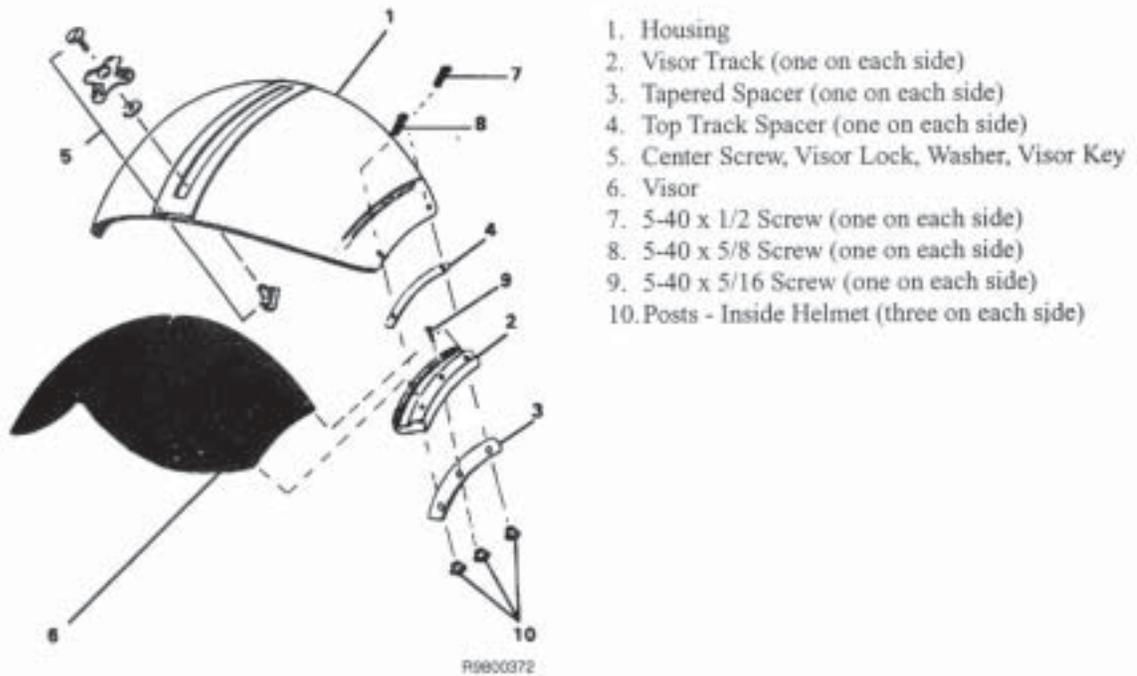


Figure 22. SPH-5 Single Visor Assembly

Appendix F

Cache Memorandum No. 01-07



9216 NFES (FC240)

September 11, 2001

**National Fire Equipment System
Cache Memorandum No. 01-07**

To: NFES: National Incident Support Caches

From: Paul Naman, NFES Representative-NIFC

Subject: Operation of “Safe-T-Way” Gas Can, NFES # 0606

A total of 6,225 DOT approved gas cans (NFES # 0606) manufactured by Safe-T-Way have been procured over the past two years and are now distributed throughout the cache system. The initial order was for 4,000 gas cans. Shortly after introducing the new gas cans into field service a problem was identified of overly slow discharge of fuel from the spout. Several changes in the item specification were subsequently made to address these concerns, and all gas cans purchased after the initial order incorporate these changes. As a result, there are two variations of these gas cans currently in service. The variations are visually indistinguishable, but require a different means of manipulating the spout valve to operate successfully.

The early model gas cans utilize a three-way valve on the spout. On these cans the valve is normally closed in the forward position due to spring tension. When the handle is pulled back about halfway to discharge fuel the valve is fully open. When the handle is pulled back all the way the valve moves into a closed position again and little or no fluid will discharge from the spout. The normal inclination for most people is to pull the handle back all the way to pour, as the can is heavy and pulling the handle back all the way improves the grip. These cans were provided with _” nozzles.

The alter versions of the gas can utilize a two-way valve. When the handle is pulled back halfway or more the valve is open and fluid can be discharged. When the handle is released the handle moves forward under spring tension and the valve is closed. These cans were provide with removable 1” nozzles.

Users of these gas cans need to be aware of the differing methods of operation of the gas cans. Use can quickly indicate which pouring method will be required. Although the size difference in nozzles may provide some clues as to the type of gas can, the nozzles may be interchanged between cans, and is not a foolproof indicator.

Please contact Dan Rodwell, Great Basin Fire Cache, at (208) 387-5124 if you have any questions or comments on the information above.

/s/ Paul E. Naman

Appendix F

cc:
State Fire Management Officers-BLM
Regional Directors Fire and Aviation Management-USFS
Technology and Development Centers-San Dimas, Missoula
Agency Directors-NIFC
Logistics Center-NICC
Ray Balli-GSA
Alice Forbes-USFS



Appendix G

In 2003 the New Generation Fire Shelter began replacing the older style Fire Shelters currently in service.

The older style Fire Shelters are not obsolete, but should be retired and replaced as funds for purchasing the New Generation Fire Shelters become available.

The following information concerns the old style Fire Shelter:

1. This shelter is not obsolete, but still provides protection when used properly.
2. Periodic inspection is still very necessary, with replacement when the Fire Shelter shows excessive wear.
3. If the Fire Shelter does not have a Red Strip running from pull ring to pull ring, the tear strip should be partially pulled to ensure the shelter polyvinyl bag will open quickly in the event of an emergency.
4. The recall originally done to correct the polyvinyl bag has been completed, if bags without a red pull strip are found, they should be immediately retired and replaced as soon as possible by New Generation Fire Shelters.

The following information concerns the New Generation Fire Shelters:

1. The inspection of the New Generation Fire Shelters is similar to the inspection done on the old style Fire Shelter. Any significant tears or holes in the polyvinyl bag, or obvious damage to the shelter means the shelter needs to be replaced.
2. Due to the cost of the New Generation Fire Shelter, we recommend that shelters that have the polyvinyl bag significantly damaged to the point the shelter is exposed or susceptible to damage should be set aside in a secure long term storage area and not destroyed, the shelter should not be removed from the protection the bag is still providing. When sufficient numbers of these shelters have been accumulated, efforts will be made to have them rebagged economically.

