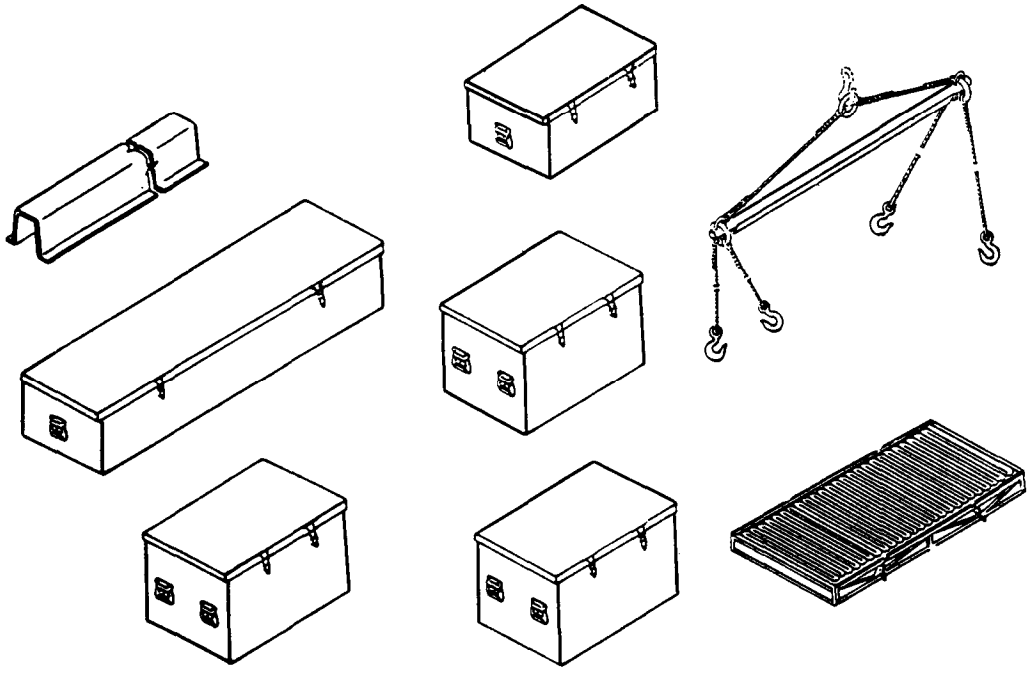
TECHNICAL MANUAL

OPERATOR, UNIT, DIRECT SUPPORT, GENERAL SUPPORT MAINTENANCE MANUAL



HOSELINE OUTFIT, FUEL HANDLING 4-INCH DIAMETER (MODEL ADC-1200, NSN 3835-00-892-5157) (MODEL 1461, NSN 3835-01-261-6518)

Approved for public release; distribution is unlimited.

* **This manual, together with TM 10-3835-219-24P, supersedes TM 10-3835-219-14&P, dated 12 February 1986.**

HEADQUARTERS, DEPARTMENT OF THE ARMY

27 APRIL 1992

CHANGE NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 31 August 1993

OPERATOR, UNIT, DIRECT SUPPORT, GENERAL SUPPORT MAINTENANCE MANUAL

HOSELINE OUTFIT, FUEL HANDLING 4-INCH DIAMETER (MODEL ADC-1200, NSN 3835-00-892-5157) (MODEL 1461, NSN 3835-01-261-6518)

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

TM 10-3835-219-14, 27 April 1992, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
a and b	a and b
i through iv	i through iv
1-1 through 1-4	1-1 through 1-4
	1-8.1/(1-8.2 blank)
1-9 through 1-12	1-9 through 1-12
	1-12.1/(1-12.2 blank)
1-13 through 1-16	1-13 through 1-16
	1-16.1/(1-16.2 blank)
1-17 and 1-18	1-17 and 1-18
2-11 and 2-12	2-11 and 2-12
2-19 and 2-20	2-19 and 2-20
2-39 and 2-40	2-39 and 2-40
2-47 and 2-48	2-47 and 2-48
	2-48.1 through 2-48.4
2-49/(2-50 blank)	2-49 and 2-50
3-1 and 3-2	3-1 and 3-2
3-7 through 3-12	3-7 through 3-12
	3-12.1 through 3-12.3/(3-12.4 blank)
3-13 through 3-16	3-13 through 3-16
3-19 through 3-22	3-19 through 3-22
4-1 through 4-4	4-1 through 4-4
4-7 through 4-12	4-7 through 4-12
5-1 through 5-7/(5-8 blank)	5-1 through 5-7/(5-8 blank)
6-11 and 6-12	6-11 and 6-12
	6-13 through 6-17/(6-18 blank)
C-1 through C-4	C-1 through C-4
E-1 and E-2	E-1 and E–2

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By Order of the Secretary of the Army:

GORDON R, SULLIVAN
General, United States Army
Chief of Staff

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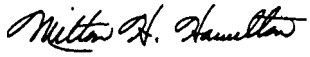

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
05084

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25-E, block no. 5434, requirements for TM 10-3835-219-14.

WARNING

DEATH or severe injury to personnel may result if personnel fail to observe precautions.

WARNING

Do not position hoseline in an area where leakage can contaminate drinking water. Failure to observe this warning can result in serious injury or death by poisoning.

WARNING

Stand clear of load being lifted in case of failure to lift sling, lift device or flaking box shackles.

Do not exceed capacity of lifting device. Ensure it has a minimum lifting capacity of 6,000 lbs. (2700 Kg).

Do not lift flaking boxes with a fork lift. Use only the special lift sling provided to lift flaking boxes.

Do not load flaking boxes in excess of truck capacity. Do lift more than three flaking boxes at a time. Do not stack flaking boxes more than three high.

WARNING

Do not smoke, carry an open flame, or use any heat-producing device near hoseline during fuel displacement and vapor evacuation operations. Ensure that ejector is firmly grounded. Failure to observe this warning can result in fire, explosion, and death. Hearing and eye protection must be worn.

WARNING

Stand clear of receiver while displacement procedure is in process. Hoseline may jump when ball arrives at receiver.

WARNING

Broken wire rope strands are a hazard, and can cause serious punctures and cuts. Take care when handling and inspecting cables.

WARNING

Prior to the cleaning of any parts have an industrial hygienist or safety personnel review the procedures and personnel protective equipment to be used in the cleaning operations.

Potential health hazards result from inhalation of petroleum solvent vapors and from contact of solvent with skin. Use rubber gloves and hand cream for protection and work with adequate ventilation.

Dry cleaning solvent used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 1OO°F-138°F (38°C-60°C).

WARNING

Use only water to pressure test hose assembly.

A baffle, composed of metal, wood or sandbags, approximately 3 feet (0.91 m) wide and 3 feet (0.91 m) high, should be placed between the water inlet of hose and operator controlling hydrostatic pressure to protect operator in case of a coupling retention failure.

WARNING

In making service pressure test, special care must be exercised to remove all air from hose before nozzle or test cap valve is closed and pressure becomes greatly compressed, and hose can whip violently, if pressure is suddenly released by a hose burst. A blown-off coupling or coupling ring can act like a high velocity missile which can result in serious injury or damage to property.

It should be understood that development of test pressures introduces a serious accident potential even when recommended procedures are followed.

WARNING

Open and close nozzles and valves gradually to prevent water hammer and pressure surges which may burst hose and, in turn, cause bodily injury. Water hammer is the surge of pressure caused when a high velocity flow of water is abruptly shut off. The pressure exerted by the flowing water against the closed system can be as much as seven times the static pressure.

WARNING

Never straddle hose while under pressure and never stand at either end in line with hose.

TECHNICAL MANUAL

NO. 10-3835-219-14
C1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC., 27 April 1992

Operator, Unit, Direct Support and General Support Maintenance Manual

for

HOSELINE OUTFIT, FUEL HANDLING, 4-INCH DIAMETER
(MODEL ADC-1200, NSN 3835-00-892-5157)
(MODEL 1461, NSN 3835-01-261-6518)
(MODEL FIHK-100, NSN 3835-01-367-9400)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. if you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual directly to: Commander, U.S. Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. A reply will be furnished directly to you.

TABLE OF CONTENTS

* This manual, together with TM 10-3835-219-24P, supersedes TM 10-3835-219-14&P, dated 12 February 1986.

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LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS (cont)

LIST OF TABLES

HOW TO USE THIS MANUAL

Be sure to read all Warnings before using your equipment.

This manual contains operating instructions and Operator, Unit, Direct Support and General Support Maintenance instruction for the 41nch Diameter Fuel Handling Hoseline Outfit.

l Chapter 1 - introduces you to the equipment and gives you information such as weight, height, length, generally used abbreviations, cross-reference information and principles of operation. The chapter is preceded by a full page illustration of the equipment.

• Chapter 2 – Provides information necessary to identify and use the equipment's operating controls. Operating procedures tell you how to use the equipment in both usual and unusual weather conditions. In addition, preventive maintenance instructions provide information needed to inspect and service the 4 Inch Diameter Fuel Handling Hoseline Outfit.

• Chapter 3 – Provides operator maintenance instructions for troubleshooting equipment malfunctions and performing emergency repairs.

• Chapter 4- Provides unit maintenance instructions including service upon receipt, preventive maintenance and troubleshooting information; detailed maintenance and repair procedures for the Unit Maintenance repairer and storage and shipment instructions.

• Chapter 5 – Provides direct support maintenance instructions.

• Chapter 6- Provides general support maintenance instructions.

- Appendix A gives you a list of frequently used forms and publications.

- Appendix B is the Maintenance Allocation Chart (MAC). It identifies the type maintenance authorized for each maintenance organization.

- Appendix C describes components that make up the end item and are shipped with the basic equipment. It also lists components that are not mounted on the equipment, but are required to make the system functional. All components in the Components of End Item and Basic Issue Items Lists are illustrated for easy identification.

- Appendix D lists additional equipment authorized for your unit for use with the fuel handling hoseling outfit but are not supplied as part of system. This equipment list may include fire extinguishers, buckets, protective clothing etc.

- Appendix E provides you with information about expendable/durable supplies such as sealant, paint, lubricants, etc. that you will need when performing maintenance.

- The Alphabetical Index is the last item in the TM. You will find it useful in locating page numbers about specific information or procedures.

Becoming familiar with this manual will enable you to operate and maintain the equipment in good working order.

CHAPTER 1

INTRODUCTION

Page

OVERVIEW

This chapter contains general information pertaining to Fuel Handling Hoseline Outfit, and its components.

Section 1. GENERAL INFORMATION

Paragraph Page

1-1 **Scope.** This manual contains operator, unit, direct support and general support maintenance for the Hoseline Outfit, Fuel Handling, 4-inch Diameter. This manual contains three models, Model ADC-1200 (figure 1-1), Model 1461 (Figure 1-2) and Model FIHK-l00 (figure 1-2).

1-2. **Maintenance** Forms and Records. Department of the Army forms and procedures used for equipment maintenance will be those prescribed in DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1-3. **Destruction Of Army Materiel to Prevent Enemy Use.** Refer to TM 750-244-3 for procedures to destroy equipment to prevent enemy use.

1-4. **Preparation for Storage or Shipment.** Refer to Chapter 4, section VI, and TM 38-230 for procedures to place the equipment into storage and prepare equipment for shipment.

1-5. **Reporting of Equipment Improvement Recommendations.** If your Fuel Handling Hoseline Outfit needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at: Commander, U.S. Army Aviation and Troop Command, Attn: AMSAT-I-MP, 4300 Goodfellow Boulevard, St. Louis, Missouri 63120-1798. We will send you a reply.

1-6. **List of Abbreviations.**

ft	feet
psi	pounds per square inch
psig	pounds per square inch gauge
gpm	gallons per minute
km/hr	kilometers per hour
m	meters
mm	millimeters
kg/cm^2	kilograms per centimeters squared

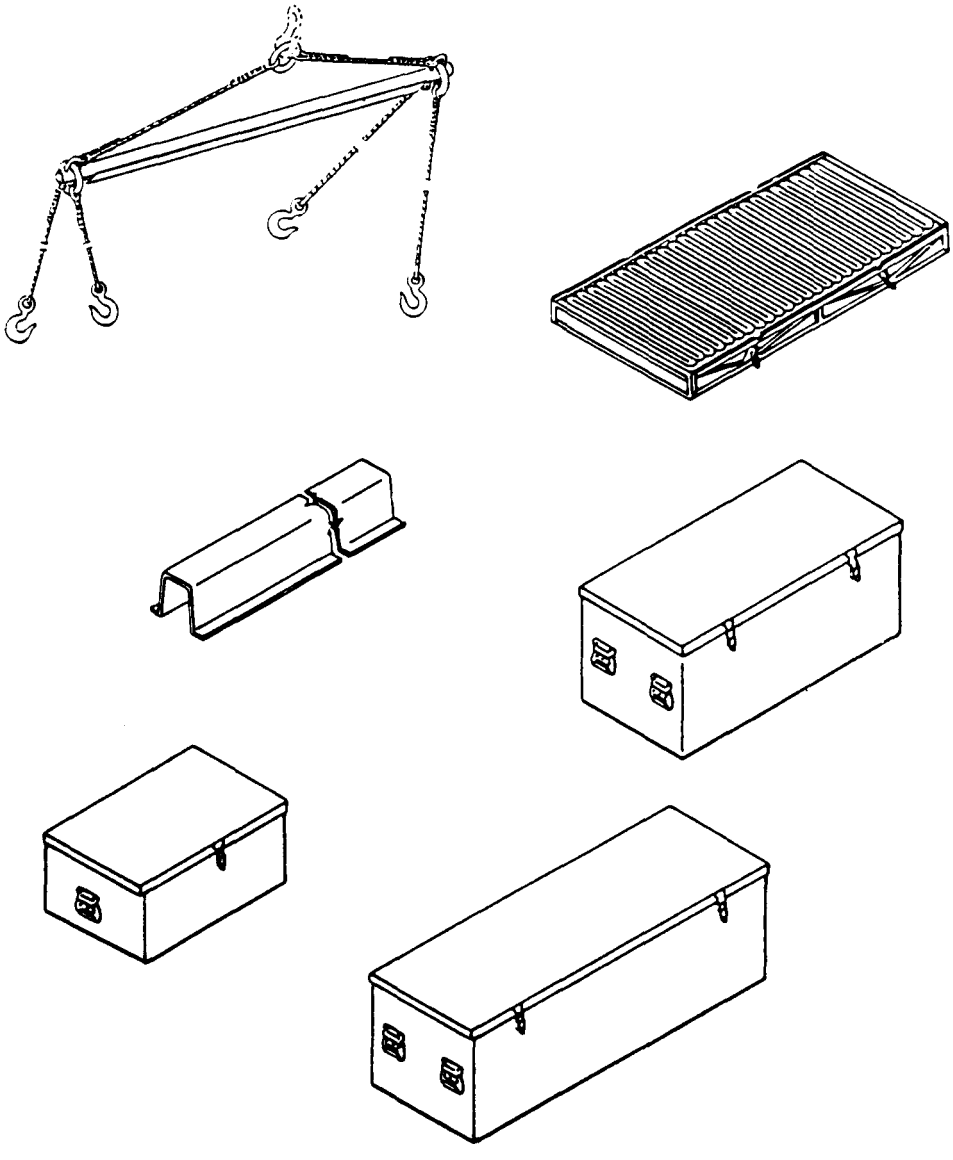

Figure 1-1. Fuel Handling, Hoseline Outfit (Model ADC-1200).

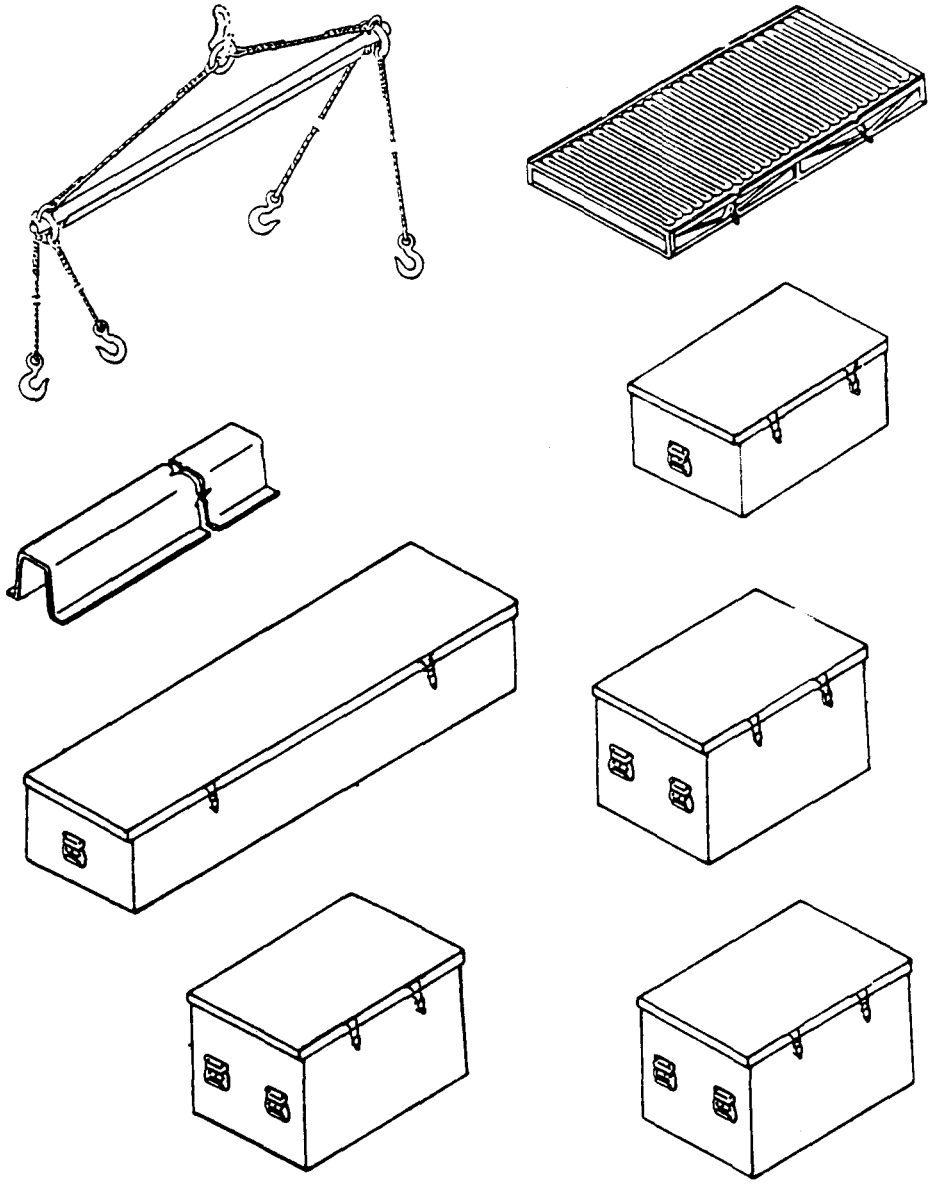

Figure 1-2. Fuel Handling, Hoseline Outfit (Models 1461 and FIHK-100).

Section II. EQUIPMENT DESCRIPTION AND DATA

1-7. **Equipment Characteristics and Features.** The 4 Inch Fuel Handling Hoseline Outfit, is compact, and can transport bulk fuel at a rate of 350 gpm. The Hoseline outfit allows rapid hose unpacking, laying, and repacking.

1-8. **Location and Description of Major Components.** (Model ADC-1200) (figure 1-3).

SLING ASSEMBLY. Used for lifting flaking boxes. Constructed of steel pipe, wire cables, attach hooks, and a lift ring.

HOSE ASSEMBLY AND FLAKING BOX. The hoseline outfit consists of 13 hose assembly and flaking boxes. Each hose consists of two 500-foot (150m) sections of collapsible hose coupled together per flaking box. The flaking box provides for packing and transportation of the hoses. The box is of steel weldment construction with lifting provisions.

ROADWAY CROSSING GUARD. The hoseline outfit consists of 20 roadway crossing guards. The guard is a steel channel that provides protection of hoseline when routed under road surfaces and train tracks.

DISPLACEMENT AND EVACUATION AND REPAIR KITS CHEST ASSEMBLY (figure 1-4). A welded assembly that contains compartments for the storage of the displacement and evacuation and repair kits.

REPAIR KIT. Consists of four hose clamps, a banding tool, a box of strapping seals (banding buckles), three quarts (2.85L0 of cleaning solvent, five cans of rubber adhesive, a hammer, a 5-pound (2.27 kg) pack of wiping rags, 350 ft. vinyl tape, a common screwdriver, a knife, a 1-1/16 inch socket, a socket wrench, 150 ft. rubber tape, two 100–foot (30m) rolls of strapping, two T handle hex keys, ten hose adapters, eight pipe coupling clamps, and two grooved coupling rings. The kit is used to repair hoselines.

DISPLACEMENT AND EVACUATION KIT. Consists of an ejector assembly, ball inlet, displacement ball, ball receiver, eight coupling clamps, and 16 pipe caps, The kit is used to remove liquid fuel, vapors, and air from hoselines to that they can be easily packed into flaking boxes.

SUSPENSION AND PACKING KIT CHEST ASSEMBLY (figure 1-5). A welded assembly that contains compartments for the storage of the suspension and packing kits.