National Interagency Fire Center
3833 S. Development Avenue
Boise, Idaho 83705

United States
Department of Agriculture

Forest Service

File Code: 5160 Route To:

NIFC

Date: June 27, 1996

Subject: Fire Shelter Safety Alert

To: All Fire Directors,
NIFC Directors, All Cooperators

After a recent fire entrapment, the investigators discovered that a fire shelter had been used that should have been taken out of service sometime ago. To ensure the maximum safety of firefighters carrying fire shelters, the fire shelters must be inspected and then either removed or kept based on the criteria given below:

Shelters that **SHOULD NO LONGER BE IN SERVICE** are those manufactured before 1978 and these specific contracts:

Contract no.	Name	Year	Reason
GS-08S-33902	Norair Lanes	1978	Toxic
GS-08S-34122	Norair Lanes	1979	Toxic
GS-08S-35119	Metro Plastics	1980	Toxic
GS-08S-35188	Metro Plastics	1981	Brittle
GS-08S-36256	Cecile	'82-'83	Brittle

TOXIC SHELTERS MUST BE DESTROYED IMMEDIATELY. Other shelters may be kept for training purposes.

As of 1996, the only fire shelters that are acceptable are manufactured by Anchor Industries under various contract numbers from 1983 to 1996 and shelters manufactured by Weckworth/Langdon in 1995. All fire shelters manufactured since 1995 are marked as compliant with NFPA 1977. **DO NOT PURCHASE ANY NEW FIRE SHELTERS THAT ARE NOT NFPA 1977 COMPLIANT.**

MTDC has inspected hundreds of fire shelters that were used in entrapments. At least 30 percent of the fire shelters showed damage that was visible through the clear plastic cases. This indicates a widespread failure to inspect the fire shelters at least every 14 days. Some firefighters have expressed the attitude that they were aware of the defects, but felt they would never have to use the shelter, so why bother to replace it. This is an unacceptable risk.

Fire shelter case liners will at least double the life of fire shelters, but at some point the shelters will become unserviceable. Inspections should continue at 14-day intervals. Pay particular attention to the fire shelter area at the open end of the liner. Each individual is responsible for inspecting his or her fire shelter. However, crew supervisors should routinely spot-check shelters to ensure only functional shelters are being carried.

If there are any questions concerning specific fire shelters or the above information, contact Ted Putnam, Fire Shelter Project Leader at the Missoula Technology Development Center (406) 329-3965, DG is T.Putnam:ROIA.

/S/ John B. Roberts

JOHN B. ROBERTS
Branch Chief, Fire Equipment & Chemicals

Inspection

The shelter has an indefinite shelf life because its materials do not degrade in normal fire-cache storage. Nevertheless, all shelters should be inspected when they are issued and every 14 days during the fire season. Only serviceable fire shelters should be taken to the fireline. Don't assume that a new carrying case contains a new shelter. Shelters with the oldest manufacture dates should be issued first.

Inspect the carrying case, liner, vinyl bag, and shelter. Do not open the vinyl bag. All opened shelters should be removed from service.

1. Check the vinyl plastic bag to ensure that the quick-opening strip is unbroken and the two red pull rings are intact. If any item is broken, remove the shelter from service (Figure 24).
2. Abrasion is the most common shelter damage. It can be spotted through the vinyl bag. Typically, the aluminum foil is rubbed from the fiberglass cloth on the outer surface or the outside edges of the shelter. Remove the shelter from service if you see extensive edge abrasion, if aluminum particles have turned the clear vinyl bag dark gray or black, or if debris is in the bottom of the bag. All of these problems are signs of serious abrasion.
3. Look for tears along folded edges. Tears are most likely to occur at the top end of the shelter where all the sharp edges come together above the liner. Damage is less common along the wider folds. Remove shelters from service when tears are longer than 0.25 inches. Many cracks and pinholes occur in the shelter fabric during manufacture, particularly when the shelter is sewn and folded. Holes the size of a dime or smaller do not impair the shelter's ability to reflect radiant heat. If holes are larger than a dime, remove the shelter from service.



Figure 24—Frequent inspection keeps damaged shelters off the fireline.

Appendix G

Shelters that have been removed from service make excellent training aids, but should be clearly marked “For Training Only” so they do not reach the fireline.

Care of the Fire Shelter

Firefighting is rough on equipment, so the fire shelter is expected to have a limited service life. A little care can extend that life—even on the fireline.

The shelter is an important piece of protective equipment. Treat it accordingly:

- Keep your shelter away from sharp objects that may puncture it.
- Do not load heavy objects on top of the shelter.
- Avoid rough handling.
- Do not crush the shelter when leaning against objects.
- Do not sit on the shelter or use it as a pillow.
- Always keep the shelter in its hard plastic liner.

Practice Fire Shelters

Practice fire shelters are made from blue plastic and are designed to be reused many times. The carrying case and liner are identical to the standard case except that the practice shelter’s carrying case is orange. Never mix practice and real fire shelter components. Sooner or later someone could end up carrying a practice fire shelter onto the fireline. This is another reason to inspect your fire shelter when you first receive it.

Appendix H

From Forest Service Standard 5100-500

3.5.2 Splices and Thimbles. Splices shall incorporate a minimum of four tucks. All thimbles shall be rated “extra heavy.”

3.5.3. Swaged Terminations. If swaged terminations in leadlines or remote hook suspension cable sections are used, such swages shall be stainless or carbon steel or copper. Aluminum swages shall not be used. Swages shall be painted for slippage check. Swages shall not be covered.

3.6. Provisions Applicable to Nets.

3.6.1. Thimbles. The extremities of heavy cargo nets shall be fitted with metal or plastic thimbles spliced or swaged to the ends of the net stands. (Note: Thimbles are optional on light cargo nets.) Thimbles shall not crack or break when the net on which they are installed is stressed to maximum safe working load, 3,000 lb (1,360 kg) for heavy cargo nets and 300 lb (136 kg) for light cargo nets. Other hardware or design features which perform the same function as thimbles may be used provided these strength requirements are met.

3.6.2. Perimeter Ropes. The perimeter ropes or cargo nets shall be made of Nylon or Dacron and treated for abrasion resistance by a minimum of two coats of solvent-carried polyurethane, 20 to 30 percent solids, or equal.

3.7. Product Marking. Each item shall be marked showing rated capacity, date of and load applied during proof test, and if such a test is required, manufacturer, date of manufacture or date of first service, and service life or strike data where applicable. Markings shall be permanently stamped or embossed on all metal items or on a metal or durable plastic tag that shall be securely attached to the item. Fabric items shall be securely tagged or marked.