SUSPENSION KIT. Consists of four tackle blocks, 25 wire rope clamps, a 350-foot (105m) spool of wire rope, a 350-foot (105m) spool of manila rope, 60 fabric hose saddles, 60 shackles, 14 guy stakes, four wire rope thimbles, and four turnbuckles.

PACKING KIT. Consists of a pullboard assembly, two left- and two right-hand hose-retaining brackets, and a 3/4-ton (675 Kg) chain host.

FLOW CONTROL KIT (figure 1-6). Consists of eight pipe coupling clamps, two coupling halves quick disconnect (female), two coupling halves quick disconnect (male), two hose assemblies, two grooved-to-external-thread couplings, two grooved-to-internal thread couplings, a strainer assembly, two check valves, a tee, steel fish tape, two gate valves, and a metal chest assembly. The kit is used to control the flow of fuel in the hoseline under all operating conditions.

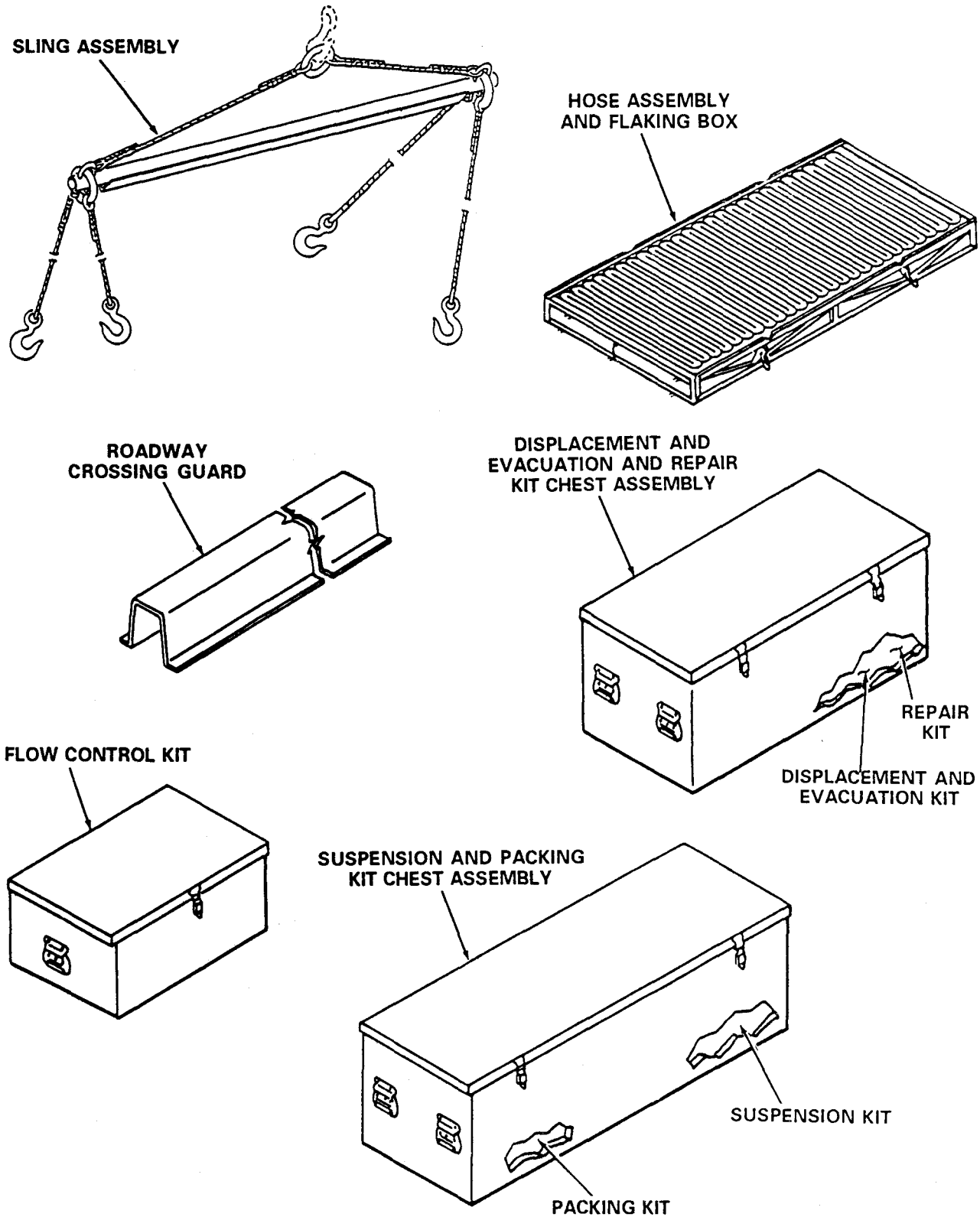

Figure 1-3. Location and Description of Major Components (Model ADC-1200).

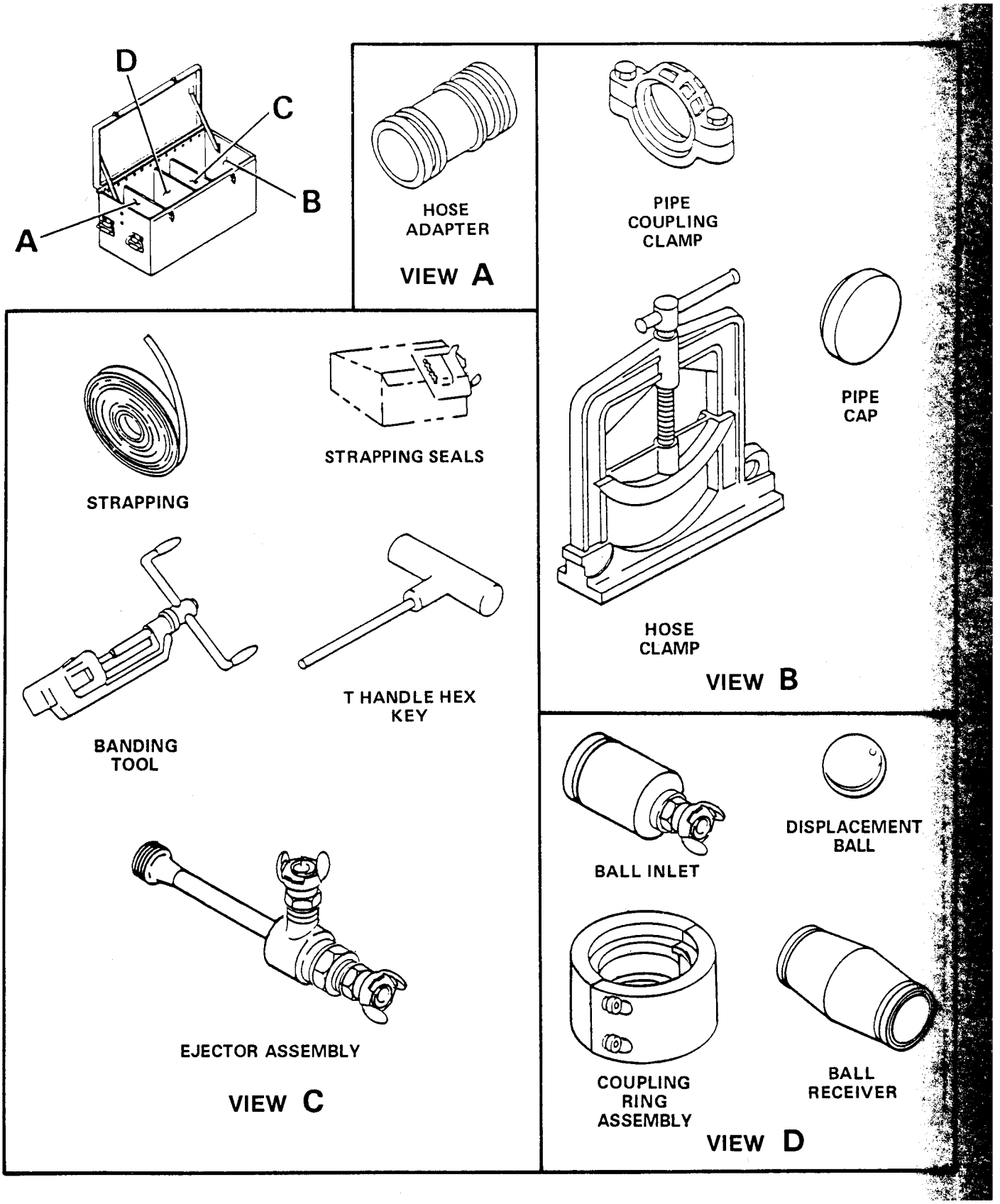

Figure 1-4. Major Components of Displacement and Evacuation and Repair Kit (Model ADC-1200).

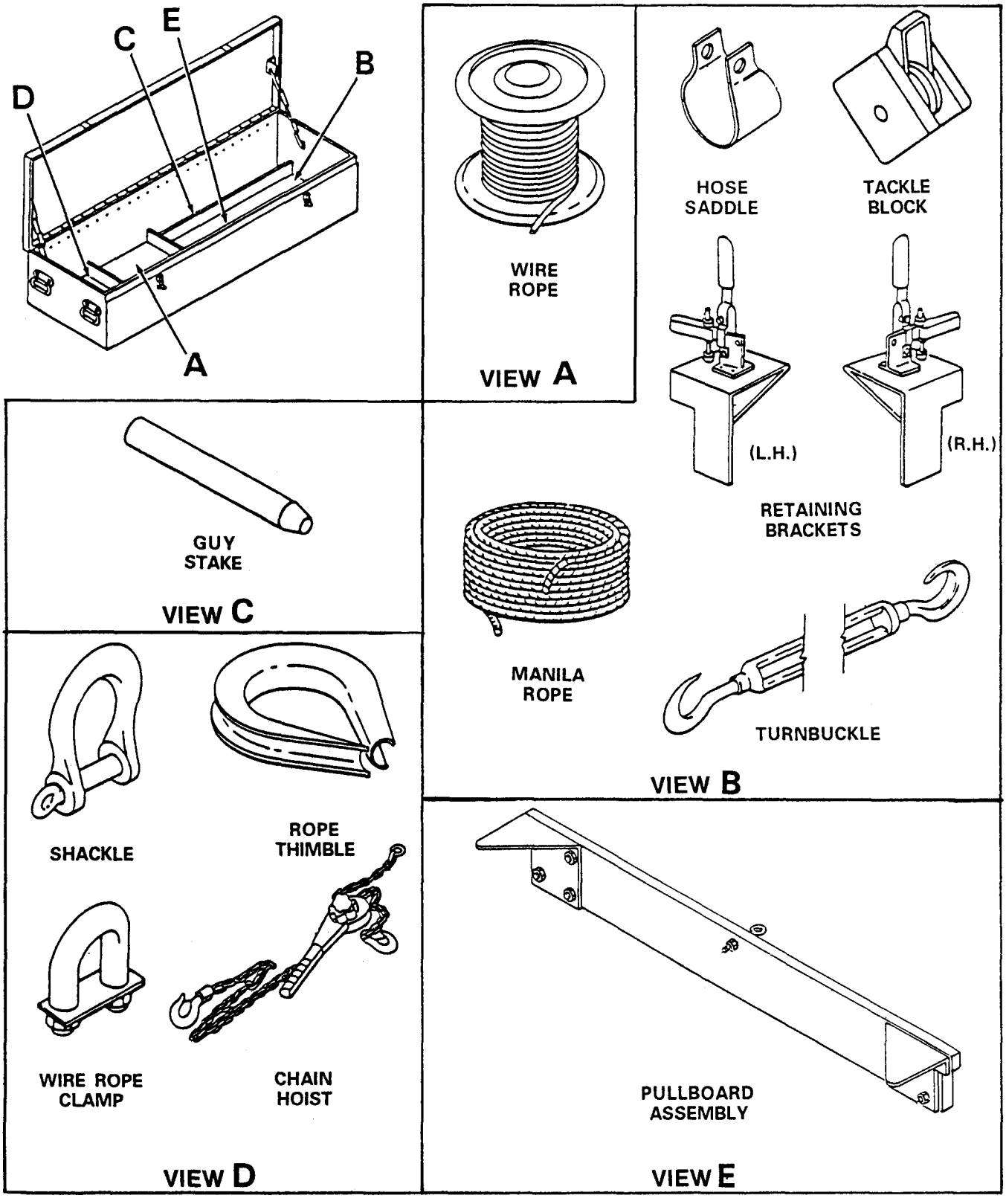

Figure 1-5. Major Components of Suspension and Packing Kit (Model ADC-1200)..

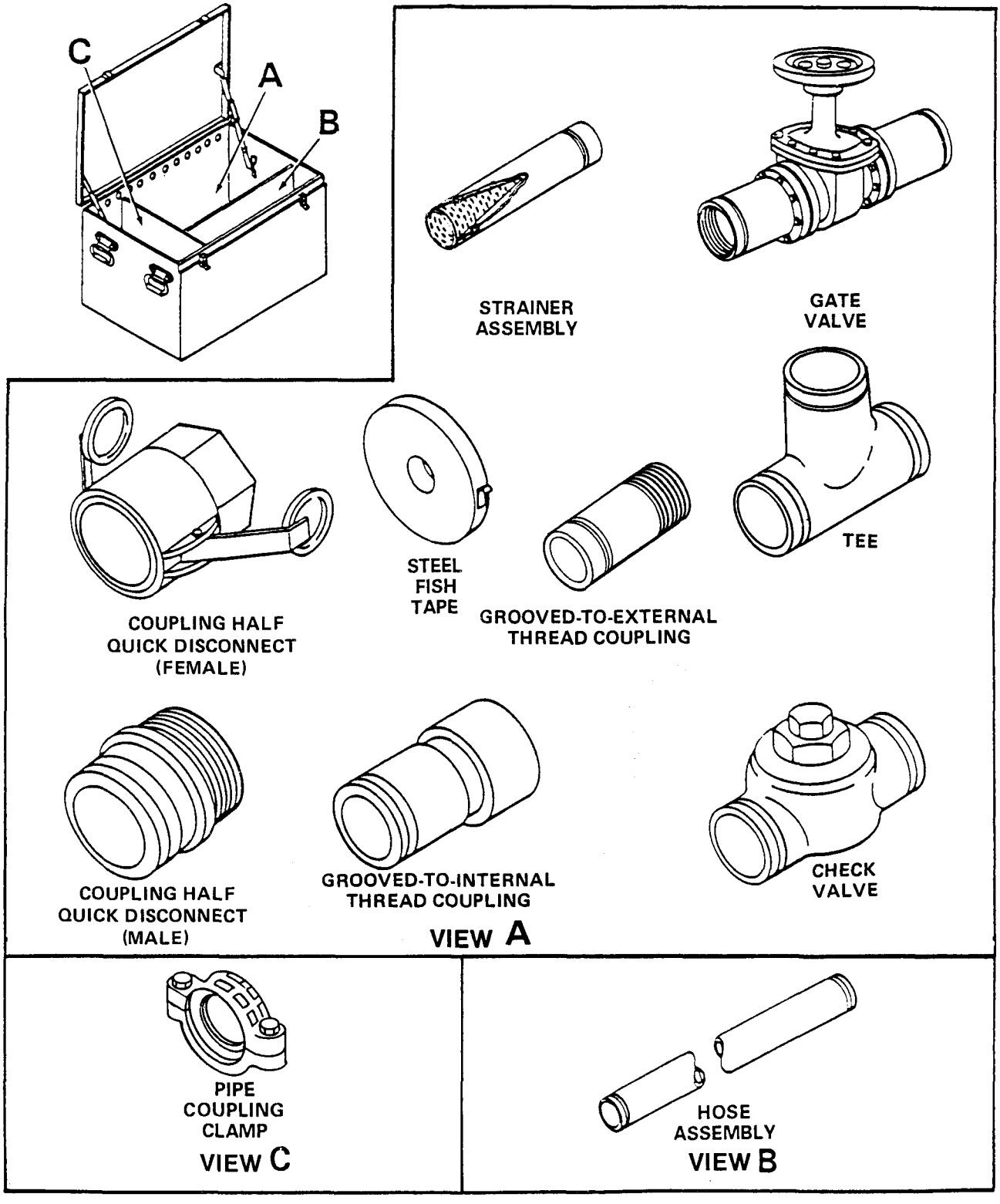

Figure 1-6. Major Componment of flow Control Kit (Model ADC-1200).

1-9. **Location and Description of Major Components.** (Model No. 1461) (figure 1-7).

SLING ASSEMBLY. Used for lifting flaking boxes. Constructed of steel pipe, wire cables, attach hooks, and lift ring.

HOSE ASSEMBLY AND FLAKING BOX. The hoseline outfit consists of 13 hose assembly and flaking boxes. Each hose consists of two 500-foot (150m) sections of collapsible hose coupled together per flaking box. The flaking box provides for packing and transportation of the hoses. Steel weldment construction with lifting provisions.

ROADWAY CROSSING GUARD. The hoseline outfit consists of 20 roadway crossing guards. The guard is a steel channel that provides protection of hoseline when routed under road surfaces and train tracks.

DISPLACEMENT AND EVACUATION KIT CHEST ASSEMBLY (figure 1-8). A welded assembly that contains compartments for the storage of the displacement and evacuation kit. The displacement and evacuation kit consists of an ejector assembly, ball inlet, displacement ball, ball receiver assembly, eight pipe coupling clamps, and 16 pipe caps. The kit is used to remove liquid fuel, vapors, and air from hoselines so that they can be easily packed into flaking boxes.

REPAIR KIT CHEST ASSEMBLY (figure 1–9). A welded assembly that contains compartments for the storage of the repair kit. The repair kit consists of four hose clamps, a banding tool, a box of strapping seals (banding buckles), three quarts (2.85LO of cleaning solvent, five cans of rubber adhesive, a hammer, a 5-pound (2.27 kg) pack of wiping rags, 350 ft. vinyl tape, a common screwdriver, a knife, a 1-1/16 inch socket, a socket wrench, 150 ft. rubber tape, two 100-foot (30m) rolls of strapping, two T handle hex keys, ten hose adapters, eight hose clamps, and two coupling strapping rings assemblies. This kit is used to repair hoselines.

SUSPENSION KIT CHEST ASSEMBLY (figure 1-10). A welded assembly that contains compartments for the storage of the suspension kit. The suspension kit consists of four tackle blocks, 25 wire rope clamps, a 350-foot (105m) spool of wire rope, a 350-foot (105m) spool of manila rope, 60 fabric hose saddles, 60 shackles, 14 guy stakes, four wire rope thimbles, and four turnbuckles.

PACKING KIT CHEST ASSEMBLY (figure 1-1 1.). A welded assembly that is used for storage of the packing kit. The packing kit consists of a pullboard assembly, two left- and two right-hand hose-retaining brackets, and a 3/4-ton (675 Kg) chain hoist.

FLOW CONTROL KIT ASSEMBLY (figure 1-1 2). A welded assembly that contains compartments for the storage of the flow control kit. The flow control kit consists of eight pipe coupling clamps, two coupling halves quick disconnect (female), two coupling halves quick disconnect (male), two hose assemblies, two grooved-to-external-thread couplings, two grooved-to-internal-thread couplings, a strainer assembly, two check valves, a tee, steel fish tape, two gate valves, and a metal chest assembly. The kit is used to control the flow of fuel in the hoseline under all operating conditions.

1-9A. **Location and Description of Major Components** (Model FIHK-1OO) (Figure 1-7).

SLING ASSEMBLY. Used for lifting flaking boxes. Constructed of steel pipe, wire cables, attach hooks and lift rings.

HOSE ASSEMBLY AND FLAKING BOX. The hoseline outfit consists of 13 hose assembly and flaking boxes. Each hose consists of two 500-foot sections of collapsible hose coupled together per flaking box. The flaking box provides for packing and transportation of the hoses. Steel weldment construction with lifting provisions.

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DISPLACEMENT AND EVACUATION KIT CHEST ASSEMBLY (figure 1-8) A welded chest assembly the contains compartments for the storage of the displacement and evacuation kit. The displacement and evacuation kit consists of and ejector assembly, ball inlet, displacement ball, ball receiver assembly, eight pipe coupling clamps and 16 pipe caps. The kit is used to remove liquid fuel, vapors and air from hoselines so that they cam be easily packed into flaking boxes.

REPAIR KIT CHEST ASSEMBLY (figure 1-9.1) A welded chest assembly that contains compartments for the storage of the repair kit. The repair kit consists of five hose coupling adapters, three pipe coupling clamps and gaskets, five cans of rubber adhesive, four hose clamps, one hammer, one knife, 150 feet of rubber tape, 350 feet of plastic tape, ten cap screws, nuts and flat washers, one flat tip screwdriver, one 3/4 inch socket, one 9/16 socket, one speed handle, one bundle of wiping rags and 10 hose-to-hose mender adapters.

SUSPENSION KIT CHEST ASSEMBLY (figure 1-10). A welded chest assembly that contains compartments for the storage of the suspension kit. The suspension kit consists of four tackle blocks, 25 wire rope clamps, a 350-foot spool of wire rope, a d 350-foot spool of manila rope, 60 fabric hose saddles and shackles, 14 steel stakes, four wire rope thimbles and four turnbuckles.

PACKING KIT CHEST ASSEMBLY (figure 1-11). A welded chest assembly that is used for storage of the packing kit. The packing kit consists of a pullboard, left-hand and right-hand hose retaining brackets and a 3/4 ton chain hoist.

FLOW CONTROL KIT ASSEMBLY (figure 1-12) A welded chest assembly that contains compartments for the storage of the flow control kit. The flow control kit consists of eight pipe coupling clamps, two male quick disconnect coupling halves, two female quick disconnect coupling halves, two hose assemblies, two grooved-to-external thread couplings, two grooved-to-internal thread couplings, a strainer, two check valves, a tee, steel fish tape and two gate valves. The kit is used to control the flow of fuel in the hoseline under all operating conditions.

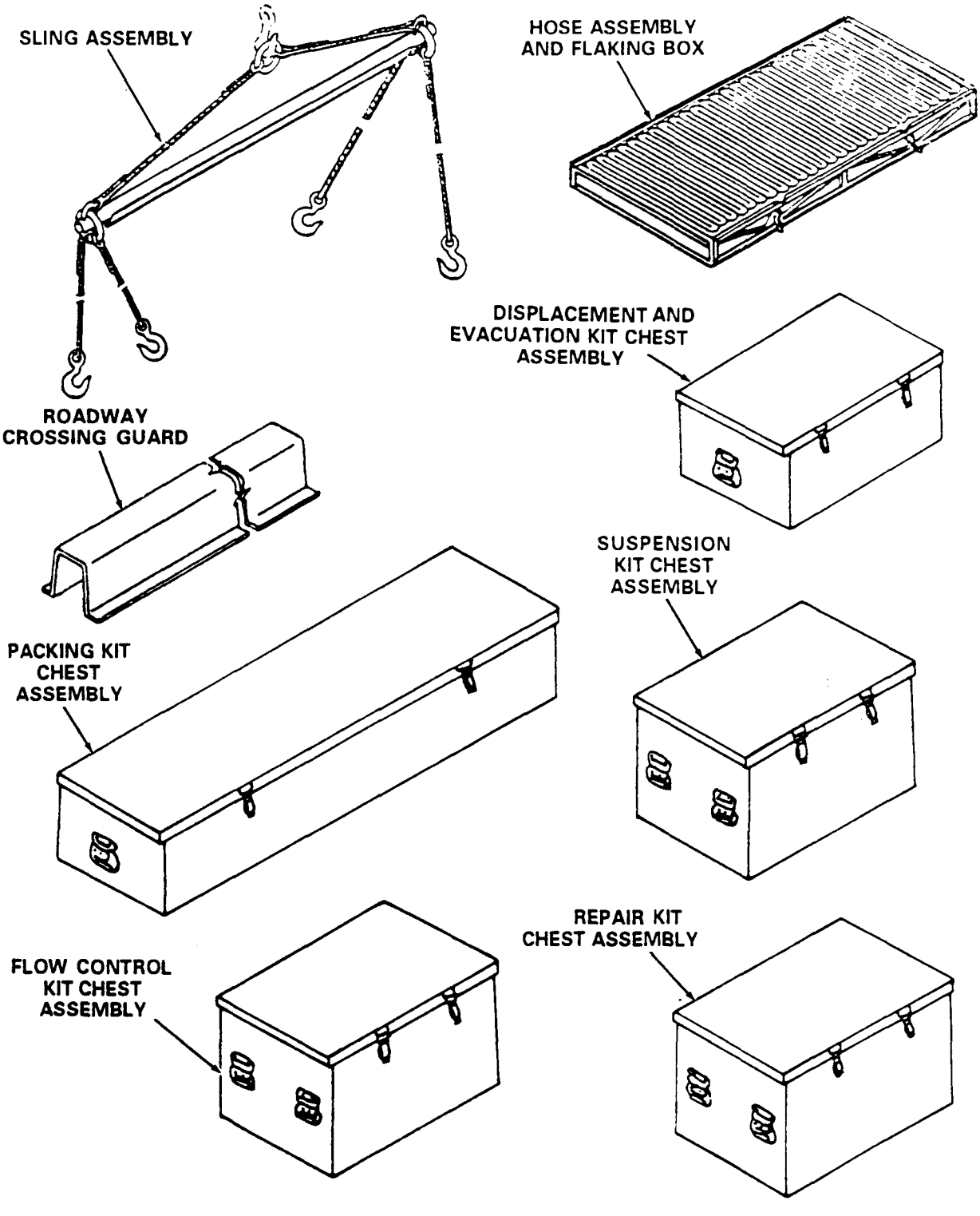


Figure 1-7. Location and Description of Major Components (Models 1461 and FIHK- 100).

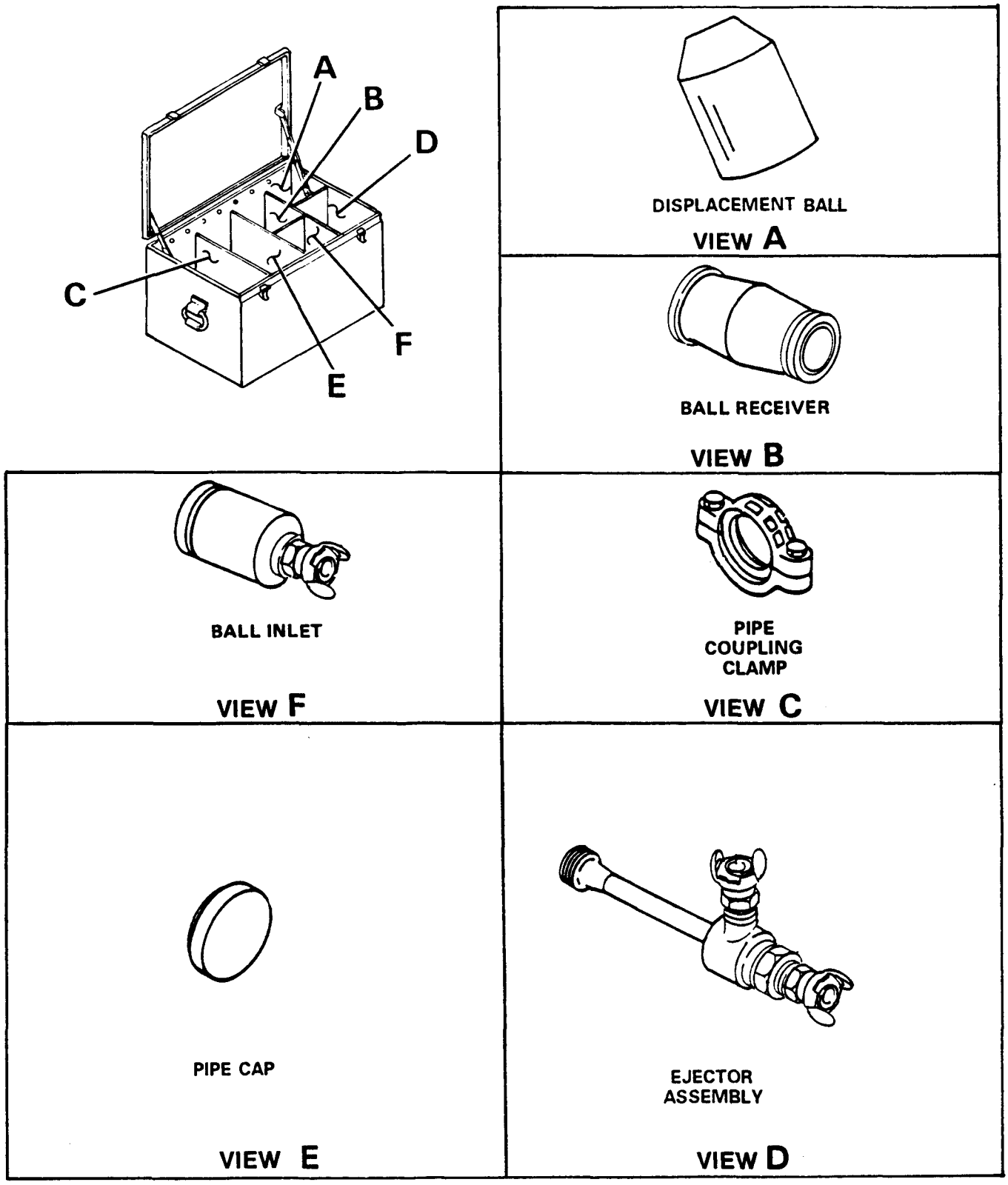


Figure 1-8. Major Components of Displacement and Evacuation Kit (Models 1461 and FIHK-100).

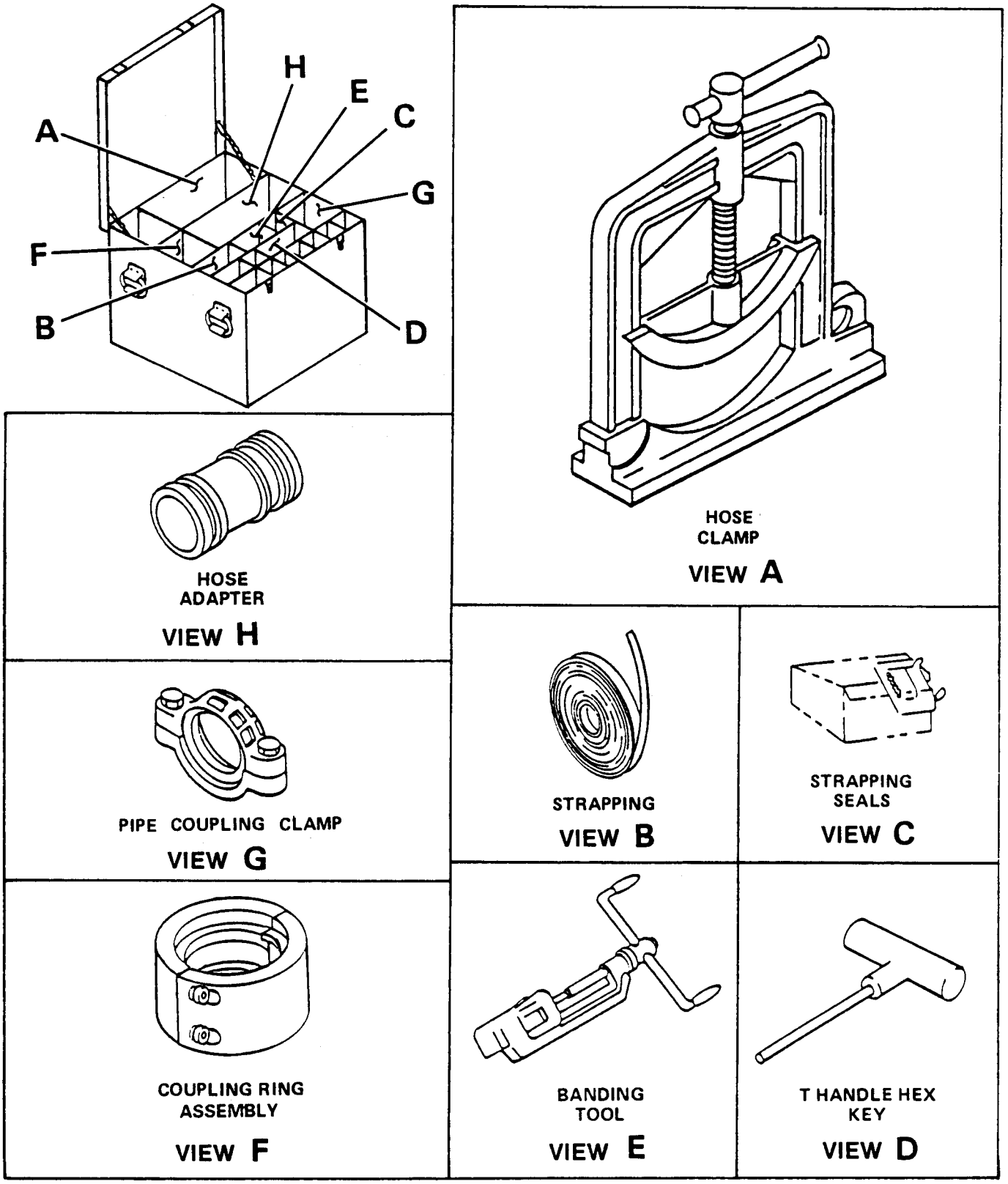
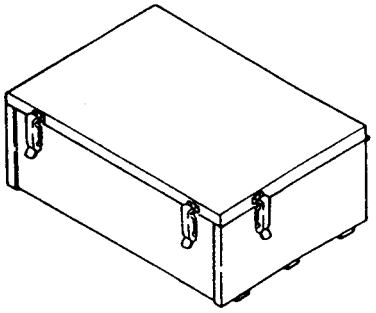
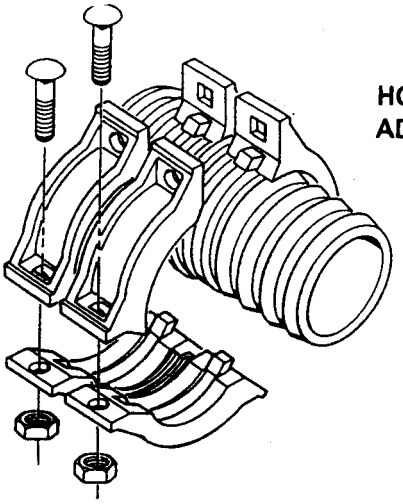


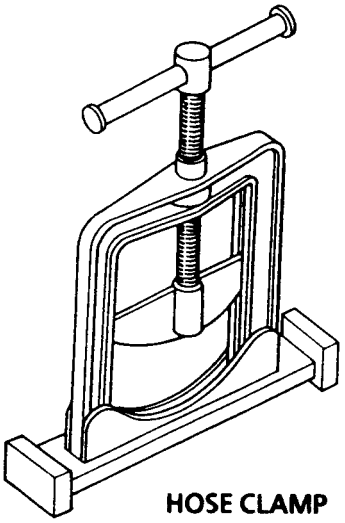
Figure 1-9. Major Components of Repair Kit (Model 1461).



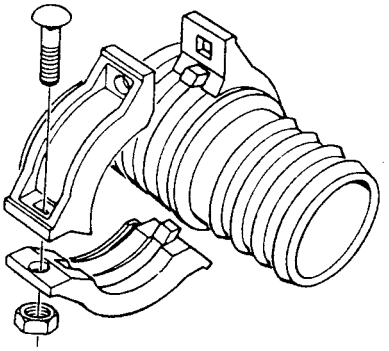
CHEST



HOSE TO HOSE ADAPTER

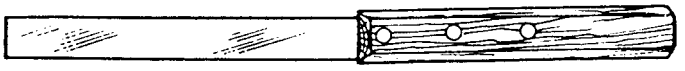


HOSE CLAMP



HOSE COUPLING ADAPTER

COUPLING CLAMP



KNIFE

Figure 1-9.1. Major Components of Repair Kit (Model FIHK- 100).

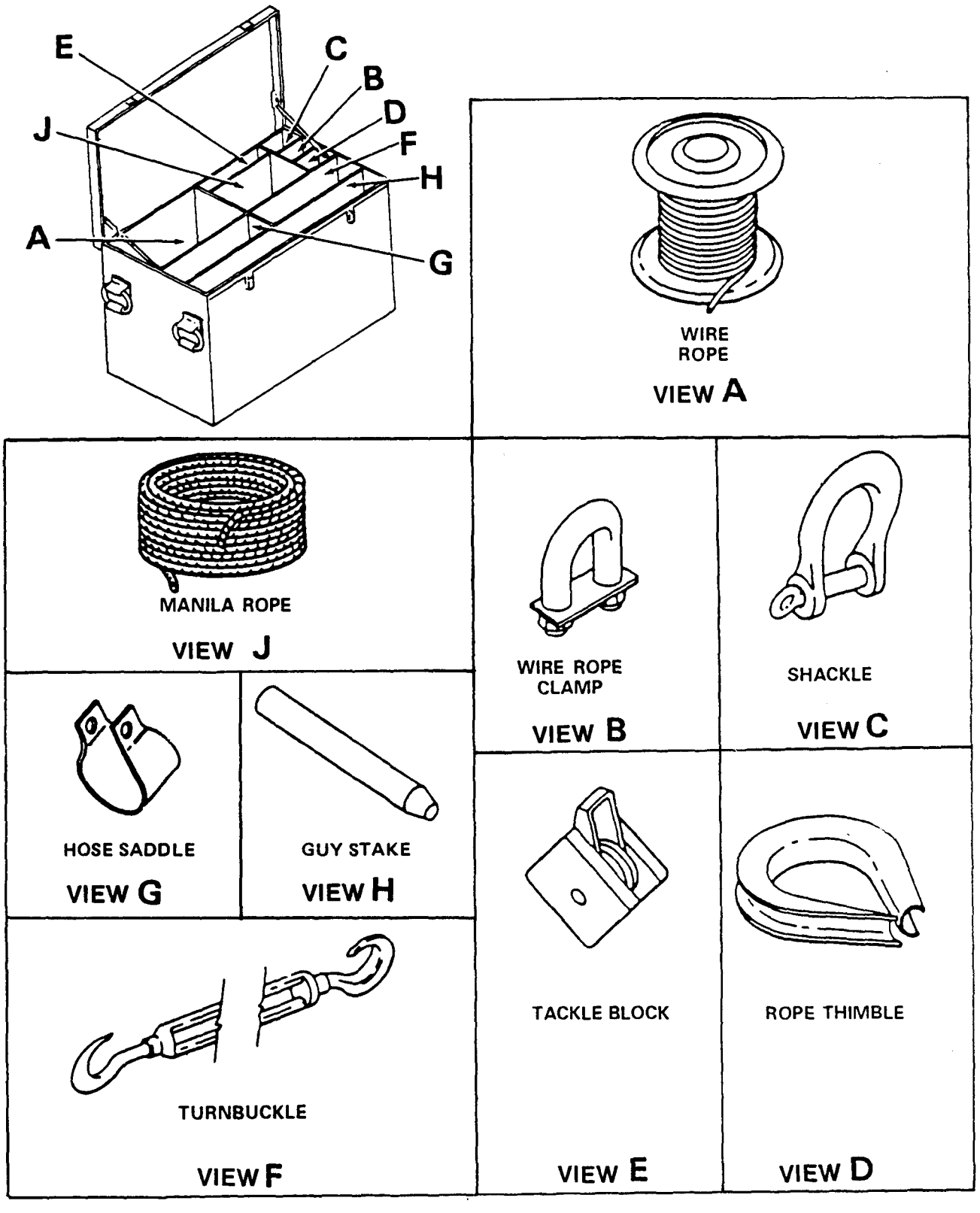


Figure 1-10. Major Components of Suspension Kit (Models 1461 and FIHK-100).

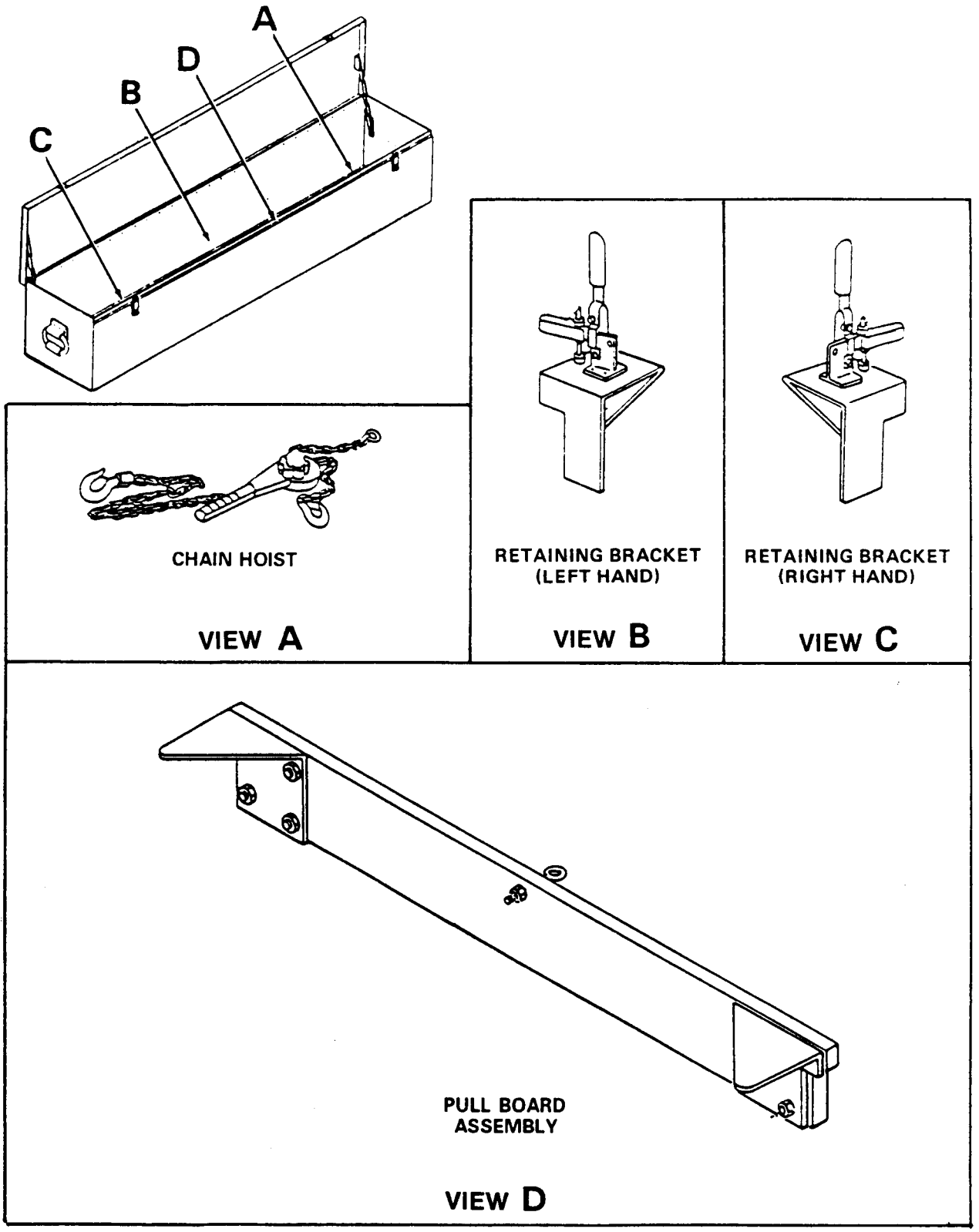


Figure 1-11. Major Components of Packing Kit (Models 1461 and FIHK- 100).