4. Item Requirements. The items referred to in this standard are typical configurations of accessories considered standard in the Forest Service. The illustrations in this standard are for general information only, except that limitations in dimensions shown are mandatory.

4.1. Rings, Links, and Hooks. Minimum and maximum permissible dimensions for rings, links, and hooks used in leadlines, remote hook and carousel suspension cables, and to attach other accessories to either the helicopter cargo hook or any remote hook or carousel, are shown in figure 1. All hooks shall employ a safety latch.

4.2. Cargo Swivel. A cargo swivel consists of a ring or link on the upper end, a hook on the lower end, and a swivel section in between. The ring or link and hook may be integral with or detachable from the swivel body. Figure 2 illustrates a cargo swivel. Except for dimensions shown in figure 2, other dimensions shall be in accordance with figure 1. If detachable, components shall be replaceable and attached by bolts secured with self-locking nuts, or some other system that provides equivalent safety.

The swivel body shall incorporate a permanently lubricated and sealed thrust-type ball or roller bearing. Free swivel rotation shall be maintained for all loads up to the safe working load. The swivel shall be designed for minimum maintenance without special tools and equipment.

Appendix H

All	Ring	Oblong Link		Pear Link			Hook with Snap		
A	B	C	D	E	F	G	H	I	J
5/3"max (15.8 mm)	3"min (76 mm) 4"max (102 mm)	3"min (76 mm) 4"max (102 mm)	1 1/2"min (38 mm) 3"max (76 mm)	3"min (76 mm) 4"max (102 mm)	1/2" (76 mm)	3/4"min min (12 mm)	-3/4"min (19 mm)	3/4"min (19 mm)	1 1/2" max (36 mm)

Figure 1—Ring, link and hook limiting dimensions.

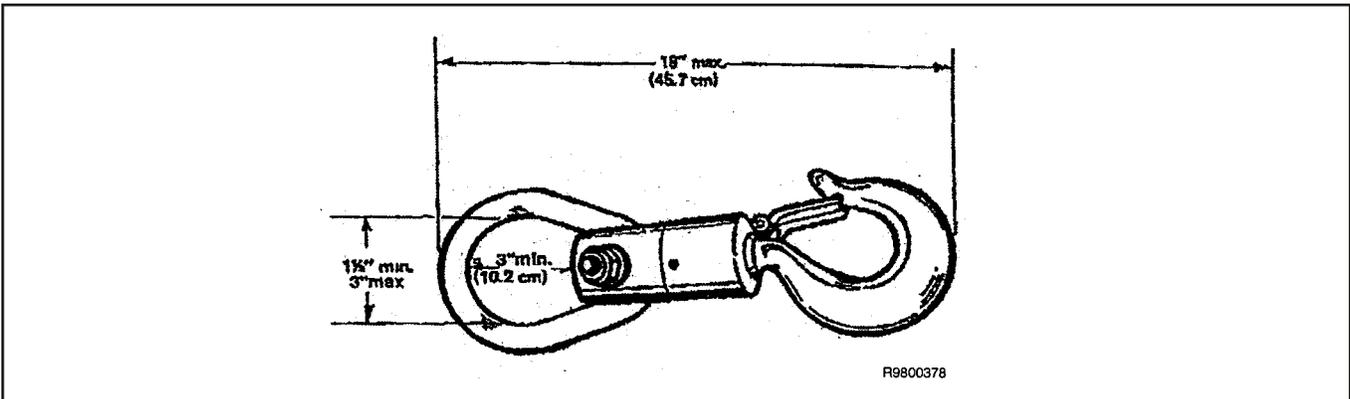


Figure 2—Cargo swivel.

4.3. Leadline. The leadline consists of a cable, as specified in 3.5.1, with a ring or link on one end, and a hook on the other end. All end loops for cables shall be formed around extra heavy metal thimbles and spliced or swaged as specified in 3.6.2 and 3.6.3. The user may specify the different lengths of 12 ft ± 3 in, 25 ft ± 3 in, or 50 ft ± 3 in (3.6 m, 7.6 m, 15.2 m ± 76 mm).

Appendix I

CARTONS REQUIRED

NFES	SIZE	NSN	USED FOR
0644	33"x16"x22"	8115-00-139-0691	NFES #0022; Bag, Sleeping, General Purpose NFES #0441; Blanket, Wool
0513	36 1/2"x24 1/2"x17"	8115-01-290-9543	NFES #1062; Bag, Sleeping, Firefighters
2006	23"x19"x10"	8115-00-139-0722	NFES #1551 ; Bag, Drinking Water, Nylon 4-Quart NFES #6131; Fly, Sunscreen NFES #0531; Net, Cargo, 12'x12' NFES #0220, 0221; Tank, Pyramid, Liquid Storage
0353	39"x13"x13"	8115-00-139-0706	NFES #0 159; Chainsaw, Kit
TBA	18"x15"x5 1/2"	8115-00-290-3386	NFES #0560; Cord, Extension, 3 Wire NFES #1172 “ NFES #1232
TBA	12"x12"x12"	8115-00-079-8680	NFES #1314-1315; Helmets, Flight NFES #1214-1215 “ NFES #2313-2314-2315
TBA	16 1/2"x12"x10"	8115-00-079-8697	NFES #0070; Fly, Tent
TBA	20"x20"x20"	8115-00-428-4158	NFES #0960; Kit, Fly Tent w/Stakes & Guy Ropes NFES #0110-0713; Headlamp
2007	24"x16"x16"	8115-00-292-0123	NFES #0109; Helmet, Safety NFES #0458; Net, Cargo, 15'x15' NFES #1372; Pack, Firefighters, Field NFES #1855; Pack, Personal Gear NFES #0511,0512,0522; Shirts, Flame Resistant NFES #0569, 0570 “ NFES #0577 to 0580 NFES #2078, 2079 NFES #1149; Pump, Backpack, Outfit.
0384	46"x11"x8"	8115-01-307-2951	NFES#1180;Tool,Combination
2030	24"x16"x12"	8115-00-183-9481	NFES #0503 to 0506; Jeans, Flame, Resistant NFES #0581 -to 0585 “ NFES #2010 to 2024 NFES #2117
TBA	18"x14"x18"	8115-00-179-0580	NFES#1143;Kit,First-Aid, 10-Person Belt NFES #0068; Kit, First-Aid, 10-Person Box NFES #1604; Kit, First-Aid, 24-Person Box
TBA	8"x8"x16"	8118-00-079-8693	NFES #0 125; Lantern, MS NFES #0241; Torch, Drip NFES #1201,1207,0738; Valve, Shutoff, Ball
TBA	10"x8"x5"	8115-00-080-1025	NFES #1081-1082; Nozzle, Shutoff, NFES #0137-0138; Combination, Barrel

Appendix I

TBA	4"x4"x6"	8115-00-576-8428	NFES #0635 to 0638; Nozzle, Tips, NFES #0903, 0904,0737; SS and Spray
TBA	12"x9"x10"	8115-01-012-5004	NFES #0024; Nozzle, Twin Tip
0134	76"x24"x19"(R6)	8815-01-381-6529	NFES #1566; Pad, Sleeping, Grey (76"x22 1/2"x20 1/2") GSA
TBA	8"x4"x4"	8115-00-290-3365	NFES#0009, 0010, 0418, 0713, Reducers
0338	37y 2"x18 1/2"x8"	8115-00-139-0673	NFES#0070; Tool, Axe, Single Bit NFES #1396; Tool, Hoe, Adze NFES #0146; Tool, Pulaski
0305	56"x20"x11"	8115-00-139-0690	NFES #1807; Tool, Council NFES #0296; Tool, McLeod
0337	55"x12 1/2 "x11 3/4"	8115-00-139-0689	NFES #0171; Tool, Shovel
TBA	To be assigned an NFES #.		

CARTONS, LOCAL CACHE OPTION

NFES #	ITEM DESCRIPTION	STANDARD PACK: CARTON
0003, 0004 0006, 0007	Adapters	None: Cache Option
0734	Applicator I Piece	10/Bundle: Cache Option
0720	Applicator, 2 Piece	10/Bundle: Cache Option
0425	Bag, Slingable, 72 Gal. Pot.	1/Carton: Cache Option
0426	Bag, Slingable, 72 Gal. Nonpot.	1/Carton: Cache Option
6017	Bag, Slingable, 250 Gal. Nonpot.	1/Carton: Cache Option
6021	Bag, Slingable, 360 Gal. Nonpot.	1/Carton: Cache Option
0036, 0085, 0265, 0350 0741, 1175, 1290, 1291, Etc.	Can, Gas, Jeep, Dot, Etc.	None: Cache Option
0563	Cord, Multi-Light	None: Cache Option
0053	Cot, Aluminum	None: Cache Option
0710, 0855, 0856 0857, 0916	Couplings	10 Or 60/Carton: Cache Option
0307, 0319, 1033, 2143	Extinguisher, Fire, Dry Chem.	1/Carton: Cache Option
0608	Fence, Plastic, 4'x50'	None: Cache Option
0501, 0507, 0508, 0509 0521, 0525, 0527, 0539 0514, 0517, 0518, 0519 0545, 0546, 0547, 0548 0567, 0572, 0574, 0576	Flight Suits	20/Carton: Cache Option
1521	Fly, Tent, Type II, 9'x 10'	20/Carton: Cache Option
6139	Heater, Propane, 20# Tank Mntd.	Cache Option
6187	Heater, Propane, 360°, Radiant	1/Carton: Cache Option
1016	Hose, Garden, Syn. 3/4"x50'	20/Carton: Cache Option
0964, 0965, 0967 1238, 1239	Hose, Lined	None: Cache Option
0111,0112 1873,	Hose Linen & Syn. Weeping 0334	None: Cache Option
0115, 0652 0914,1808	Hose, Suction	None: Cache Option

Appendix I

0416,0854, 2235	Increasesers	20/Carton: Cache Option
0480	Kit, Coffee Heating	1/Container: Cache Option
1309	Kit, Longline W/Remote Hook	I/Container: Cache Option
0430	Kit, Shelter, 15'x27"	None: Cache Option
0550	Kit, Shelter, 16' Octagon	None: Cache Option
0540	Kit, Shelter, 18' Octagon	None: Cache Option
0549	Kit, Shelter, 20' Octagon	None: Cache Option
0127	Lantern, Port. Elec. 6 Volt	None: Cache Option
2501	Lantern, Camp, Florescent	None: Cache Option
0627, 0628, 0629	Nozzle, Fire, Foam	None: Cache Option
0136	Nozzle, Garden Hose	10 Or 100/Carton: Cache Option
0140	Packboard	10/Carton: Cache Option
0744	Packsack,	Nylon W/Straps 20/Carton: Cache Option
0151	Pump, Single Action	None: Cache Option
0124, 0253	Pump, Lightweight	None: Cache Option
0417, 2229, 2230	Reducers	10/Carton: Cache Option
0930	Regulators, Propane	None: Cache Option
0210	Spout, Gas, Flex., Steel 16"	10/Carton: Cache Option
0526	Swivel, Cargo, 3,000# Cap.	10/Carton: Cache Option
0286	Swivel, Cargo, 6,000# Cap.	None: Cache Option
0588	Tank, Collapsible, 1,000 Gal.	I/Carton: Cache Option
0090	Tank, Collapsible, 1,200 Gal.	I/Carton: Cache Option
0589	Tank, Collapsible, 1,500 Gal.	I/Carton: Cache Option
0668	Tank, Collapsible, 1,800 Gal.	I/Carton: Cache Option
0568	Tank, Collapsible, 3,000 Gal.	I/Container: Cache Option
6030	Tank, Collapsible, 4,800 Gal.	1/Container: Cache Option
6031	Tank, Collapsible, 6,000 Gal.	1/Container: Cache Option
0230, 0731, 1809, 2240	Tees, Hoseline	10/Carton: Cache Option
0077	Tent, 2-Person	None: Cache Option
0223, 0084	Tent, Wall 10'x12'/14'x16'	1/Carton: Cache Option
0735, 0736	Tip, Applicator	None: Cache Option
0228	Valve, Check & Bleeder	None: Cache Option
0212, 0906	Valve, Foot W/Strainer	None: Cache Option
0229	Valve, Pressure Relief	None: Cache Option