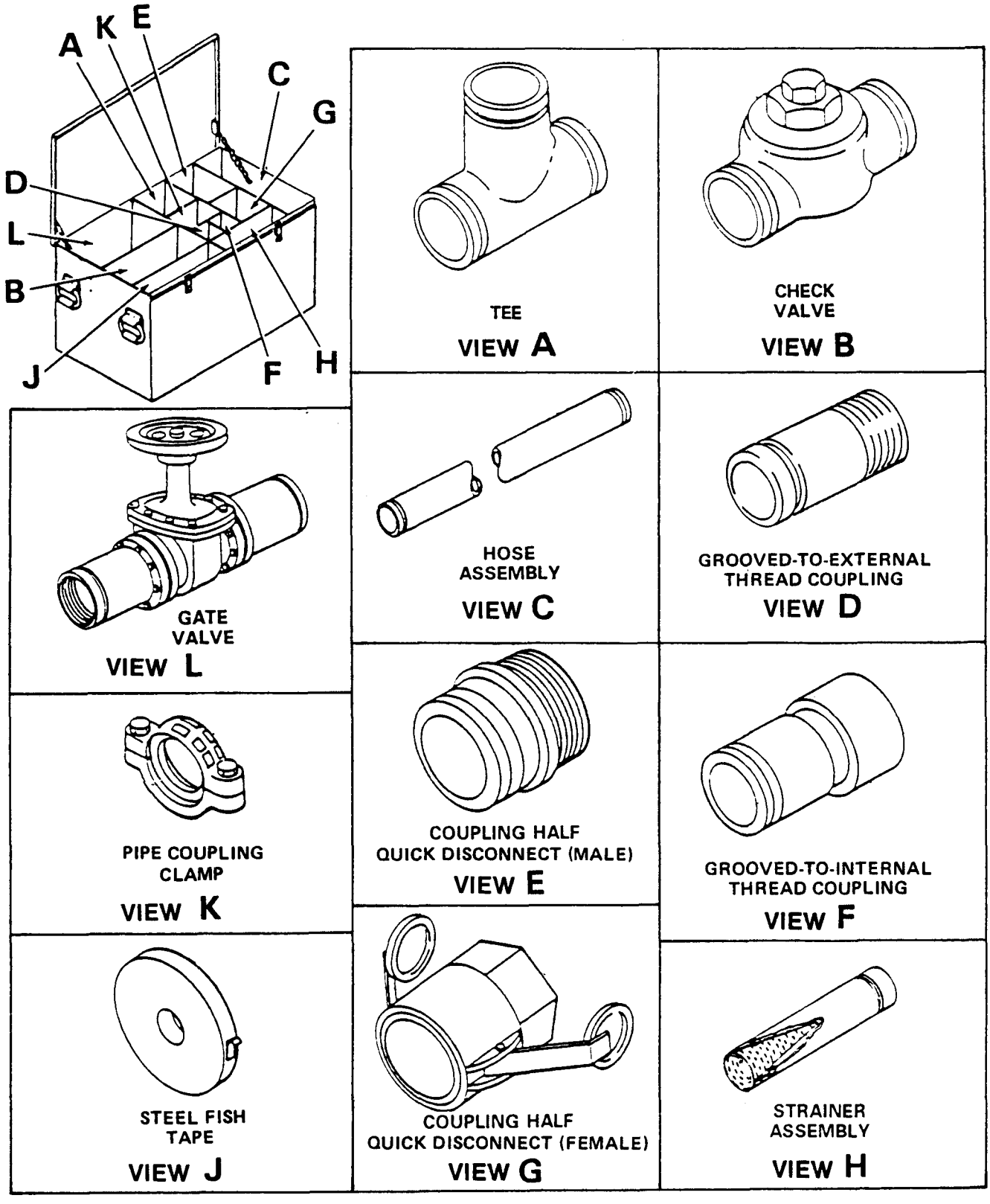


Figure 1-12. Major Components of Flow Control Kit (Models 1461 and FIHK- 100).

1-10. Equipment and Data.

a. *Fuel Handing Hoseline Outfit.*

Designed flow rate	350 gpm
Designed working pressure	125 psi (8.7 kg/cm2)
Maximum operating pressure	150 psi (10.8 kg/cm2)
Designed suction pressure	20psi(1.4kg/cm2)
Line fill (volume)	3100gal/mi (approx. 11,730 liters/gm)
Line fill (packing) rate	4.0 mph(6.4k/hr)
Designed laying speed	10mph(16 km)
Retrieval/repacking speed	2000 ft/hr (609.6 m/hr)

b. *Hose Assemble and Flaking Box.*

Weight	
Hose removed	320 lb (144 kg)
Hose installed	2000 lb (900 kg)
Length	144 in. (3657 mm)
Width	72in. (1828mm)
Depth	11.4 in. (290 mm)

c. *Hoseline.*

Weight per 500 ft (150m) section	840 lb (378 kg)

d. *Sling Assembly.*

Weight	86 lb(39 kg)

e. *Suspension Kit Chest Assembly (Model 1461).*

Weight	413 lb(186 kg)
Length	68 in. (1727 mm)
Width	21.5 in. (546 mm)
Depth	12.8 in. (325 mm)

f. *Suspe nsion Kit Chest Assembly (Model 1461).*

Weight	
Kit removed	135 lb (61.2 kg)
Kit installed	378 lb (171.5 kg)
Length	36.5 in. (927 mm)
Width	20.5 in. (520 mm)
Depth	21.5 in. (546 mm)

g. *Packing Kit Chest Assembly (Model 1461).*

Weight	
Kit removed	90 lb(40.8 kg)
Kit installed	188 lb(85.3 kg)
Length	68.5 in. (1740 mm)
Width	14 in. (355 mm)
Depth	13 in. (330 mm)

h. *Displacement and Evacuation and Repair Kits (Model ADC-1200).*

Weight . . . . . 390 lb (176 kg)
Length . . . . . 45.5 in. (1156 mm)
Width . . . . . 21.5 in. (546 mm)
Depth . . . . . 20 in. (508 mm)

i. *Displacement and Evacuation Kit Chest Assembly (Model No 1461).*

Weight
Kit removed . . . . . 56 lb (25.4 kg)
Kit installed . . . . . 122 lb (55.3 kg)
Length . . . . . 25 in. (635 mm)
Width . . . . . 16.0 in. (406 mm)
Depth . . . . . 13 in. (330 mm)

i. *Repair Kit Chest Assembly (Model No. 1461).*

Weight
Kit removed . . . . . 140 lb (63.5 kg)
Kit installed . . . . . 332 lb (250.6 kg)

Length . . . . . 36.5 in. (927 mm)
Width . . . . . 20.5 in. (520 mm)
Depth . . . . . 21.5 in. (546 mm)

k. *Flow Control Kit (Model ADC-1200).*

Weight . . . . . 294 lb(132 kg)
Length . . . . . 28 in. (711 mm)
Width . . . . . 21.5 in. (546 mm)
Depth . . . . . 18.5 in. (470 mm)

l. *Flow Control Kit Chest (Model No.1461).*

Weight
Kit removed . . . . . 119 lb (54.0 kg)
Kit installed . . . . . 315 lb (142.9 kg)
Length . . . . . 35.25 in. (895 mm)
Width . . . . . 20.50 in. (520 mm)
Depth . . . . . 20.00 in. (508 mm)

m. *Roadway Crossing Guard.*

Weight . . . . . 80 lb(36 kg)

n. Suspension Kit Chest Assembly (Mode/ FIHK- 100).

Weight		
Kit removed	135 lb.	(61.2 kg)
Kit Installed	378 lb.	(171.5 kg)
Length	38 in.	(965 mm)
Width	21.5 in.	(546 mm)
Depth	12.7 in.	(323 mm)

o. Packing Kit Chest Assembly (Model FIHK-100)

Weight		
Kit removed	92 lb	(41.4 kg)
Kit Installed	190 lb.	(85.5 kg)
Length	70 in.	(1778 mm)
Width	21.5 in.	(546 mm)
Depth	13 in.	(330 mm)

p. Displacement and Evacuation Kit Chest Assembly (Model FIHK-100)

Weight		
Kit removed	56 lb	(25.2 kg)
Kit Installed	122 lb.	(54.9 kg)
Length	24 in.	(610 mm)
Width	22 in.	(559 mm)
Depth	13 in.	(330 mm)

q. Repair Kit Chest Assembly (Model FIHK- 100)

Weight		
Kit removed	152 lb	(68.4 kg)
Kit Installed	346 lb.	(155.7 kg)
Length	45.5 in.	(1156 mm)
Width	21.5 in.	(546 mm)
Depth	21.5 in.	(546 mm)

r. Flow Control Kit Chest Assembly (Model FIHK-100)

Weight		
Kit removed	119 lb	(53.5 kg)
Kit Installed	315 lb.	(141.7 kg)
Length	28 in.	(711.2 mm)
Width	22 in.	(558.8 mm)
Depth	19 in.	(482.6 mm)

1-11. **Safety, Care, and Handling.** When operating or doing maintenance on Fuel Handling Hoseline Outfit take necessary precautions to ensure the safety of others as well as yourself. Avoid careless operating or maintenance habits which cause accidents to personnel and damage to the equipment. Observe all WARNING'S, CAUTION'S and NOTE's in this manual. This equipment can be extremely dangerous if these instructions are not followed.

Section III. TECHNICAL PRINCIPLES OF OPERATION

1-12. **Technical Principles of Operation.** The hoseline is used to supply fuel from a supply point to an aircraft or vehicle. The system is made up of many hoses and valves, so that distribution system can be configured to meet the consumption and to adapt to the terrain. The hose line is used in conjunction with a fuel pump which moves the fuel from the storage vehicle through the hoselines. A filter separator is used to filter the fuel of any contaminants. The valves supplied with the hoselines are used to control and channel the fuel to a nozzle to the aircraft or vehicle. After use of the hoseline system, a displacement and evacuation kit is used to remove any fuel vapors and to collapse. the hose to properly fit hoselines in flaking boxes.

CHAPTER 2

OPERATING INSTRUCTIONS

OVERVIEW

This chapter provides information and procedures required by the operator to operate the Fuel Handling Hoseline outfit safely and efficiently.

Section 1. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1. **General.** This section contains a list of operato's controls and indicators and a description of their function. The fuel handling hoseline outfit is connected to a pump assembly in a fuel system installation. The controls and indicators are covered in the manual for the fuel system. The fuel handling hoseline output controls are the gate valve assembly and check valve assembly. These controls control the fuel flow in the hoseline under all operating conditions and are operated by turning clockwise or counter clockwise to close or open.

Section II. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-2. **General.** Operator PMCS are performed to ensure that the Fuel Handling Hoseline Outfit is ready for operation at all times. Perform the checks and services at the specified intervals (table 2-1).

a. Before you operate, perform your before (B) PMCS. Observe all CAUTIONS and WARNINGS.

b. While you operate, perform your during (D) PMCS. Observe all CAUTIONS and WARNINGS.

c. After your operate, be sure to perform your after (A) PMCS.

2-3. **Purpose Of PMCS Table.** The purpose of the PMCS table is to provide a systematic method of inspection and servicing the equipment. In this way, small defects can be detected early before they become a major problem causing the equipment to fail to complete its mission. The PMCS table is arranged with the individual PMCS procedures listed in sequence under assigned intervals. the most logical time (before, during, or after operation) to perform each procedure determines the interval to which it is assigned. Make a habit of doing the checks in the same order each time and anything wrong will be seen quickly. See paragraph 2-4 for an explanation of the columns in table 2-1.

2-4. **Explanation Of Columns.** The following is a list of the PMCS table column headings with a description of the information found in each column.

a. Item No. This column shows the sequence in which the checks and services are to be performed, and is used to identify the equipment area on the Equipment Inspection and Maintenance Worksheet, DA Form 2404.

b. Interval. This column contains the time frame for which a required check or service is to be performed. A dot (o) is placed in a appropriate subcolumn(s) that contains a symbol identifying the time frame for which designated checks or services are to be performed. The symbol designations for the various time frames are as follows:

B - Before
D - During
A - After

c. Item to be Inspected/procedures. This column identifies the general area or specific part where the check(s) or service(s) to be done, and explains how to do them.

d. Equipment is Not Ready/Available If. This column lists conditions that make the equipment unavailable for use because it is unable to perform its mission, or because it would represent a safety hazard. Do not accept or operate equipment with a condition in the “Equipment is Not ready/Available If” column.

NOTE

The terms ready/available and mission capable refer to the same status: Equipment is on hand and is able to perform its combat mission. Refer to DA Pam 738-750.

2-5. **Reporting Deficiencies.** If any problem with the equipment is discovered during PMCS or while it is being operated that cannot be corrected at the operator/crew maintenance level, it must be reported. Refer to DA Pam 738-750 and report the deficiency using the proper forms.

NOTE

If equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make complete checks and services when equipment can be shut down.

Within designated intervals, perform these checks in order listed. Perform before operations PMCS if:

a. Item has not been operated since last PMCS checks.

b. Operating item for first time.

Table 2-1. Preventive Maintenance Checks and Services (PMCS)

B - Before Operation D - During Operation A - After Operation

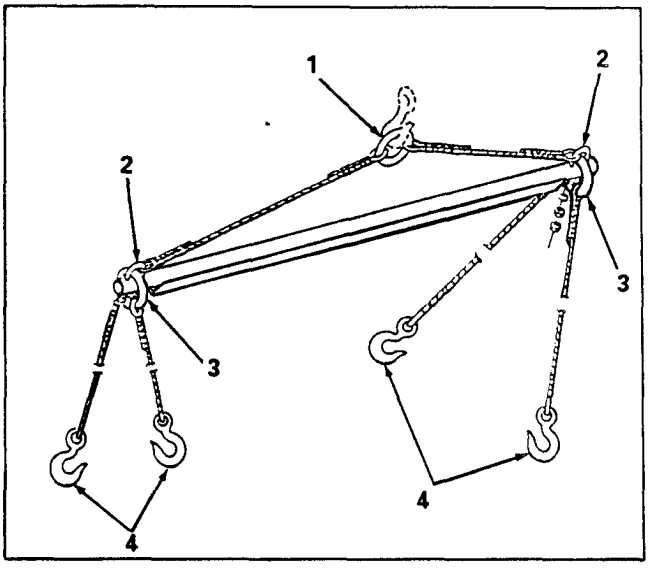
Item No.	Interval B	Interval D	Interval A	Item to be inspected / Procedure	Equipment is not ready/available if:
					
1				Sling Assembly	
	•			a. Inspect sling lift ring (1) for cracks or breaks. Notify next higher level of maintenance of damaged parts.	Lift ring cracked, broken, or missing.
	•			b. Inspect "U" bolts (2) for cracks, breaks and security. Notify next higher level maintenance of damaged parts.	"U" bolts cracked, broken, or missing.
	•			c. Inspect to spreader bar rings (3) for cracks or breaks. Notify next higher level of maintenance of damaged parts.	Spreader bar rings cracked, broken, or missing.
	•			d. Inspect four lift hooks (4) for cracks, breaks, or distortions. Inspect throat opening of hooks. If opening is more than 15 percent in excess of normal, more than a 10 degree twist from the plane of the unbent hook, or wear exceeds 10 percent of the original dimension, or damage noted, notify next higher level of maintenance.	Lift hooks cracked, broken, missing, or distorted beyond limits.

Table 2-1. Preventive Maintenance Checks and Services (PMCS) (cont).

B - Before Operation D - During Operation A - After Operation

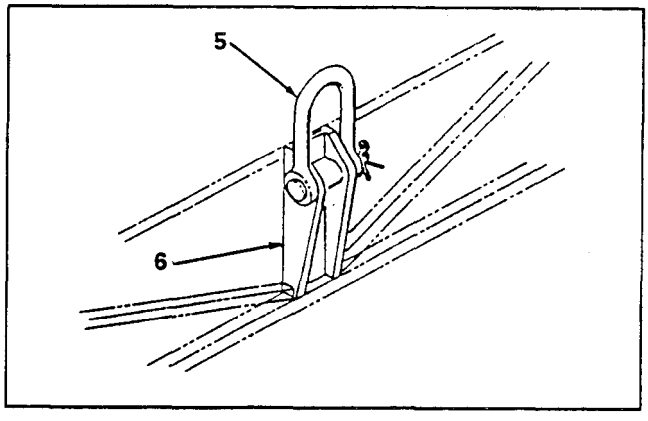
Item No.	Interval B	Interval D	Interval A	Item to be inspected / Procedure	Equipment is not ready/available if:
				Sling Assembly (cent)	
				WARNING Broken wire rope strands are a hazard, and can cause serious punctures and cuts. Take care when handling and inspecting cables.	
	•			e. Inspect wire rope for broken or worn outside wires, reduction of rope diameter below nominal value, corroded, broken, or frayed wires at end connections. Check for severe kinking, crushing, cutting or unstranding.	Any reduction in diameter, excessive corrosion, any broken, frayed wires, wire is kinked, broken or crushed.
	•			f. Check for worn, broken or missing cable thimbles at rings and eyes and loose or missing cable clips. Notify higher level of maintenance of damaged parts.	Cable trimbles worn, broken or missing. Cable clips are loose or missing.
					
2				Flaking Box Assembly	
	•			a. Check all accessible frame seam welds for cracks or separated metal. Notify next higher level of maintenance of damaged parts.	Seam weld is cracked or metal separated.

Table 2-1. Preventive Maintenance Checks and Services (PMCS) (cont).

B - Before Operation D - During Operation A - After Operation

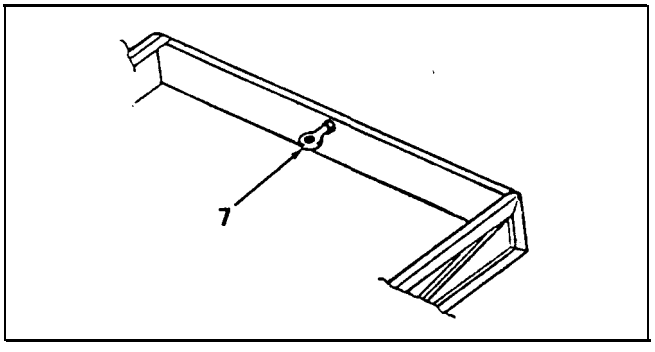
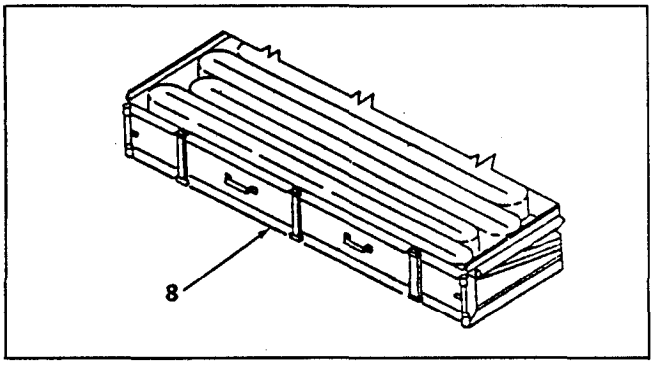
Item No.	B	D	A	Item to be inspected Procedure	Equipment is not ready/available if:
				Flaking Box Assembly (cent)	
				b. Inspect lifting shackles (5) for cracks or any deformation. Notify next higher level of maintenance of damaged parts.	Shackles are cracked or deformed.
	•			Inspect shackle attach bracket (6) for cracked holes, cracked or separated seam welds. Notify next higher level of maintenance of damaged parts	Bracket is cracked around holes, seams cracked or separated.
					
	•			d. Inspect eye bolt assembly (7) at rear of box for cracks and security. Notify next higher level of maintenance of damaged parts	
					
	•			e. Inspect tailgate assembly (8) for cracks, breaks, holes, defective latches or any other distortions. Notify next higher level of maintenance of damaged parts.	Eye bolt is cracked, broken, or deformed.