0839 Wye, Connection None: Cache Option
 0739, 0883 Wye, Siamese None: Cache Option

NFES #	ITEM DESCRIPTION	CARTON	NSN: QTY/CTN
0435	Bag, Drinking Water, 55 Gal.	18"x15"x10"	8115-00-190-5007: 1/Ctn
0437	Bag, Suppression, 55 Gal.	18"x15"x10"	8115-00-190-5007:1/Ctn
0097	Bag, Backpack Pump	23"x17"x13"	8815-00-079-8879: 6/Ctn
****	Bag, Backpack Pump (Old)	23"x17"x13'	8818-00-079-8879: 6/Ctn
0044, 0045, 0078, 0150	Chaps, Protective	16"x14"x12"	8115-00-183-9484: 10 Pr./Ctn
0943	Jug, Insulated	20"x16"x16"	8115-00-275-5777: 1/Ctn
0827	Jug, Vacuum, 10 Gal.	20"x16"x16"	8115-00-275-5777:1/Ctn
0380	Lead Line, 6,000 Lbs.	17"x17"x4"	Commercial Ctn.: Cache Option
0531	Net, Cargo, 12' x12' (NFES # 2006)	23"x19"x10"	8115-00-139-0722: 1/Ctn
1458	Net, Cargo, 15' x15' (NFES # 2007)	24"x16"x16"	8115-00-292-0123: 1/Ctn
0082, 0089	Pole, Ridge	4 1/2"x6 1/2"x42 1/2"	Commercial: 1/Ctn
0083	Pole, Upright	4 1/2"x6 1/2"x42 1/2"	Commercial: 6/Ctn
2407	Shelter, Fire, Practice	16"x10"x12"	Commercial: 20/Ctn
0169	Shelter, Fire	16"x10"x12"	Commercial: 20/Ctn

Appendix J

Dry Vacuum Test For Suction Hose

Suction hose should be dry vacuum tested annually to a vacuum of 25 inches of mercury (85 kPa). The following describes dry vacuum testing using three different equipment setups for use to establish suction. These three methods of establishing suction are using suction off a fire engine, by use of a vacuum/pressure pump or by using an air transducer pump with a venturi.

1. Suction off a Fire Engine using the 2-1/2 inch (64 mm) suction valve and vacuum gage, as described in the Wildland Fire Hose Guide, February 1997, page 27.
2. Vacuum/Pressure Pump. Air pump comes with vacuum and pressure regulators and regulator assemblies. Maximum vacuum is 24 inches of Hg (82 kPa) and maximum pressure is 60 psi (414 kPa). Includes carrying handle, 6 foot (1.8 m), three wire cord with plug for 115 VAC, 60 Hz operation. Heavy and bulky. Cole-Palmer Model number JM-07061-40, vacuum/pressure pump with regulators. Shipping weight 17.4 pounds (7.9 kg) \$335. Cole-Palmer 800-323-4340.

Attach the suction hose to a suction source with the free end tightly sealed. The free end may be sealed by using a 1 inch (25 mm) or 1-1/2 inch (38 mm) cap. Reduce down to test 2-1/2 inch (64 mm) suction hose. It is important that all connections and fittings be tightened securely before vacuum testing is conducted for safety and to ensure correct test results.

Obtain a vacuum of 25 inches of mercury (85 kPa) and shut the vacuum pump off. The hose should maintain the vacuum of 25 inches of mercury (85 kPa) for 5 minutes, with no loss of vacuum, with the vacuum pump off. If there is a loss of vacuum, suspect a loose seal. Check the connections and fittings for leaks and rerun the test. Disconnect the suction hose from the suction source and examine the inner and outer lining for collapse or failure.

3. Air transducer pump with venturi for use with compressed air. Light and easily transportable. An air operated vacuum pump used to measure a vacuum up to 28 inches of Hg (95 kPa). Vacuum transducer pump Air-Vac Engineering Model AVD320H \$88, available from Willard Engineering 526-663-0730. Cost of the indicated connections and fittings is approximately \$25. The test setup using the air transducer pump with venturi is as follows:

Appendix J

This procedure describes a method to test suction hose for serviceability using an air transducer pump with venturi. For this test, the ends of the hose are capped and a vacuum is applied. The hose is then inspected for leaks and collapse (see figure 1).

PARTS LIST

Item	Quantity
Vacuum Transducer Pump (venturi), Air-Vac Model AV 191H	1
Reducing Nipple, 1/4" NPT x 1/8" NPT	1
Quick Disconnect Coupler, (as needed for shop air connection)	1
Needle Valve, 1/8" NPT x 1/8" NPT	1
Poly-Tite Male Connector, 1/8" NPT x 1/4" Tube	1
Poly-Tite Male Connector, 1/4" NPT x 1/4" Tube	1
Poly-Tite Tubing, 1/4" x 36"	1
Poly-Tite Nut and Sleeve, 1/4"	2
Pipe Street Tee, 1/4" NPT	1
Female Adapter, 1/2" NPT x 3/4" NH (garden hose type with washer)	1
Pipe Bushing, 1/4" NPT x 1/2" NPT	1
Reducer, 1-1/2" NH x 1" NPSH	1
Double Male, 1-1/2" NH x 1-1/2" NH	1
Reducer, 1" NPSH x 3/4"HN	1
Cap, 1-1/2" NH	1
Reducer, 2-1/2" NH x 1-1/2" NH (for testing 2-1/2" hose)	2
Double Male, 2-1/2" NH x 2-1/2" NH (for testing 2-1/2" hose)	1

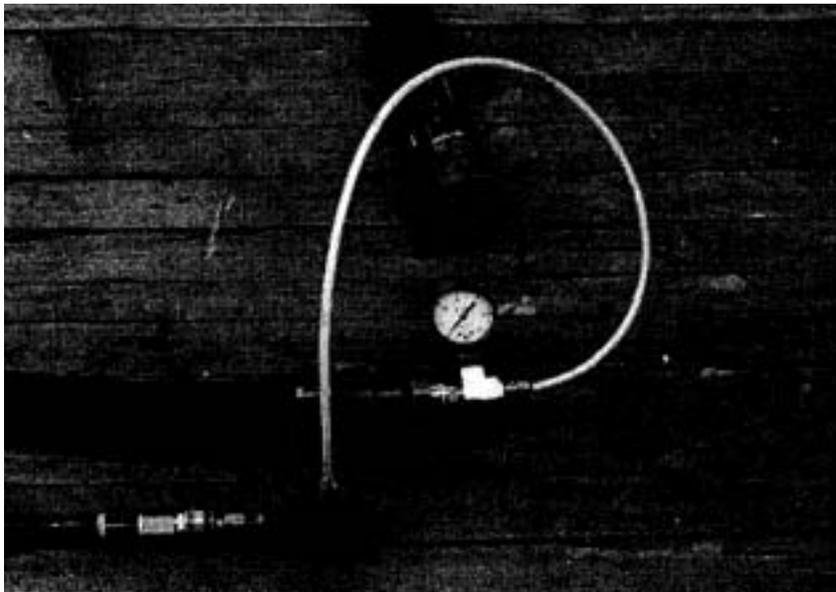


Figure 1—Test setup.

Assembly Instructions

- Use anti-seize tape or compound on all NPT connections.
- Attach the quick-disconnect coupling to air supply port on the vacuum transducer pump using the 1/4" x 1/8" reducing nipple (see figure 2).
- Attach the needle valve to the suction port of the vacuum transducer pump
- Attach the Poly-Flo tubing to the needle valve using the 1/8" x 1/4" Poly-Tite male connector and a Poly-Tite nut and sleeve.

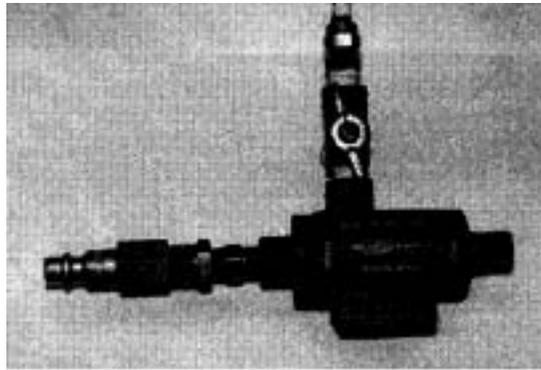


Figure 2—Vacuum transducer pump.

- Attach the vacuum gage to the garden hose adapter using the pipe street tee and 1/4" x 1/2" pipe bushing (see figure 3).
- Use the Poly-Tite 1/4" x 1/4" male connector and a PolyTite nut and sleeve to attach the Poly-Flo tubing to the pipe street tee.
- Attach the assembly to the female end of the suction hose using the double male and reducers.

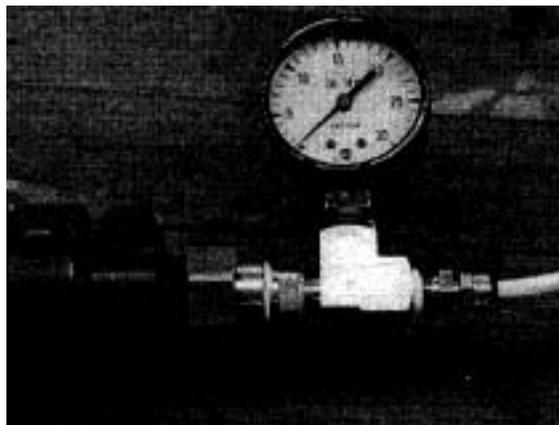


Figure 3—Vacuum gauge.

Test Procedure

- Complete the above assembly instructions.
- Cap the male end of the hose and make sure all connections are tight.
- Start with the needle valve on the vacuum pump closed.
- Apply shop air to the Vacuum Transducer Pump (venturi) as shown in figure 4.

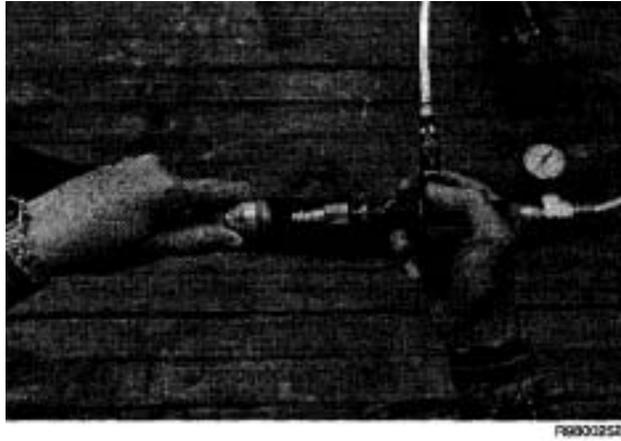


Figure 4—Apply shop air.

- Open the needle valve slowly to apply a vacuum of 25 in-Hg (85 kPa) as read on the gage, then close the valve (see figure 5).
- Disconnect or shut off the air supply to the venturi.
- The vacuum should hold at 25 in-Hg-(85 kPa) for at least 5 minutes.
- Inspect the hose carefully for leaks and collapse of the jacket.
- If there are leaks, check the fittings and connections to ensure all connections are tight.
- Repeat the test procedure before reinspecting the hose

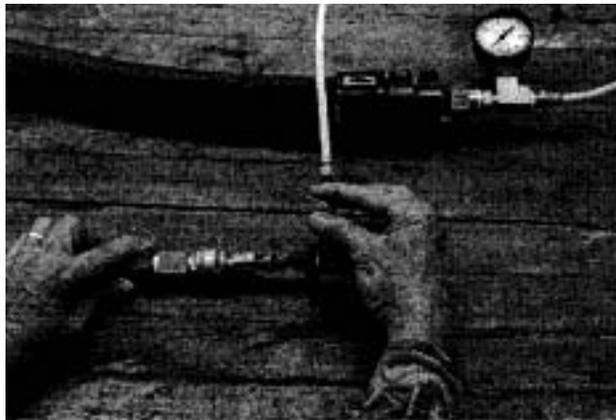


Figure 5—Apply vacuum.

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Appendix K

WATER-SOLUBLE BIODEGRADABLE DEGREASERS

For information on water-soluble biodegradable degreasers just go to your search engine and input the above data and the amount of information that becomes available is outstanding. You can pick and choose your own type of degreasers and how much you would like to pay for the item.

Most websites have online catalogs for ease of ordering with an abundance of information for the various vendor's products.

Appendix L

Active Propane

Safety Information

OPD Valves

What are OPD Valves?

Overflow Prevention Device fitted valves are the result of extensive research into improving gas safety for you and your gas tanks. The new OPD valves (shown below) prevent overfilling of gas cylinders, making filling and using gas cylinders safer than ever before. They are also compatible with your current gas appliances so it is easy to upgrade.