Table 2-1. Preventive Maintenance Checks and Services (PMCS) (cent).

B - Before Operation D - During Operation A - After Operation

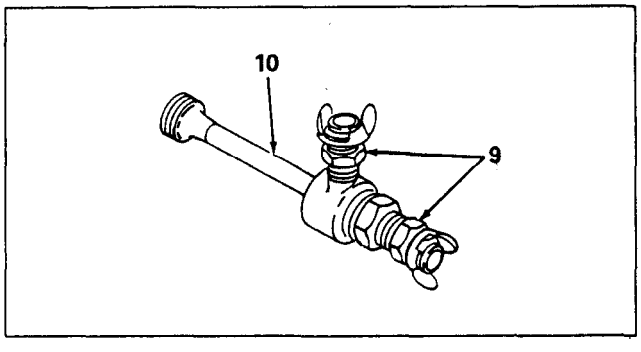
Item No.	Interval B	Interval D	Interval A	Item to be inspected / Procedure	Equipment is not ready/available if:
3				Hoseline Assembly	
				NOTE Hoseline cannot be inspected until removed from flaking box.	
	•	•	•	a. Inspect hoseline for security of all coupling clamps and rings. Check for damaged couplings, rings or defective gaskets. Replace damaged parts.	Loose or damaged clamps, rings or gaskets.
		•		b. Check entire length of hoseline for any breaks, leaks or seepage through hose wall. Repair hose by using repair kit if defects noted.	Walls are excessively worn or hose contains breaks. Any sign of leakage.
		•		c. Check entire length of hoseline for rubbing or chafing against trees, rocks, suspension towers or any objects which might damage hose-line. Reposition as required.	
		•		d. Check for security of all suspension devices if used.	
					
4			•	Ejector Jet Assembly	
				Inspect couplings and adapter (9) and body (10) for cracks, plugged ports and thread damage. If damage is found, notify higher level of maintenance	Jet assembly is cracked, ports plugged, or threads damaged.

Table 2-1. Preventive Maintenance Checks and Services (PMCS) (cont).

B - Before Operation D - During Operation A - After Operation

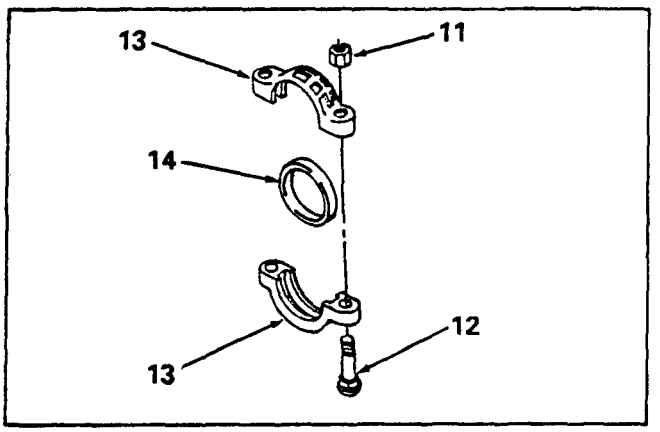
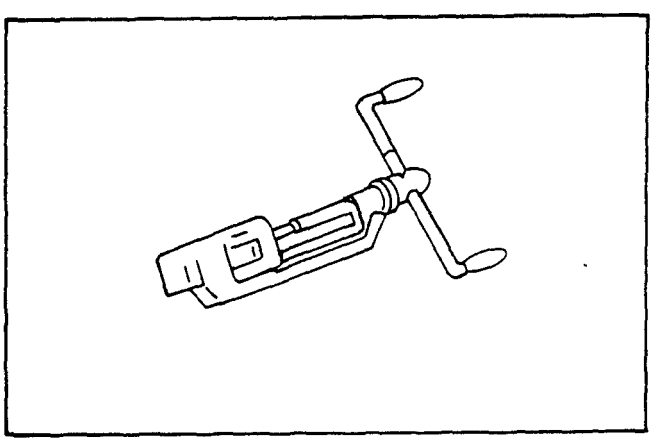
Item No.	B	D	A	Item to be inspected Procedure	Equipment is not ready/available if:
					
5				Pipe Coupling Clamps	
	•			a. Remove nuts (11) and bolts (12). Separate halves (13) and inspect gasket (14) for cracks, distortion and damage. Replace gasket (14) if damaged.	Cracked, damaged or distorted gaskets.
	•			b. Inspect coupling halves (13) for cracks and distortion. Inspect nuts (11) and bolts (12) for damage. Replace damaged items.	Damaged components.
					
6				Banding Tool	
	•			Inspect tool for breaks, cracks or distorted threads. Replace tool if damaged	Banding tool is broken, or has cracks or distorted threads

Table 2-1. Preventive Maintenance Checks and Services (PMCS) (cont).

B - Before Operation D - During Operation A - After Operation

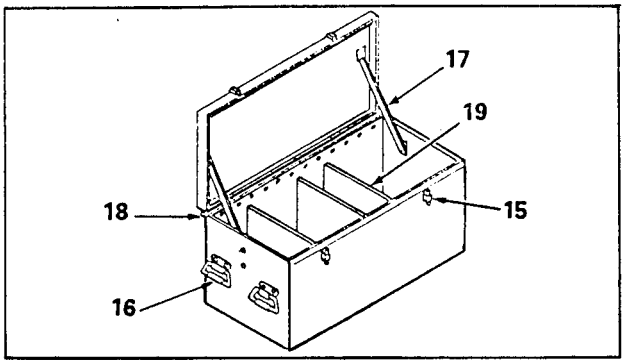
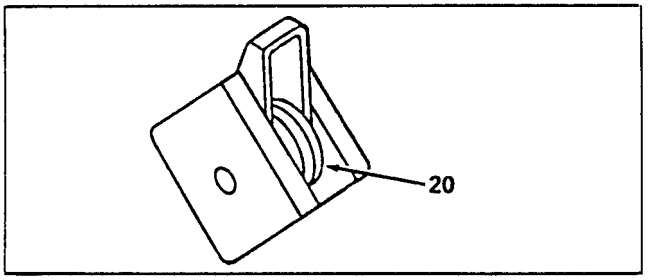
Item No.	Interval B	Interval D	Interval A	Item to be inspected / Procedure	Equipment is not ready/available if:
					
7	•			Storage Chests Inspect for broken latches (15), handles (16), lid supports (17) and hinges (18). Check internal partitions (19) for broken seam welds. Check exterior surfaces for damage. If defects are noted, notify next higher level of maintenance.	
					
8	•			Block, Tackle Inspect sheave (20) for smoothness and freedom from surface defects, eccentric bores, cracked hubs, or flanges. Check size and configuration of groove. If groove depth or internal flange width has increased ten percent or more, replace block, tackle and notify next higher level of maintenance.	Sheave binds or will not operate smoothly, bores are elongated, or hubs or flanges are cracked.

Table 2-1. Preventive Maintenance Checks and Services (PMCS) (cont).

B - Before Operation D - During Operation A - After Operation

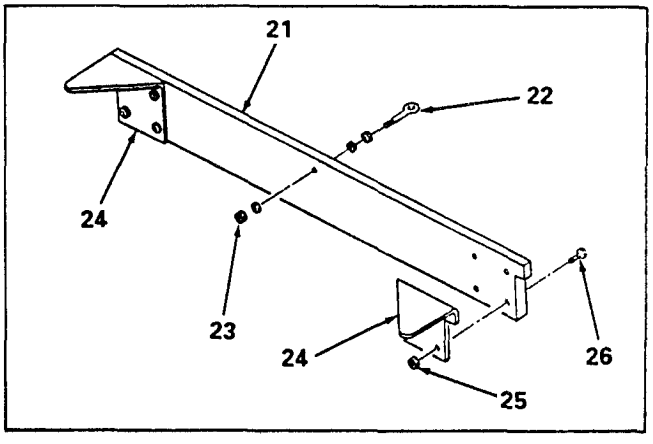
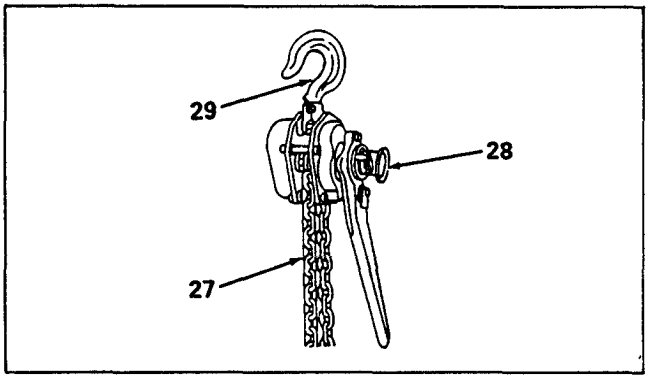
Item No.	Interval B	Interval D	Interval A	Item to be inspected Procedure	Equipment is not ready/available if:
					
9				Pullboard Assembly	
	•			a. Inspect pullboard (21) for breaks or cracks. Replace pullboard if damage is found.	Pullboard is cracked or broken.
	•			b. Inspect eye bolt (22) and nut (23) for, security, damaged threads, cracks or distortion. If loose, damaged or distorted, notify next higher level of maintenance.	Eyebolt is cracked, distorted, damaged, or missing.
	•			c. Inspect braces (24), nuts (25), and bolts (26) for cracks, breaks and security. If defects are noted, notify higher level of maintenance.	Braces are cracked or broken, or hardware is loosen.
					

Table 2-1. Preventive Maintenance Checks and Services (PMCS) (cont).

B - Before Operation D - During Operation A - After Operation

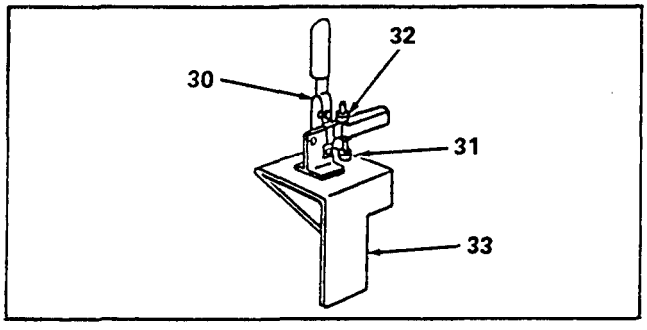
Item No.	Interval B	Interval D	Interval A	Item to be inspected / Procedure	Equipment is not ready/available if:
10				Chain hoist	
				a. Inspect chain (27) for excessive wear or stretch, bent or twisted links, defective welds, nicks and gouges. Notify next higher level of maintenance of damaged parts.	Chain is broken, excessively worn, has broken welds, or is nicked and gouged.
				b. Inspect ratchet (28) for breaks, cracks or distortions. Notify next higher level of maintenance of damaged parts.	Ratchet is broken, cracked, or distorted.
				c. Inspect throat opening of hooks (29). If opening is more than 15 percent in excess of normal, more than a 10 degree twist from the plane of the unbent hook, or wear exceeds 10 percent of the original dimensions, notify next higher level of maintenance.	Hooks are distorted beyond limits, cracked, damaged, or missing.
					
11				Hose Retaining Bracket	
				a. Inspect for bent, broken or cracked clamp (30). Replace assembly if damage noted.	Clamp is bent, broken or distorted.
				b. Inspect for missing or damaged screw (31) or nut (32). Notify next higher level of maintenance.	Screw or nut is missing, loose, or damaged.
				c. Inspect for bent, cracked or distorted bracket (33). Replace assembly if damage noted.	Bracket is bent, cracked or distorted.

Table 2-1. Preventive Maintenance Checks and Services (PMCS) (cont).

B - Before Operation D - During Operation A - After Operation

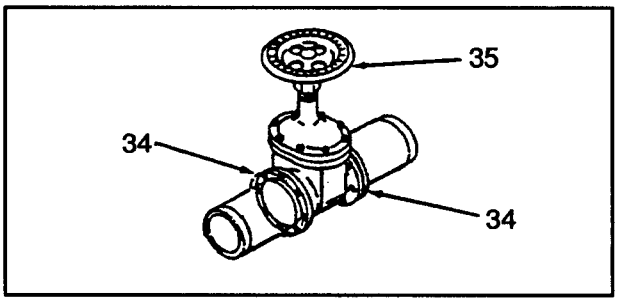
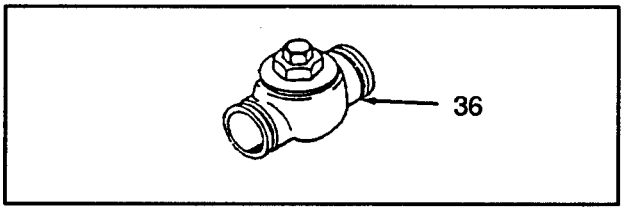
Item No.	Interval B	Interval D	Interval A	Item to be inspected / Procedure	Equipment is not ready/available if:
					
12				Gate Valve Assembly	
	•	•		a. Visually check flanges (34) for evidence of leakage. Notify next higher level of maintenance if leaks or evidence of leaks are present.	Valve leaks.
	•	•		b. Check that valve assembly is working properly. Check rotation of handle (35) to ensure it turns freely. Notify higher level of maintenance if handle will not turn, or is difficult to turn.	Valve does not operate properly or will not turn freely.
					
13				Check Valve Assembly.	
	•	•		Inspect check valve assembly (36) for leaks, cracks, dents, or damage. Replace if damaged or leaking.	Valve leaks, or defects noted.

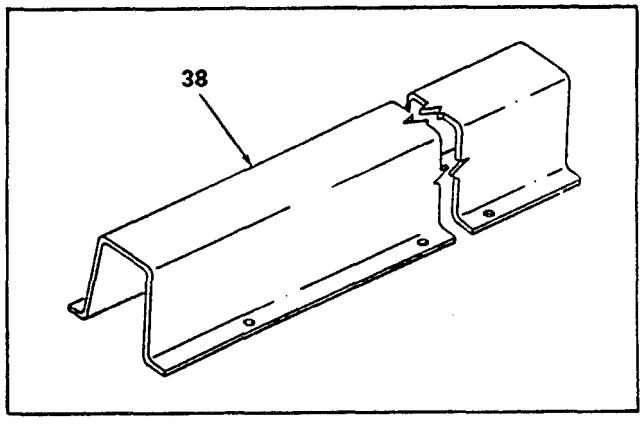
Table 2-1. Preventive Maintenance Checks and Services (PMCS) (cont).

B - Before Operation D - During Operation A - After Operation

Item No.	Interval			Item to be inspected / Procedure	Equipment is not ready/available if:
	B	D	A		
14				Strainer Assembly **WARNING** Potential health hazards result from inhalation of petroleum solvent vapors and from contact of solvent with skin. Use rubber gloves and hand cream for protection and work with adequate ventilation. Petroleum solvents are highly flammable. Keep solvent container lids closed when not in use, and avoid all possible risks of igniting solvent vapors, keep away from open flame and excessive heat. Flash point of solvent is 100 to 138 degrees F (38 to 59 degrees C).	
	•		•	Inspect strainer (37) from cracks, breaks or dogged screen. Replace strainer if damage noted. If screen is clogged, clean strainer with solvent, Federal Specification cleaning compound solution and allow to dry.	Strainer is cracked, broken, or screen is clogged.

Table 2-1. Preventive Maintenance Checks and Services (PMCS) (cont).

B - Before Operation D - During Operation A - After Operation

Item No.	Interval B	Interval D	Interval A	Item to be inspected / Procedure	Equipment is not ready/available if:
					
15				Roadway Crossing Guard	
	•		•	Inspect crossing guard (38) for cracks or any other defects. Straighten guard if bent. If cracked or badly distorted, replace guard.	Guard cannot be straightened.

Section III. OPERATION UNDER USUAL CONDITIONS

Paragraph Page

2-6. **Preparation for Use.**

a. Determine Hoseline Route. A useable hoseline route must be determined prior to using the hoseline outfit. A rapid reconnaissance and survey of proposed routings must be conducted using all available resources, including topographic maps, aerial photographs, and actual ground inspection if possible. The minimum data required are: a sketch of the proposed route; vehicular speedometer distances; and enough topographic information (surveying altimeter elevations) to establish the static fluid head.

b. Route Selection. Ideally, the hoseline should be laid out on firm, dry, level ground beyond any drainage ditches paralleling a roadway. Select a route based on the following guidelines:

(1) Route should be direct and present a minimum number of obstacles or obstructions.

(2) Route should follow an existing roadway to facilitate hose-laying operation, and security of hoseline.

(a) A route parallel to secondary all-weather roadway is preferable to a route along a heavily traveled road.

(b) If existing roadway bends excessively, cross-country routing may be used.

(c) If no roadway is suitable, select a route which is accessible to vehicles needed for laying out hoseline.

WARNING

Do not position hoseline in an area where leakage can contaminate drinking water. Failure to observe this warning can result in serious injury or death by poisoning.

(d) Do not route hoseline through marshes, swamps, water courses, or land subject to periodic flooding.

(3) Plan the location of any necessary take-off tees.

(4) In rolling country, the hoseline is most effective where the elevation varies no more than 100 feet per 13,000 feet (30m per 3,900 m). If increase in elevation of the line is too great, then either a reduction in flow must be accepted or, the hoseline shortened.

(5) Depending upon the situation in which the hoseline is to be used, the following basic security precautions should be considered when planning the hoseline route.

CAUTION

Do not lay hoseline on areas of exposed rock. Hoseline is easily damaged by sharp edges or abrasive action of rock.

(a) Do not route the hoseline through densely populated areas.

(b) Take full advantage of natural cover (fence lines, woods, hedging, etc.).

(c) Disturb the natural cover as little as possible.

(d) Do no leveling or grading.

c. *HOSELINE FLAKING INSTRUCTIONS.*

CAUTION

Weight of 3 flaking boxes is approximately 6000 pounds. Do not overload vehicle,

(1) ***General.*** The hoseline is positioned by flaking the hose from the rear of a moving truck, then manually moving the hose to a secure position. A maximum of three flaking boxes (3000 feet (900m) of hose) are loaded onto a truck, and the leading and trailing ends of each hose are connected to the next hose in line. When the truck moves forward along a predetermined route, the hose flakes out of the flaking boxes and is laid out behind the truck. As the hose flakes out, it must be manually picked up and moved to a secure position 5 to 10 feet (1.5-3.0m) from the roadway. Any bends or kinks in the hoseline must be straightened. The recommended hose laying speed is approximately 10 mph (16 km); however, the actual rate will vary in each usage. The optimum speed for any hose-laying operation will vary depending upon the terrain, available manpower, and how far the hose must be moved between the point it flakes off the truck and a secure area for hoseline operation. The hose must not be left exposed on any roadway or track which will be traveled by other vehicles. Due to its lightweight, thin-wall constructions, the hoseline is easily damaged by rough handling, abuse, or abrasive contact with rocks. Special kits are included in the hoseline outfit for use in construction of short, roadway crossings and overhead suspension crossings. The flow control kit contains hoseline valves, couplings, and a tee used to supplement the hoseline under varying usage conditions. A minimum of five trucks with crews of five men each laying hose is recommended for efficient hose-laying operation (refer to Table 2-2).

Table 2-2. Manpower Requirements.

Hose laying	25 persons and 5 trucks
Hose retrieval/repacking	35 persons and 5 trucks
Install 10-foot (3m) road crossing	5 man-hours
Repositioning hose 5 to 10 feet (1.5-3.0m) from drop point to suitable position	4 man-hours/mi
Hose laying	8 man-hours/mi
Hose retrieval	12 man-hours/mi

(2) *Individua/ task assignments.* Task assignments for the hose-laying operation per truck areas follows:

(a) Supervisor in charge. One supervisor is needed per truck during hose-laying operation

(b) Driver. One driver is needed to operate each truck.

(c) Assistant driver. One assistant driver is needed to observe the actual flaking out of the hose and the work of the line walkers. The assistant driver tells the driver to vary the speed of the truck according to the speed and needs of the line walkers, and also stops the operation if there is a problem.

(d) Line wakers. A minimum of two line walkers follow behind each truck straightening kinks or bends in the hoseline. The line walkers are also responsible for picking up the hoseline and moving it away from the roadway. Installation of roadway and suspension crossings may require additional personnel.

(3) *Prepare flaking boxes.* Prepare flaking boxes for hose-laying as follows (figure 2-1):

(a) Ensure that first box (1) to second box (2) and second box (2) to third box (3) retaining pins (4) are securely in place.

CAUTION

Open end of hooks must face outward to prevent damage to flaking box.

(b) Attach lifting sling hooks (5) to lifting shackles (6) on the bottom box (3).

WARNING

Stand clear of load being lifted in case of failure to lift sling, lift device or flaking box shackles.

Do not exceed capacity of lifting device. Ensure it has a minimum lifting capacity of 6,000 lbs. (2700 kg).

Do not lift flaking boxes with a fork lift. Use only the special lift sling provided to lift flaking boxes.

Do not load flaking boxes in excess of truck capacity. Do not lift more than three flaking boxes at a time. Do not stack flaking boxes more than three high.

(c) Carefully lift flaking boxes and load on truck.