Older style valves were more susceptible to overfilling which leaves no room for the liquid propane to expand. As a result gas may escape, creating a potentially hazardous situation. OPD valves solve this problem by using a special float (shown left) which rises during refilling to block the filling process when the tank is 80% full.

OPD valves will be required on all cylinders 4# to 40# by April 2002. Active propane can help you upgrade your cylinder to OPD for a minimal charge by exchanging it at over 1000 Active locations.

Identifying Your Valves

How the OPD Valve Works

1. Liquid propane (dark blue) fills the cylinder through the OPD Valve.
2. At a safe level, the float cam (yellow) triggers the pin (orange) to fall into the recess of the cam, sealing this path off and preventing any more liquid propane from entering the cylinder.
3. The propane builds up pressure in the chamber (center spring) and pushes the piston arm up to form a seal, effectively stopping the filling process.
4. Using propane from the cylinder resets the OPD for the next fill.

For more information, please feel free to email or call us.

Requalifying DOT Cylinders

Description:

U.S. DOT specification cylinders used to transport LP-gas in commerce must be requalified 12 years after their original test date, and every 5, 7, or 12 years thereafter, depending on the method used for the last requalification.

Regulatory Reference

49 CFR § 107.805	Approval of cylinder requalifiers
49 CFR § 173.301	General requirements for shipment of compressed gases in cylinders...
49 CFR § 180.203	Definitions
49 CFR § 180.205	General requirements for requalification of cylinders
49 CFR § 180.209	Requirements for requalification of specification cylinders
49 CFR § 180.209	Requalification markings
49 CFR § 180.215	Requirements for requalification of specification cylinders

NOTE: The regulations listed become effective October 1, 2002. It is recommended that you retain the previous Compliance Guide No DOT 31 in your reference manual until October 1, 2002. After that date you may want to retain it for future reference in another file.

Applies to:

The regulations apply to all cylinders used to transport LP-gas in commerce and persons who fill cylinders or who must be registered with U.S. Department of Transportation to requalify specification cylinders.

General Requirements:

- (1) 49 CFR § 173.301 (a)(1) requires, "Compressed gases [includes LP-gases] must be in metal cylinders and containers built in accordance with DOT and ICC specifications... in effect at the time of manufacture, and requalified and marked as required by the specification and the regulation for requalification...."

(a)(2) states, "... Before each filling of a cylinder, the person filling the cylinder must visually inspect the outside of the cylinder. A cylinder that has a crack or leak, is bulged, has a defective valve or a leaking or defective pressure relief device, or bears evidence of physical abuse, fire or heat damage, or detrimental rusting or corrosion, may not be filled and offered for transportation. A cylinder may be repaired and requalified only as prescribed in subpart C of part 180 of this subchapter."

Paragraph (a)(2) states, "Pressure relief devices must be tested for leaks before the charged [filled] cylinder is shipped from the cylinder filling plant."

Paragraph (a)(6) requires, "No person may fill a cylinder overdue for periodic requalification with a hazardous material and then offer it for transportation. The prohibition against offering a cylinder for transportation does not apply to a cylinder filled prior to the requalification due date."

Paragraph (b) requires, "Required markings on a cylinder must be legible and must meet the applicable requirements of subpart C of part 180...."

Paragraph (f) requires, "...a cylinder filled with a gas and offered for transportation must be equipped with one or more pressure relief devices sized and selected as to type, location and quantity, and tested in accordance with CGA Pamphlet[s] 5-1.1.1 (compliance with paragraph 9.1.1.1 of CGA Pamphlet S-1 is not required)...."

- (2) 49 CFR § 180.209 (a) *Periodic qualification of cylinders (1)* requires, “Each specification cylinder that becomes due for periodic requalification as specified in the following table, must be requalified and marked in conformance with the requirements of this subpart. Requalification records must be maintained in accordance with § 180.215.

Table 1—Requalification of Cylinders

Specification under which cylinder was made:	Minimum test pressure (psig) ²	Test Period (years)
DOT 3A, 3AA	5/3 times service pressure, except non-corrosive service (see § 180.209 (g))	5, 10, or 12 (see § 180.209 (b), (f), (h), and (j))
3B, 3BN	2 times service pressure (see § 180.209 (g))	5 or 10 (see § 180.209 (f))
4B, 4BA, 4BW, 4B—240ET	2 times service pressure, except non-corrosive service (see § 180.209 (g))	5, 10, or 12 (see § 180.209 (e), (f), and (j))
DOT 4E	2 times service pressure, except non-corrosive service (see § 180.209 (g))	5

Paragraph (g), *Visual inspections*, permits requalification of specification cylinders used exclusively in LP-gas service by complete external visual inspection in accordance with CGA Pamphlet C-6 or C-6.3 at the time periodic requalification comes due. After September 30, 2003, inspections for cylinder requalification must be made only by persons holding a current U.S. DOT requalifier identification number (RIN) and the results must be recorded and maintained in accordance with § 180.215. Cylinders requalified by external visual inspection must be marked as required in § 180.213.

- (3) DOT and ICC specification cylinders used to transport LP-gas in commerce may also be requalified by one of two alternative tests:
- (a) The (water jacket-type hydrostatic) volumetric expansion test at twice the marked service pressure, valid for a 12-year requalification period, and designated with the test month and year stamped on the cylinder (along with the RIN as illustrated in (d) of § 180.213); and
 - (b) The proof pressure test at twice the marked service pressure, valid for a 7-year requalification period, and designated with the test month and year, followed by the letter “S” (along with the RIN as illustrated in (d) of § 180.213).
- (4) Cylinder rejection and condemnation. The meaning of the words “rejected cylinder” and “condemn” are defined in § 180.213. A condemned cylinder is one that cannot be repaired or rebuilt and subsequently requalified for continued service. Paragraph (h)(1) requires, “When a cylinder must be condemned, the requalifier must stamp a series of X’s over the DOT specification number and the marked [service] pressure or stamp “CONDEMNED” on the shoulder, top head, or neck using a steel stamp. Alternatively, at the direction of the owner, the requalifier may render the cylinder incapable of holding pressure. In addition, the requalifier shall notify the cylinder owner, in writing, that the cylinder is condemned and may not be filled with hazardous material for transportation in commerce where use of a specification packaging is required.” No person may remove or obliterate the “condemned” marking.

- (5) Record keeping. 49 CFR § 180.215 (b) requires, “Daily records of visual inspection, pressure test... must be maintained by the person who performs the requalification until either the expiration of the requalification period or until the cylinder is again requalified, whichever occurs first.”

Other specific record keeping requirements, including records for all cylinders requalified, RIN issuance letters and renewals, copies of CGA standards used for requalification, any notifications to the Associate Administrator [of U.S. DOT] required by the regulations, are found in §§ 180.215 and 107.803-805.

Training Requirements:

When applying for a U.S. DOT requalifier identification number (RIN) the training and qualifications of persons who perform requalifying external visual inspection must be stated in the application. All persons who perform requalifying tasks must be trained so that they are familiar with the standards that apply; requalifiers using the external visual inspection method must be competent to use the Compressed Gas Association (CGA) external visual inspection methods and thoroughly familiar with the requirements of CGA Pamphlets C-6 and C-6.3.

Maintenance and Review

Operating companies that offer cylinder requalification should periodically review the record keeping requirements of the regulation, and the performance of persons authorized to perform requalification. Documentation of requalification registration must be kept current. Means to document compliance on the part of all persons who inspect, fill, or transport cylinders should also be implemented and reviewed on a continuing basis.

Appendix M

9216 NFES (FC240)



August 1, 2002

**National Fire Equipment System
Cache Memorandum No. 02-07**

To: NFES: National Incident Support Caches

From: Paul Naman, NFES Representative-NIFC

Subject: Defective Single-bit Boy's Axe, NFES, #0352, NSN 5110-00-293-2339

It has been determined that a supplier of the single-bit, boy's axe, NFES #0352, NSN 5110-00-293-2339, has furnished axes to GSA that are deficient in multiple areas which presents a potential safety hazard. The primary defects that necessitate inspection of each organization's entire stock are as follows:

1. The axe head on some examples is reversed on the handle (or upside down). Therefore, the handle was placed into the large end of the axe eye (instead of the small end).
2. The axe head was wedged to the handle with a wooden wedge instead of the required plastic wedge.
3. The axe head was not glued to the handle with epoxy glue.

Users are instructed to inspect axes in their possession and if they meet any of the criteria above, pull them from service and have them reworked (replace handles) and refurbished in accordance with established standards.

The supplier of the deficient axes was Kaufman Company. However, they are a distributor and the actual manufacturer was Madison Mills. To complicate identification, they do not have a manufacturer's symbol or trademark engraved on the head nor the "FSS" marking. When supplied new, the axes did have a paper label on the handle identifying them as Madison Model No. 1811, 2-1/4 lb Boy's Axe.

To assist in the identification of deficient axes, the attached photo is provided. It is based on a scan of a deficient axe, showing the improperly attached head. Since it is reproduced here full size, one can use it by placing a questionable axe on top of it (as if to trace it) and determine if the head profile is the same. If so, then the axe should be considered deficient and will require refurbishment. If the axe being examined has already been refurbished, then the cutting edge may be smaller and we have to assume that the refurbishment took care of the problem. Also if the handle has been replaced during refurbishment, then the axe should be okay since the standards require the head to be epoxied to the handle.

As an additional aid in identifying deficient axes, the head contains a metal ring pressed on top of the wood wedge (approximately one-half inch in diameter). If the axes being examined have the metal ring, then they were supplied by Kaufman/Madison Mills and should be refurbished.

Appendix M

GSA will ensure that their stock is free from any of the above deficiencies.

The above actions have been coordinated with and approved by MTDC. For further clarification or inquiries, please contact Bill Hicks, GSA Engineering Staff, (817) 978-4428.

/s/ Paul E. Naman

cc:
State Fire Management Officers-BLM
Regional Directors Fire and Aviation Management-USFS
Technology and Development Centers-San Dimas, Missoula
Agency Directors-NIFC
Logistics Center-NICC
Ray Balli-GSA
Paul Solarz-USFS



Appendix N

Cache Memorandum No. 02-03



9216 NFES (FA240)

April 22, 2002

**National Fire Equipment System
Cache Memorandum No. 02-03**

To: NFES: National Incident Support Caches

From: Paul Naman, NFES Representative-NIFC

Subject: The New VR-5AA Headlamp (NFES # 0667, NSN 6230-01-493-7630)

After an extensive period of development by the Missoula Technology and Development Center (MTDC) a new headlamp is now available for purchase from GSA. The VR-5AA headlamp (NFES # 0667, NSN 6230-01-493-7630) has been designed to meet specific performance requirements for use by wildland firefighters and is manufactured by the Greater Hartford Easter Seals Company.

Development of the new headlamp was initiated for several reasons. Battery life of the old model 4 AA battery headlamp did not meet desired minimum requirements. The old model headlamp uses a filament type of bulb that is no longer being manufactured domestically and is considered obsolete within the industry. Bulbs of this type acquired overseas have demonstrated an unacceptable rejection rate of 90%. In 1999 the Greater Hartford Easter Seals Company asked MTDC for parameters around which to begin development of a new headlamp design using a computer chip and a modern, domestically manufactured bulb. After numerous combinations of batteries, bulbs, and chip settings, the VR-5AA headlamp was born.

The general appearance of the new headlamp is very similar to the old style 4 AA headlamps that have been available for years. The VR-5AA is actually radically different upon closer inspection. Some of the differences between the VR-5AA and the old style headlamp include the following:

- 5 AA batteries (instead of 4);
- The battery pack can be disconnected from the light head;
- The light output is controlled by a computer chip and remains at the same level until the batteries are completely discharged;
- The computer chip provides around 15 minutes warning of low batteries by pulsing the light;
- 2 light intensity settings (high/low);
- Improved battery life, with as much as 12 hours battery life at the low setting (depending on the batteries);
- Water resistant;
- Readily available white light halon bulb.

Structurally reinforced, balanced, and designed to work on a hard hat, at \$42.80 the new headlamp is more expensive than the old headlamps. It is anticipated that the higher cost of the VR-5AA will be offset by improved operating efficiency and a significant reduction in AA battery use when compared with the old headlamp system.

Appendix N

If you have any questions regarding the new headlamp please contact Dennis Davis at (406) 329-3929.

/s/ Paul E. Naman

cc:

State Fire Management Officers-BLM
Regional Directors Fire and Aviation Management-USFS
Technology and Development Centers-San Dimas, Missoula
Agency Directors-NIFC
Logistics Center-NICC
Ray Balli-GSA
Paul Solarz-USFS