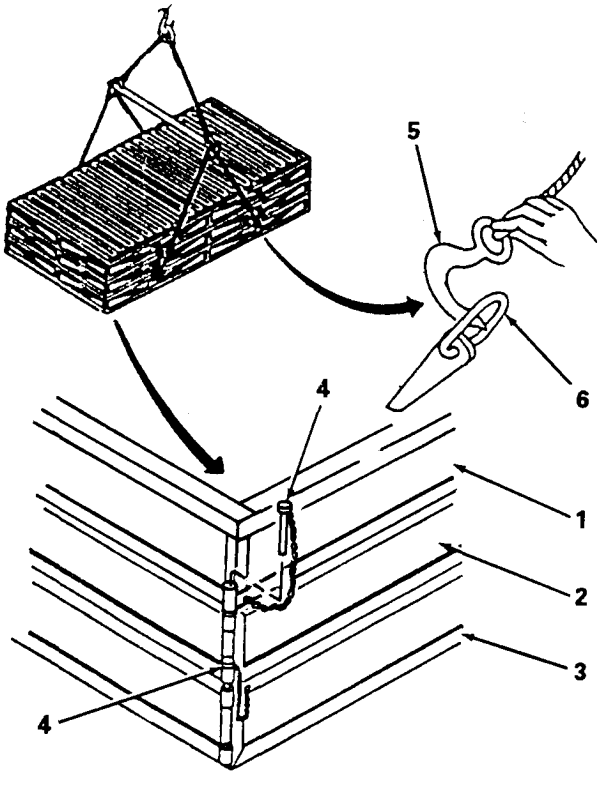


Figure 2-1. Prepare Flaking Boxes.

(d) Carefully remove lifting sling hooks from flaking box.

(e) Using lifting shackles (6) as attachment points, securely tie flaking boxes to truck to prevent boxes from slipping during hose laying operations.

(f) Remove tailgate assembly as follows (figure 2-2):

1 Slide latches (1) from flaking box (2).

2 Lift tailgate assembly (3) up and away from flaking box (2).

NOTE

Retain tailgate for reuse.

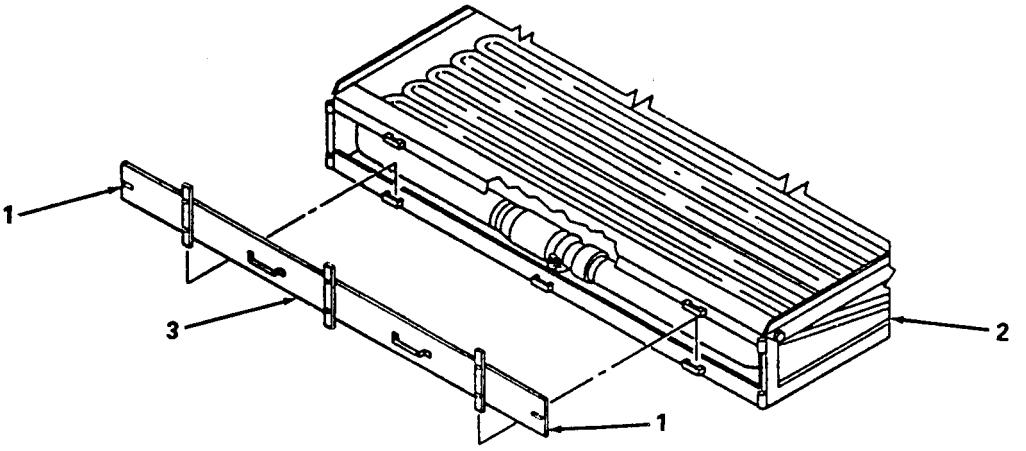


Figure 2-2. Removing Tailgate Assembly.

(g) Install breakaway as follows (figure 2-3):

NOTE

Breakaway must fall away automatically during hose laying operation. Do not secure breakaway too tightly or hose will not pull out of flaking box. Recover and retain fabric breakaway for reuse.

1 Position fabric breakaway (1) so that holes (2) in breakaway lineup with cleats (3) on tie bar (4). Leave both ends of hose (5) outside the breakaway.

2 Thread wire (6) provided with breakaway through top and bottom cleats (3). Secure top of wire (6) to top tie bar (4) by bending. Bottom end of wire will hang unrestrained.

3 Attach remaining two wire lengths exactly as the first.

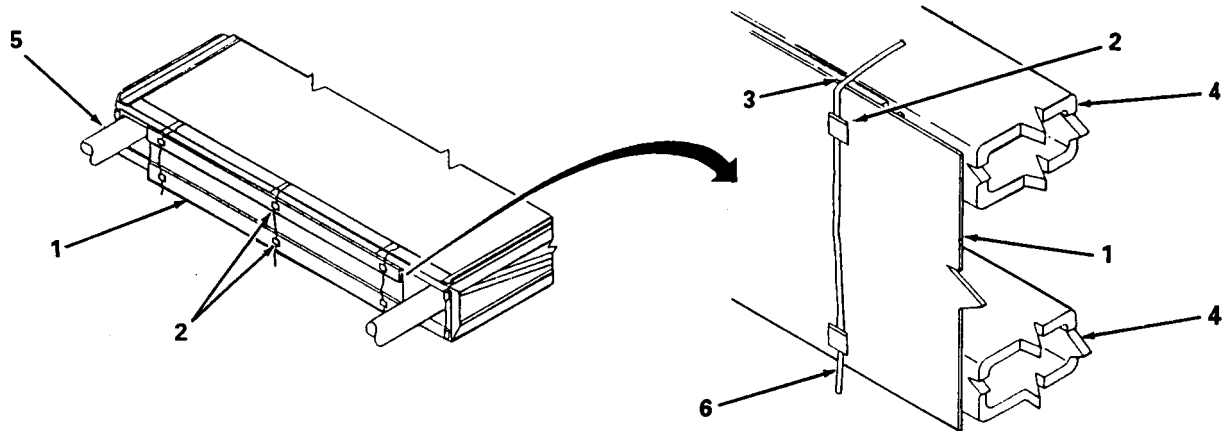


Figure 2-3. Installing Breakaway.

(h) Couple hose sections as follows (figure *2-4):*

1 Remove two bolts (1) and nuts (2) securing lower half of pipe coupling clamp (3) and upper half of pipe coupling clamp (4) to leading end of hose (5) of middle flaking box.

2 Remove pipe coupling clamp halves (3 and 4) and gasket (6).

3 Visually inspect coupling to ensure that there are no nicks, dents, or burrs on couplings sealing faces. If damage or deformity exists, contact unit level maintenance for repair or replacement.

4 Place gasket (6) over of the hose end. Make certain gasket is flush with end.

NOTE

Align lay-line stripe on hose when coupling hoselines together.

5 Bring trailing end of top flaking box (swivel end) (7) and leading end of middle flaking box together and align couplings.

6 When couplings are in proper alignment, slide gasket (6) over joint and center it in place.

7 Position lower coupling clamp half (3), then position upper coupling clamp half (4).

8 Install two bolts (1) so that nuts (2) will be exposed on the upper coupling clamp half.

9 Hand-tighten nuts evenly, then, using a wrench, tighten nuts evenly until the coupling faces just meet.

10 Continue tightening nuts evenly until both bolts are secure.

11 Repeat procedure until hoseline in each flaking box on truck is coupled to the hose in the flaking box below.

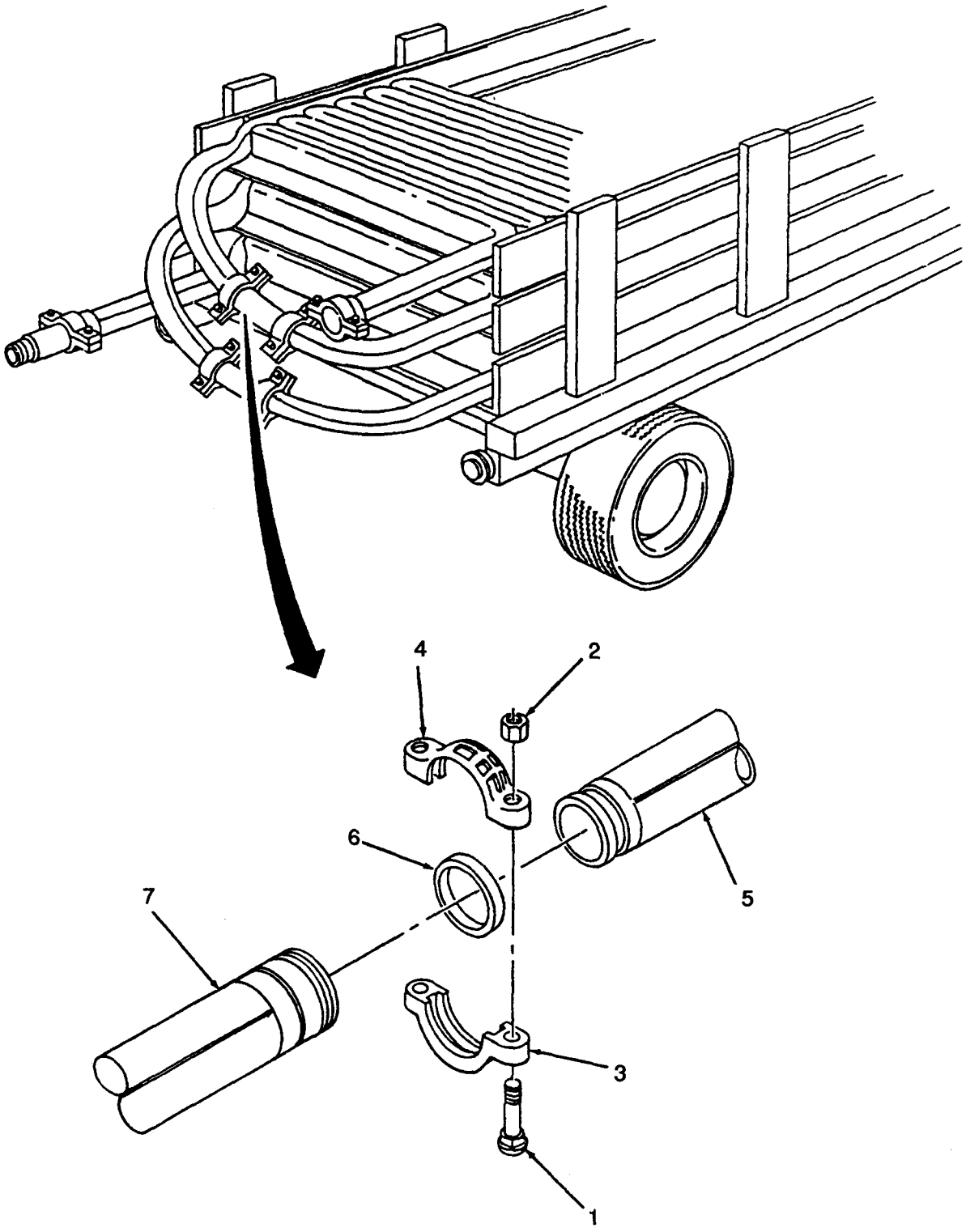


Figure 2-4. Coupling Hose Sections.

(4) Laying out hoseline.

WARNING

Do not position hoseline in an area where leakage can contaminate drinking water. Failure to observe this warning can result in serious injury or death by poisoning.

CAUTION

Do not allow heavy trucks or any tracked vehicles to drive over hoseline.

Do not lay hoseline through marshes, swamps, watercourses, or areas subject to periodic flooding.

Failure to observe these cautions can result in equipment damage or failure.

(a) Manually position the hose until the first 50 feet(15m) of hose is in place. After 50 feet of hose is in place, the weight of the hose will hold the line in position.

(b) The assistant driver must observe the hose-laying operation and tell the driver to speed up, slow down, or stop the truck depending on the needs of the line walkers straightening and repositioning the hoseline. He must also observe for catching or binding of the hose as it flakes out of the flaking box. The recommended hose laying speed is approximately 10 mph (16 km). The optimum speed for any installation will vary depending upon the terrain, manpower available, and how far the hose must be manually moved.

(c) As the hoseline is laid out, two persons (line walkers) should walk the line behind the truck to perform the following tasks:

CAUTION

Handle hoseline with care. Rough handling or abuse can cause hoseline damage or failure.

1 Straighten out kinks or bends in hoseline.

2 If hoseline is being laid along an existing roadway, hose must be manually repositioned to a secure point 5 to 10 feet (1.5-3.0m) from road.

3 Remove small obstructions, branches, and sharp rocks which can damage hoseline.

4 If required by conditions of use, follow security guidelines given in paragraph 2-6b, Step (5).

(d) Retain empty flaking boxes for repacking.

NOTE

Adjust lay-line stripe on hose when coupling hoselines together.

(e) Couple subsequent truckloads of hose to existing hoseline section using coupling procedure in paragraph h. Noting that the trailing end of existing hoseline section is one the ground and the leading end of new hoseline section is in the top flaking box of the truck.

2-7. **Attaching Hoselines to Pumping Assembly.**

a. *Attaching Suction Hoseline to Pumping Assembly.* (figure 2-5)

(1) Open chest containing hoseline flow control kit.

(2) Remove one coupling half quick disconnect (MALE) (1).

(3) Remove one grooved-to-internal thread coupling (2).

(4) Wrap one layer of white teflon tape (3) on threads of each coupling half quick disconnect (MALE) (1). Screw one coupling half (1) into a grooved-to-internal thread coupling (2). Coupling must be tight to prevent leakage.

(5) Slide pipe coupling clamp rubber gasket (4) over end of hoseline (5). Make certain gasket is flush with end.

(6) Place grooved adapter (2) in line with hoseline (5) and slide gasket (4) over joint. Center gasket in place.

(7) Place lower pipe coupling clamp half (6) over gasket, then position upper pipe coupling clamp half (7).

(8) install two bolts (8), and nuts (9) so that nuts (9) will be exposed on the upper coupling half (7).

(9) Hand tighten nuts (9) evenly, then with wrench, tighten nuts evenly until coupling faces meet.

(10) Continue tightening nuts evenly, until both bolts are secure.

(11) Remove one plug (10) at suction port (11) of pump. Ensure that gasket is properly positioned in pump coupling half.

(12) Attach hoseline (5) to pump suction port (11).

(13) Secure coupling (1) with pump coupling half cam-lock lever (12).

(14) Repeat steps 1 through 13 if a second hoseline is required.

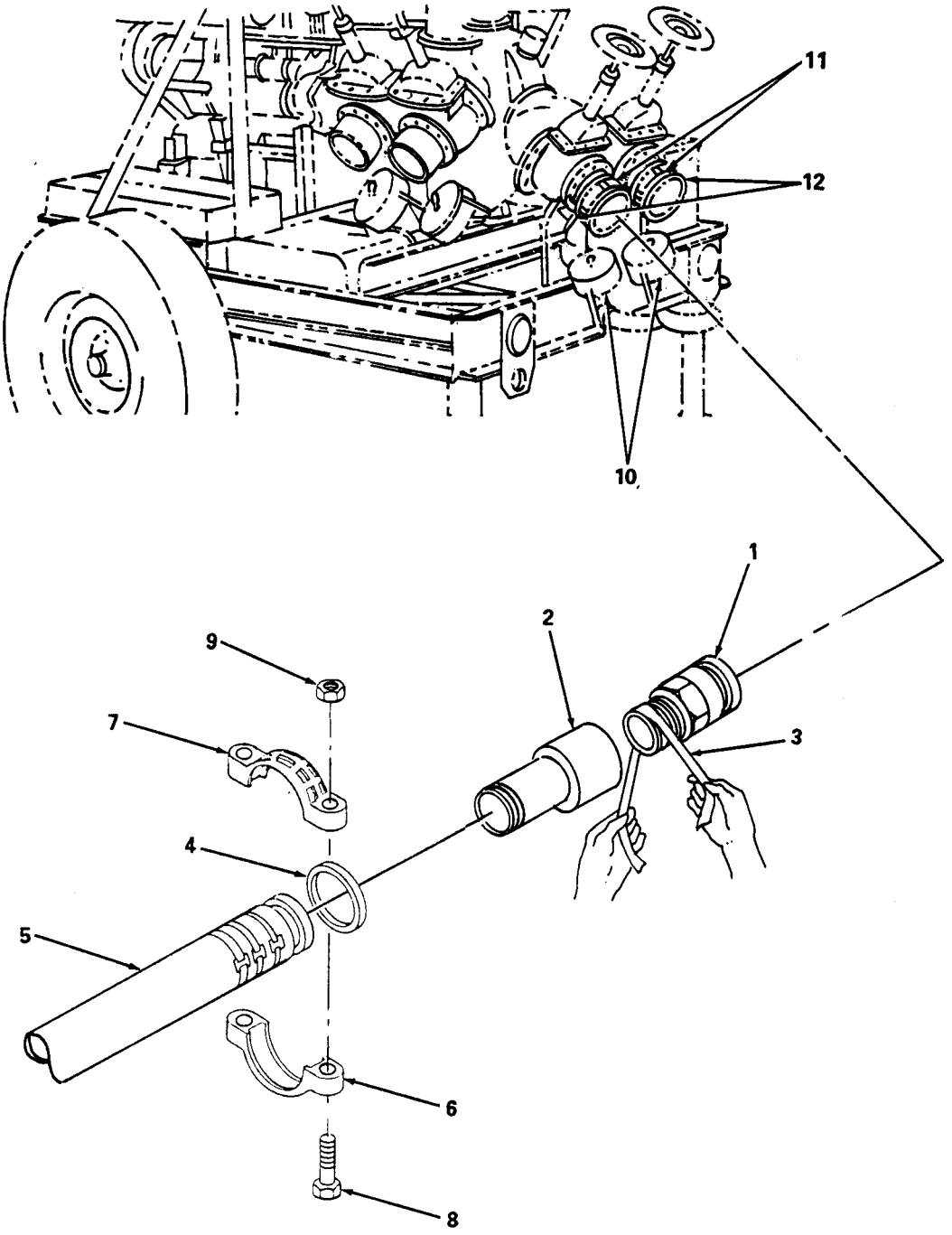


Figure 2-5. Attaching Suction Hoseline to Pumping Assembly.

b. **Attaching Discharge Hoseline to Pump Assembly.** (figure 2-6)

(1) Open chest containing hoseline flow control kit.

(2) Remove one coupling half quick disconnect (female) (1).

(3) Remove one grooved to external thread coupling (2).

(4) Wrap one layer of white teflon tape (3) on threads of grooved-to-external (2) and attach coupling to quick disconnect coupling half (1). Coupling must be tight to prevent leakage.

(5) Slide pipe coupling clamp rubber gasket (4) over end of hoseline (5). Make certain gasket is flush with end.

(6) Place coupling (2) in line with hoseline (5) and slide gasket (4) over joint. Center gasket in place.

(7) Position lower pipe coupling half (6) over gasket, then position upper pipe coupling clamp half (7).

(8) Install two bolts (8) and nuts (9) so that nuts (9) will be exposed on the upper coupling half (7).

(9) Hand tighten nuts (9) evenly, then with wrench, tighten nuts evenly until coupling faces meet.

(10) Continue tightening nuts (9) evenly until both bolts (8) are secure.

(11) Remove caps (10) from pump discharge ports.

(12) Ensure that gasket is properly positioned in hoseline quick disconnect coupling half.

(15) Attach assembled hoseline (5) to pump discharge port and secure with camlock levers (11).

(14) Repeat steps 1 through 13 if a second hoseline is required.

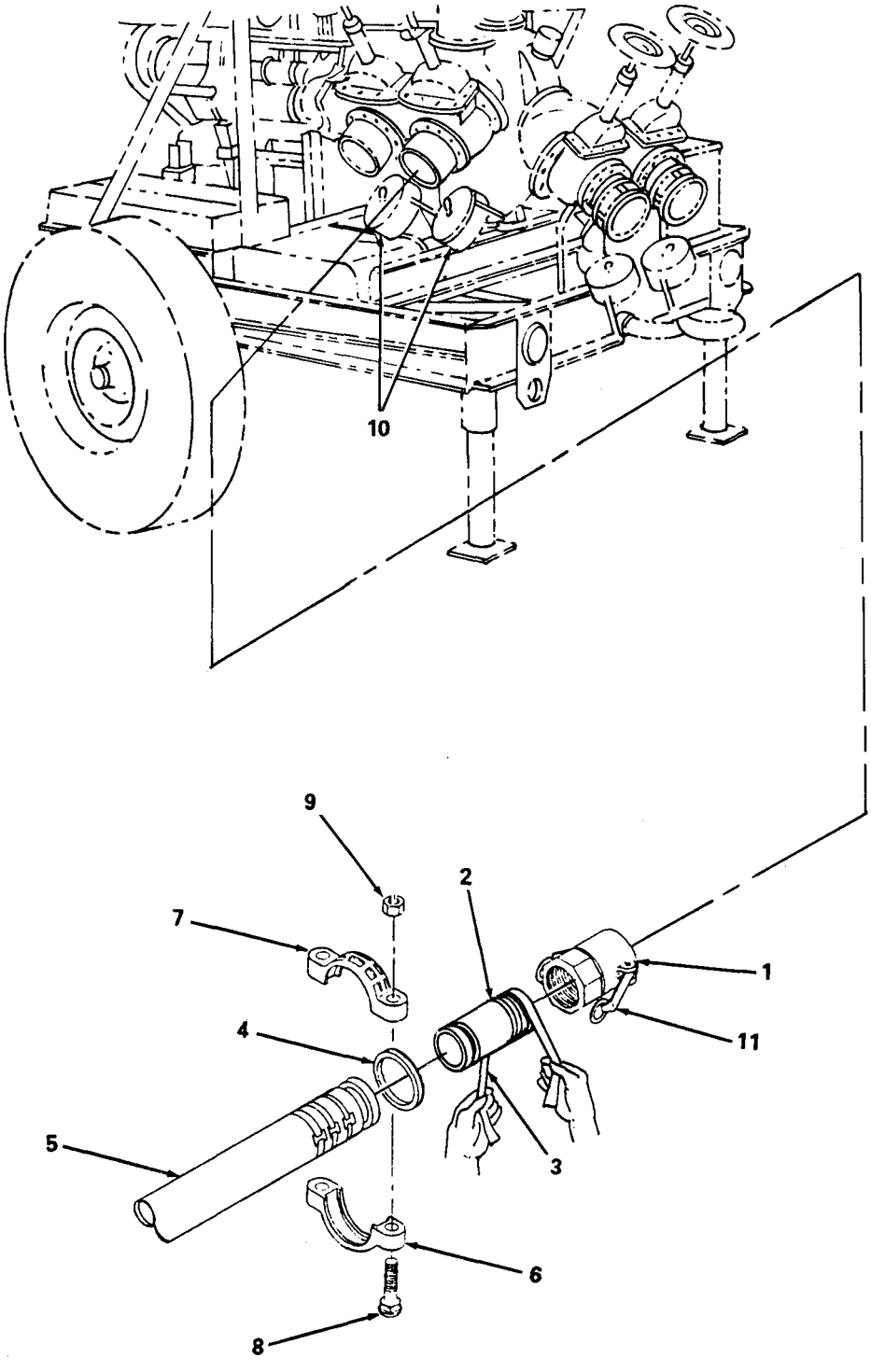


Figure 2-6. Attaching Discharge Hoseline to Pumping Assembly.

2-8. Roadway Crossing Guard Installation.

a. General. If hoseline must be laid across a roadway or railroad, hose should be laid under an existing bridge or through an existing culvert. Hose may be pulled through culvert using a rope or steel fish tape with hose end covered to prevent contamination. If no bridge or culvert is available, expedient roadway crossings maybe constructed using roadway crossing guard. Hoseline must never be buried unprotected because weight of fill would collapse hose, and any sharp rocks in contact with hose would cause a puncture. A plank should be nailed to bottom of guard for greater hose protection. Do not lay hose directly in trench or railbed because shifting gravel will gradually damage hose. If it is necessary to lay hose under a railroad bed, dig a tunnel beneath gravel of railbed and nail a plank to bottom of guard.

b. Installing Roadway Crossing Guard. (figure 2-7) Install roadway guard as follows:

(1) Dig a trench (1) 12 inches (304.8 mm) deep across road or railbed.

CAUTION

Remove stones and sharp rocks from trench before laying hoseline. Rocks can cause hoseline damage and failure.

(2) If hoseline is being run beneath a railroad bed, a plank (2) must be placed in trench before laying in hoseline (3). Planking may also be used in roadway crossings.

(3) Lay hoseline (3) in trench (1).

(4) Place roadway crossing guard (4) in position. Nail guard to plank (2), if used.

(5) Backfill trench (5) using dirt removed in step a. Do not put any stones on top of crossing guard (4). Fill trench (1) to a level 1 to 2 inches (25.4-50.8 mm) above original roadbed before packing.

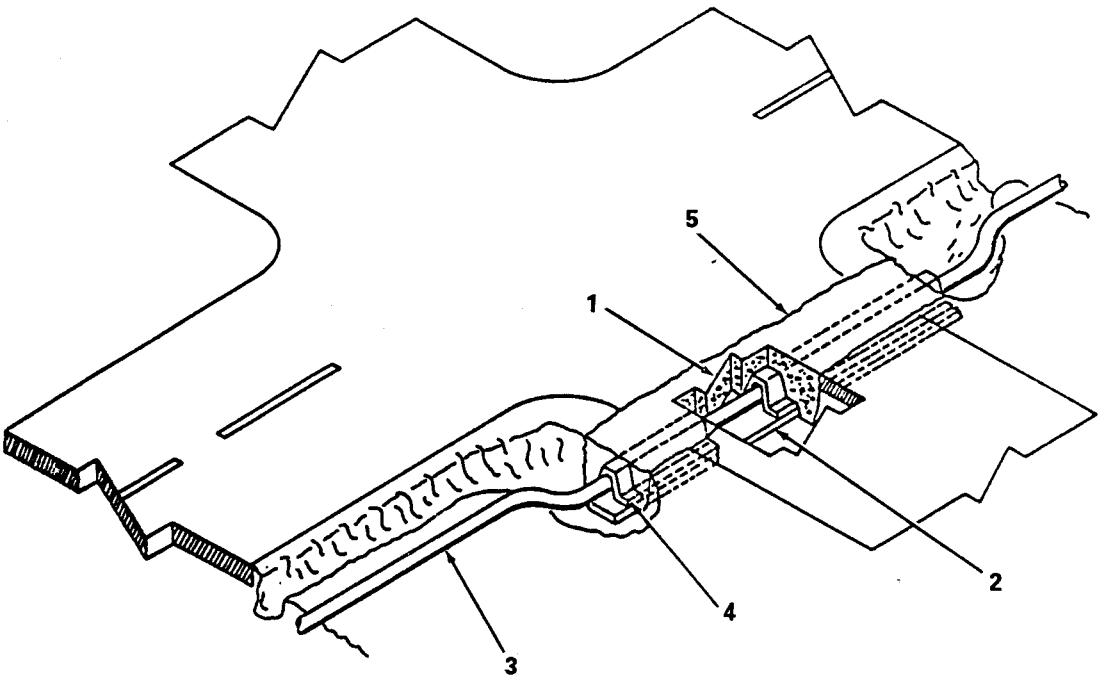


Figure 2-7. Installing Roadway Crossing Guard.

2-9. Suspension of Hoseline.

a. General. Aerial Suspensions are the most effective and readily installed means of crossing streams and deep gorges or ravines. Suitably protected and secure suspension crossings must be used in these cases. Adequate provision must be made to permit free passage of the displacement ball. For wide crossings a suspension bridge should be built to provide a flat deck or floor, which will support entire length of hose and eliminate bends which would occur if suspension cables were used. The practice of laying hose across decks of actively used bridges, or suspending hose from bridge structures, should be avoided due to the danger of fire in the event of hoseline failure. Under emergency usage conditions, hose maybe installed across an actively used bridge if found to be necessary on a calculated-risk basis. If a hoseline is installed on an actively used bridge, it must be secured outside bridge structure on downstream side if possible. Crossings must not interfere with passage of ships, and must provide clearance from flood stages. The hoseline suspension kit provides adequate material for one 200-foot-wide (60m) crossing or two 100-foot-wide (30m) crossings. Construction of several shorter suspension spans, or additional large spans, would require additional stakes, tackle blocks, and turnbuckles.

b. Suspension Towers.

WARNING

Aerial crossings over rivers and streams must provide adequate clearance for flood stages. Crossings must not interfere with the passage of ships on navigable waters.

(1) *Short spans.* For spans up to 75 feet (22.5m), short towers constructed of 2 x 6 timber or similar material can be utilized, as long as adequate clearance is ensured.

(2) *Long spans.* For spans over 75 feet (22.5m), towers must be constructed of 4 x 4 timer or similar material to provide adequate clearance and strength.

(3) *Use of natural materials.* Existing trees may serve as towers if they provide adequate clearance. Trees must be a minimum of 8 inches (203.2 mm) in diameter, sound, and well-routed to serve as towers.

c. Installing Hoseline On Towers. (figure 2-8) After suspension towers have been erected, install cable and hoseline as follows:

(1) Drive a guy stake (1) into ground approximately 15 feet (4.5m) from each tower (2) in line with and leaning away from both towers. Stake should protrude from ground approximately 6 inches (152.4mm).

(2) Hang a tackle block (3) off of each tower (2) and thread wire rope (4) through sheave on near side stream or obstruction.

(3) Pull wire rope (4) across stream or obstruction.

(4) Thread wire rope (4) through tackle block (3) on far side or stream or obstruction.

(5) Make a loop (5) of wire rope approximately 9 inches (228.6mm) from wire rope end and insert thimble (6) into loop.

(6) Secure wire rope end with two clamps (7) and nuts (8).

(7) Place a shackle (9) onto stake (1). This may require tapping on shackle in order for it to slip around stake due to close fit of shackle to stake.

(8) Install shackle bolt (10).

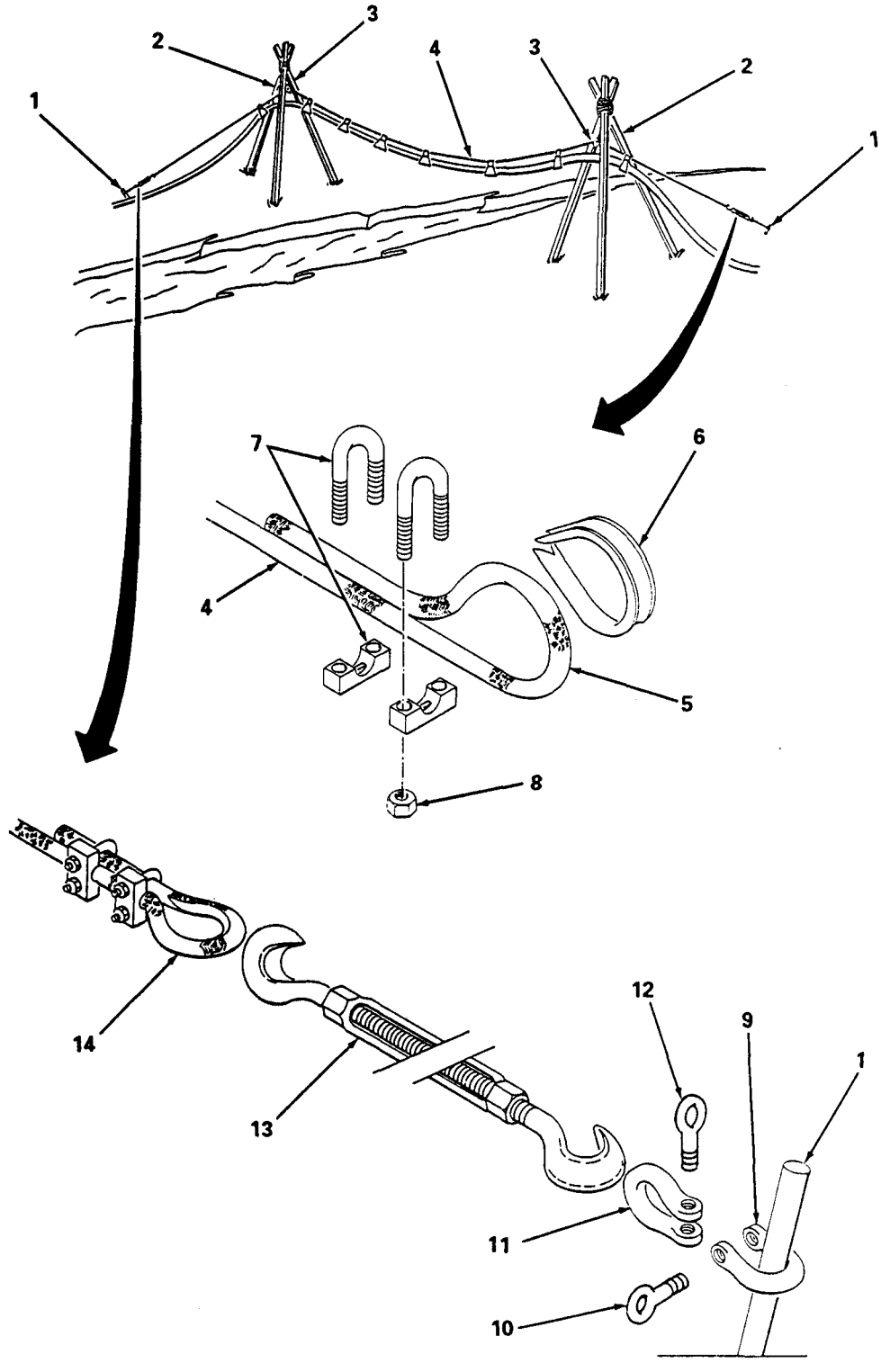


Figure 2-8. Installing Hoseline on Towers (Sheet 1 of 2).

NOTE

Second shackle must be installed to afford attachment of turnbuckle.

(9) Attach a second shackle (11) to first shackle (9). Install shackle bolt (12).

(10) Unscrew turnbuckle (13) so that it is nearly fully extended. This will allow for turnbuckle adjustment to take-up wire rope (14) sag.

(11) Attach turnbuckle (13) to shackle (11) and wire rope (14).

(12) Attach opposite end of wire rope (14) exactly as in steps (4) through (11) above.

(13) Use turnbuckles to adjust sag with no load on wire rope to 6 percent of span. Refer to Table 2-3.

(14) Place shackle (15) on wire rope (14).

(15) Lift hose end.

(16) Wrap saddle (16) around hose (17) and attach to shackle (15) with bolt (18) and nut (19).

(17) Tie manila rope (19) to leading end of hose (17).

(18) As saddles (16) are applied and secured, use manila rope (19) to pull hoseline across stream, gorge or obstruction. Saddles will travel along wire rope, providing support for hose.

(19) When hose line is in place, use clamps (20) to secure shackles (15) closes to guy stake to wire rope to prevent an accumulation of slack in center of span.

(20) Gate valves should be installed at hose coupling nearest each side of span.

(21) After line is filled with fuel, readjust sag to maximum of 9 percent of span. Refer to Table 2-4.

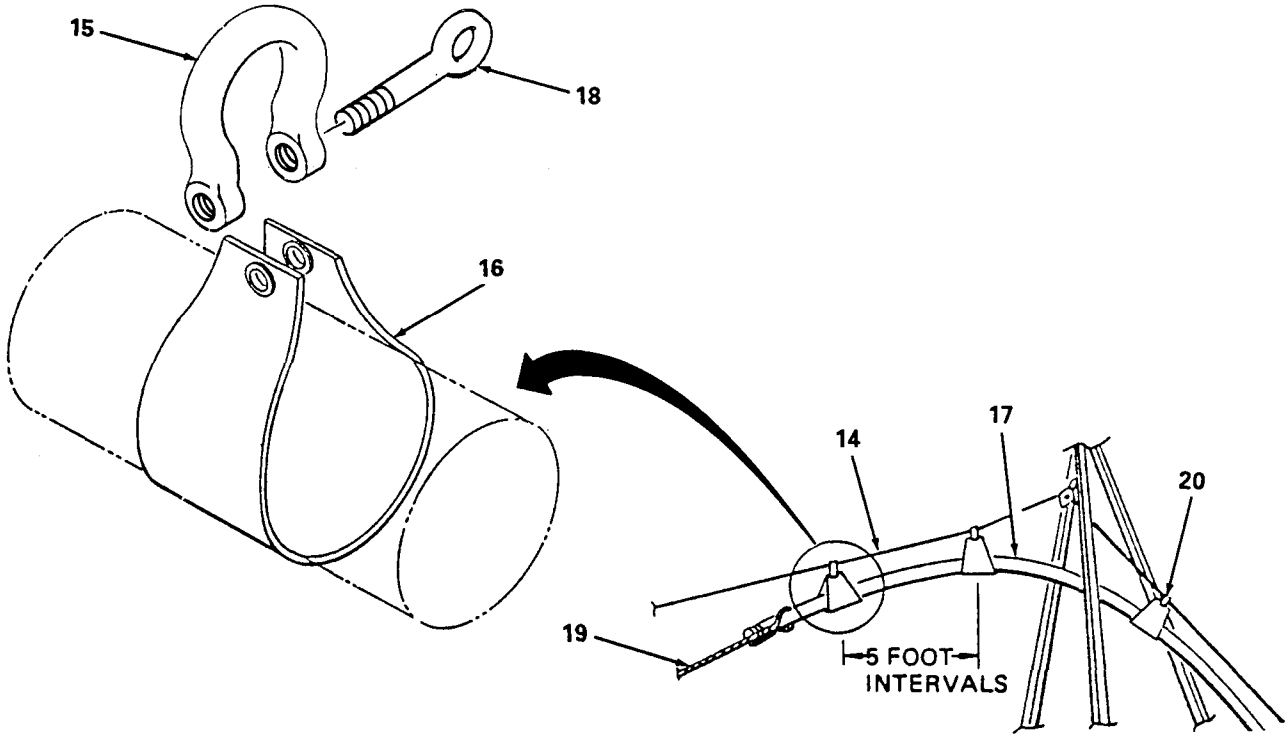
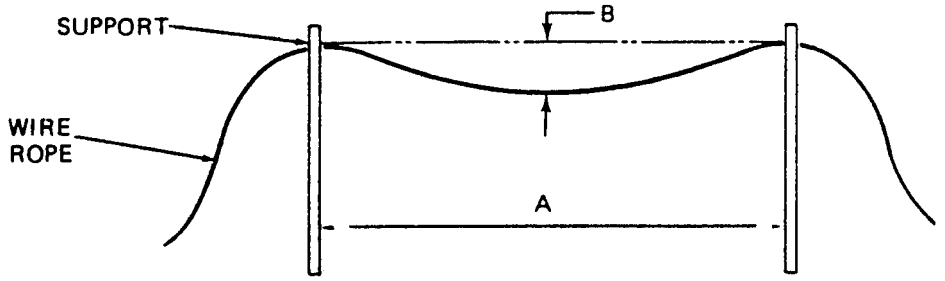


Figure 2-8. Installing Hoseline On Towers (Sheet 2 of 2).

Table 2-3. Maximum Allowable Wire Rope Sag.

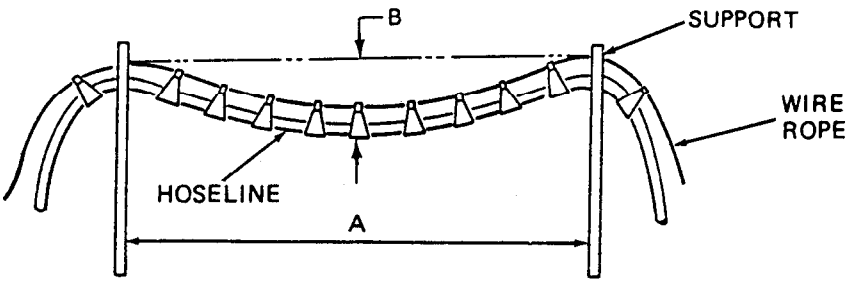


Span distance Dimension A	Maximum sag Dimension B (Approx)
25 ft. (7.5m)	1.5 ft. (0.45m)
50 ft. (15m)	3.0 ft. (0.9m)
75 ft. (22.5m)	4.5 ft. (1.35m)
100 ft. (30m)	6.0 ft. (2.41m)
150 ft.(45m)	9.0 ft (2.85m)
200 ft. (60m)	12.0 ft. (3.9m)

NOTE

Maximum sag limits (Dimension-B) are based on 6% of span distance (Dimension-A) and are applicable to a wire rope installed minus hoseline.

Table 2-4. Maximum Allowable Hose Line Sag.



Span distance Dimension A	Maximum sag Dimension B (Approx)
25 ft. (7.5m)	2.25 ft. (0.45m)
50 ft. (15m)	4.5 ft. (0.9m)
75 ft. (22.5m)	6.75 ft. (1.35m)
100 ft. (30m)	9.0 ft. (2.41m)
150 ft (45m)	13.5 ft (2.85m)
200 ft. (60m)	18.0 ft. (3.9m)

NOTE

Maximum sag limits (Dimension-B) are based on 9% of span distance (Dimension-A) and are applicable to a hoseline filled with fuel.

2-10. **Use of Flow Control Kit items.** (figure 2-9)

a. *General.* The flow control kit includes check valves, gate valves, and an assortment of couplings and adapters, a pipe tee, a strainer, pipe clamps and two 5-foot (1.5m) hose assemblies. These parts are provided for use with the hoseline in a variety of situations. The check valves are used on long upgrades. The gate valves can be used to isolate a roadway or suspension crossing, or direct the fuel flow along the main route or through the pipe to a branch line. The strainer is installed at the suction end of the pump, to remove any debris before it damages the pump. The hose assemblies and couplings are used as required, in conjunction with the strainer and the various valves.

b. *Gate Valve.* Gate valve can be used to isolate a section of hoseline (such as a suspension or roadway crossing), to direct fuel flow (by using two gate valves and pipe tee) or as shutoff valves at initial (suction) and terminal (discharge) ends of hoseline. The gate valves are supplied with flange-to-grooved adapters and are installed using procedures in operator maintenance chapter.

CAUTION

Ensure that check valve is positioned correctly to allow free flow in the direction desired. Reverse installation will cause flow blockage.

c. *Check Valve.* Check valve must be installed on hoseline to prevent backflow when pumps are shut down. Locate check valve at downstream (discharge) end of each pump and near bottom of long upgrades. The check valves are supplied with grooved coupling faces and can be installed, using an additional coupling clamp, according to procedures in operator maintenance chapter.

d. *Pipe Tee.* Pipe tee is used for creating takeoff (spur) lines leading away from main hoseline route. The tee is supplied with grooved ends on all sides and is installed using coupling procedure in operator maintenance chapter.

e. *Strainer.* Strainer should be attached to suction end of the pump used with hoseline outfit. A hose assembly should be connected to pump suction end, and strainer attached between end of hose and fuel source.

NOTE

Cone of strainer should face downstream or point in the direction of flow.

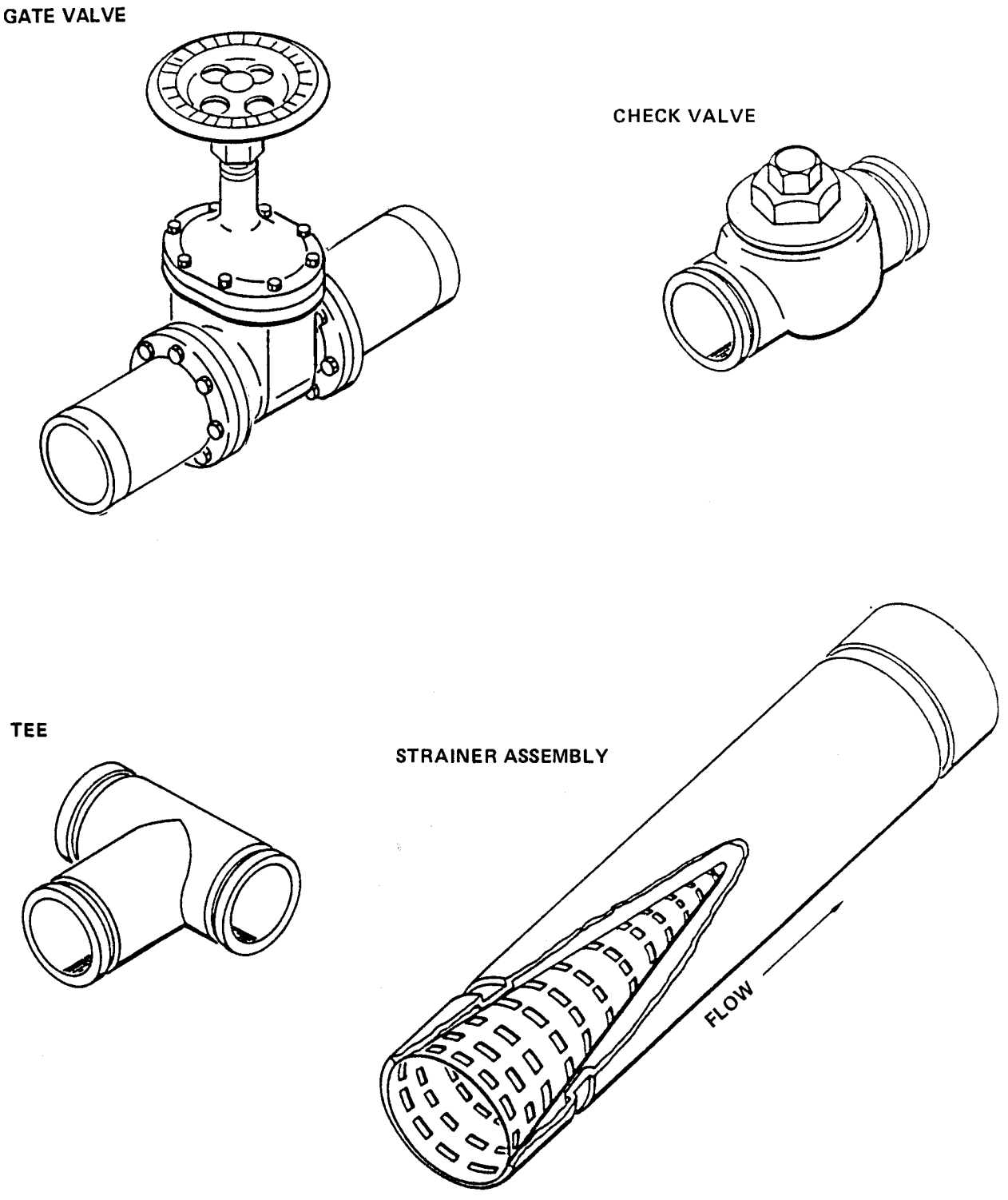


Figure 2-9. Flow Control Kit Items.

2-11. Preparation for Hoseline Outfit Repacking.

a. General. The Hoseline outfit is designed for temporary use only, and should be retrieved and repacked after need for outfit has been met. Before packing outfit, all residual fuel must be removed, and all fuel vapors and air must be evacuated so that hose will collapse for repacking into flaking boxes. This section details the use of the displacement and evacuation kit.

b. Fuel Displacement. (figure 2-10) Residual fuel in hoseline will be removed using the following procedures.

WARNING

Do not smoke, carry an open flame, or use any heat-producing device near hoseline during fuel displacement and vapor evacuation operations.

NOTE

- Fuel flow from pump to supply.
- When breaking hoseline connections, ensure fuel is drained in a suitable container.

(1) Remove hose clamp (1) from repair kit and apply it to discharge hoseline (2) at pump end. Ensure that clamp is positioned 12 inches (305 mm) from coupling end.

(2) Disconnect discharge hoseline at pump end.

(3) Attach ball inlet (3), with ball (4) installed, to hoseline (2) at pump end using a pipe coupling clamp (5) and gasket (6) and secure with bolts (7) and nuts (8).

(4) Apply a second hose clamp (9) to opposite end of hoseline (2). Close supply and shut off valve and disconnect hoseline at supply connection (10).

(5) Connect ball receiver (11) between supply end of hoseline and supply connection (10) using pipe coupling clamps (12) and gaskets (13) and secure with bolts (14) and nuts (15).

(6) Connect an air compressor to ball inlet (3) and apply 25 to 30 psi (1.8-2.0 kg/cm^2) to hoseline.

WARNING

Stand clear of receiver while displacement procedure is in process. Hoseline may jump when ball arrives at receiver.

(7) Remove both hose clamps (1) and (9) and open supply shutoff valve. The ball will move through hose displacing any residual fuel. A sound will be heard when ball reaches receiver.

NOTE

If ball gets stuck or binds, it maybe necessary to ease any possible hoseline kinks or restrictions. It maybe necessary to increase air pressure. Do not exceed 150 psi (10.5kg/cm2).

(8) Shut off air compressor when ball reaches receiver and close supply shutoff valve.

(9) Disconnect hoseline and remove ball receiver (11) and ball (4). Do not remove ball inlet (3).

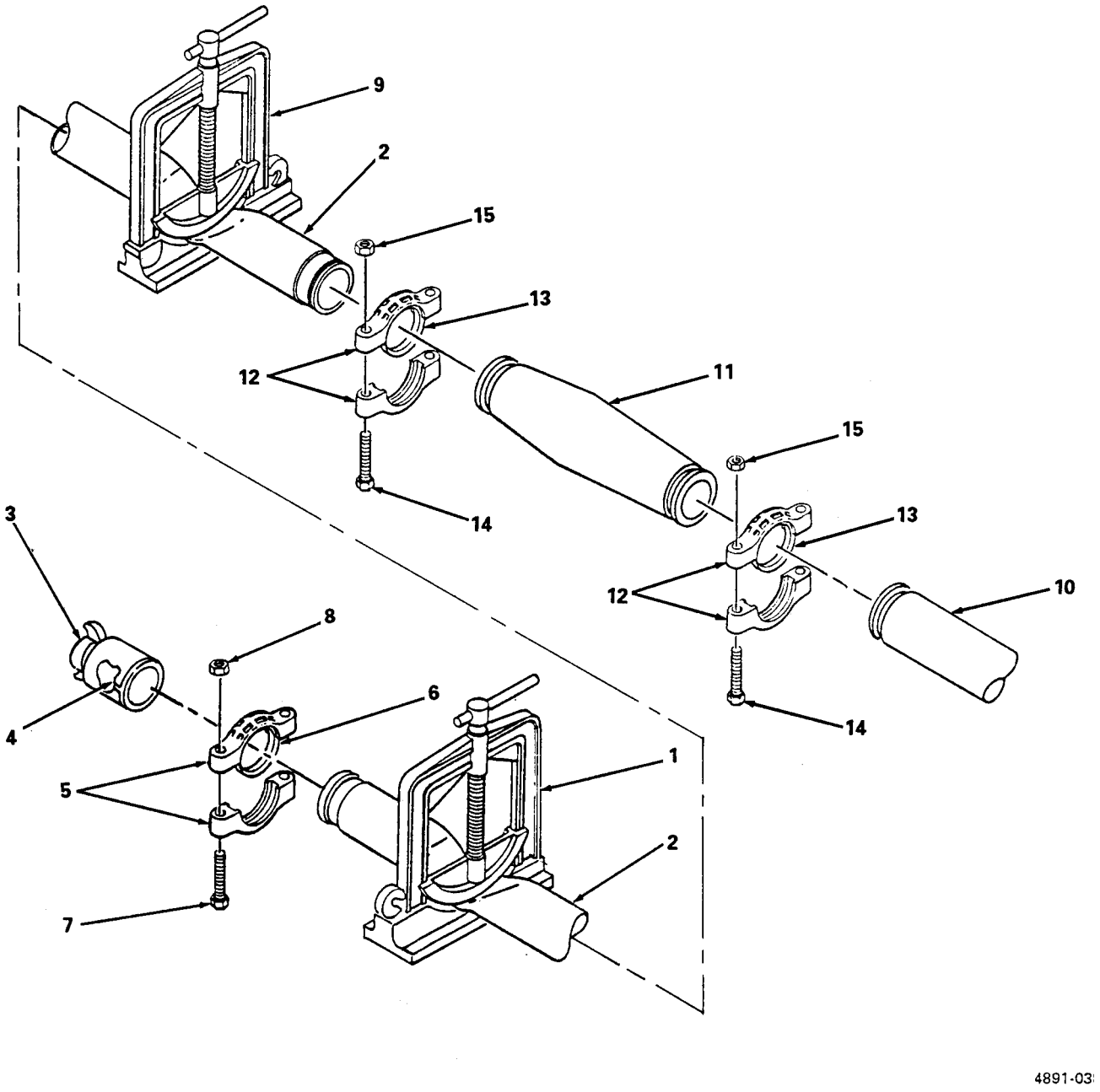


Figure 2-10. Fuel Displacement.

c. *Air and Vapor Evacuation*. (figure 2-11) After removal of residual fuel from hoseline, any air and fuel vapors must be evacuated so that hose can be folded flat in flaking box.

WARNING

Do not smoke, carry an open flame, or use any heat-producing device near hoseline during fuel displacement and vapor evacuation operations. Hearing and eye protection must be worn.

(1) Breakdown hoseline into 1000-foot (300m) sections by disconnecting leading and trailing couplings.

(2) Seal of the trailing end of first hose section (1) with a pipe cap (2), clamp (3), and gasket (4) and secure with bolts (5) and nuts (6).

(3) Ball inlet (7) should still be attached to leading end of first hose section (8) with air compressor line (9) attached. Disconnect air compressor line (9) and attach ejector jet assembly (10) to ball inlet (7).

(4) Connect compressor line (9) to ejector jet assembly (10).

(5) Apply air pressure to ejector jet assembly (10). The rapid passage of air through ejector will create a partial vacuum in the hoseline. It is necessary to operate compressor for approximately 10 minutes to clear each 1000 feet (300m) of hoseline.

(6) When hose has flattened apply hose clamp, shut off air compressor and remove ball inlet (7) from hose. Install pipe cap (2) and secure with pipe coupling clamp then remove hose clamp.

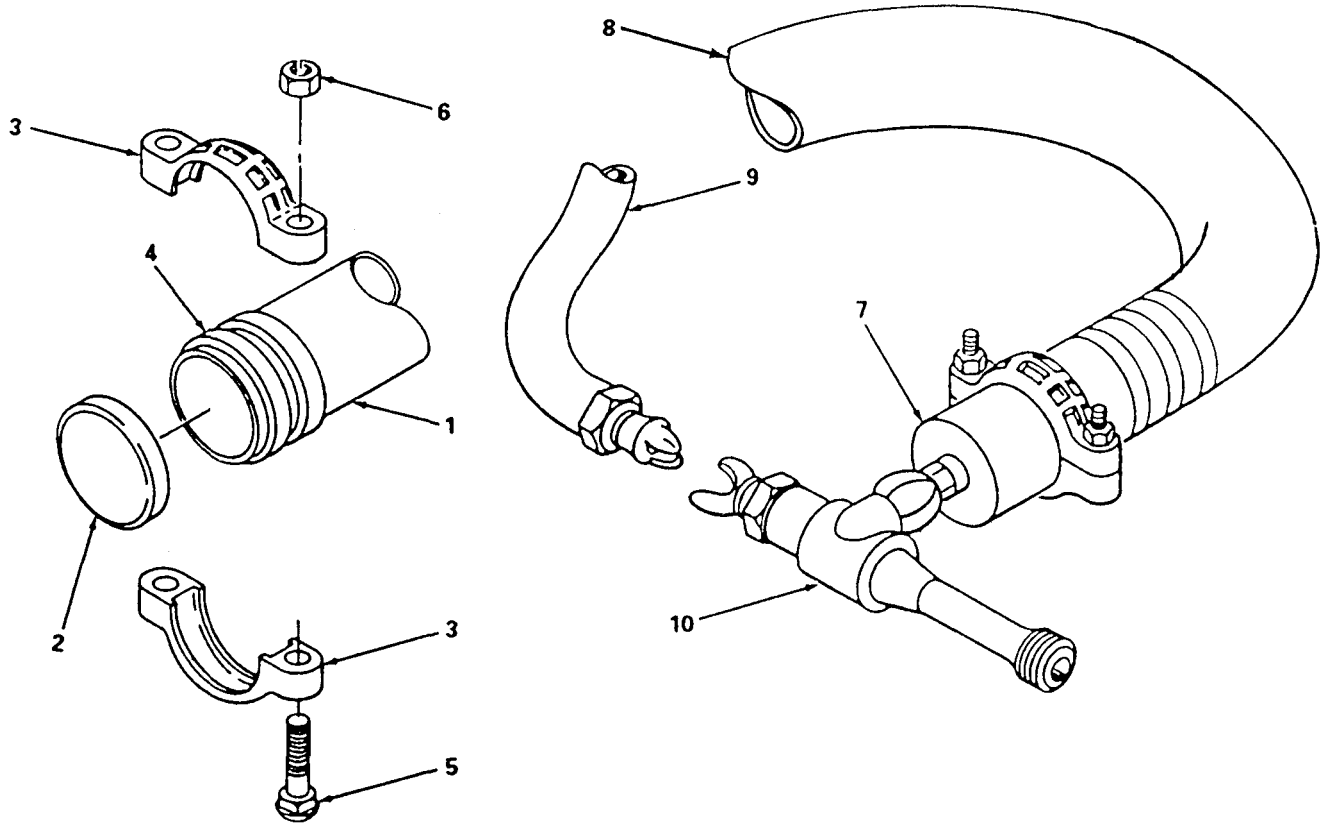


Figure 2-11. Air and Vapor Evacuation.

2-12. Repacking Flaking Boxes and Kits.

a. *Use of Repacking Kit .* After fuel displacement and evacuation procedures are completed, hoseline is ready for repacking. It will be packed into flaking boxes by hand, aboard a truck which backs along the hoseline route. The repacking rate will vary greatly depending upon terrain, available manpower, how far hose must be moved from its operating area to roadway or truck for pickup, and level of experience of crew. A minimum of five trucks with crews alternately packing hose is recommended for efficient retrieval operations. Individual task assignments are as follows:

(1) *Supervisor.* One supervisor is needed per truck during hose repacking.

(2) *Driver.* A driver is needed to operate truck during hose repacking.

(3) *Line walkers.* A minimum of two line walkers are needed to pick up hose, move it toward truck, and feed hose to packers on truck bed.

(4) Packers. A minimum of three packers are needed. Two must take hose from line walkers and lay it into place in box. The third operates packing mechanism and coordinates truck speed with driver and supervisor.

b. *Packing.* Pack hoseline into flaking boxes using flaking procedure below (figure 2-12):

CAUTION

Keep foreign material and sharp objects out of flaking box during packing. Anything pressed against hose during packing may puncture it when hose is compressed.

(1) *Step 1.*

(a) Place an empty flaking box (1) at trailing end (swivel joint end) of each 1000-foot (300m) hose assembly.

(b) Place trailing end of hose (2) at left rear corner of box, leaving about 28 inches (711mm) beyond tail gate end of flaking box. Lay hose along left side and across back as shown.

(2) *Step 2.*

(a) At right front corner of box (3), fold hose back to left (4).

(b) Flake about 300 feet (90 m) of hose into flaking box, alternating folds (5) at slightly shorter than the full width of the box.

(3) Step 3.

(a) Insert pullboard assembly (6) and chain hoist (7).

CAUTION

Take care when compressing hose with chain hoist and pullboard. Excess compression can bend flaking box.

(b) Use chain hoist (7) and pullboard assembly (6) to compress hose into one-third (or slightly less) of the flaking box (1).

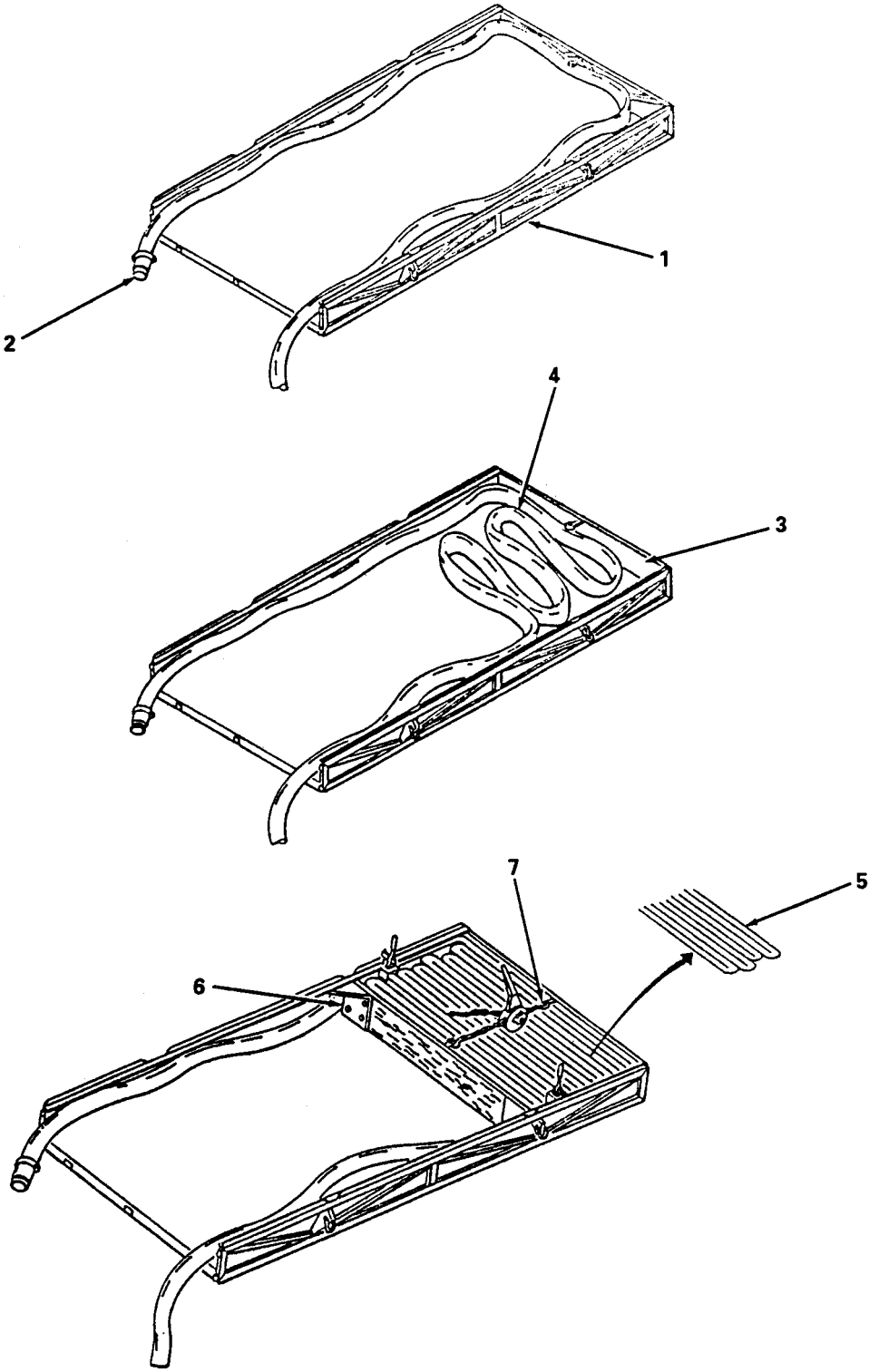


Figure 2-12. Packing Flaking Boxes (Sheet 1 of 2).

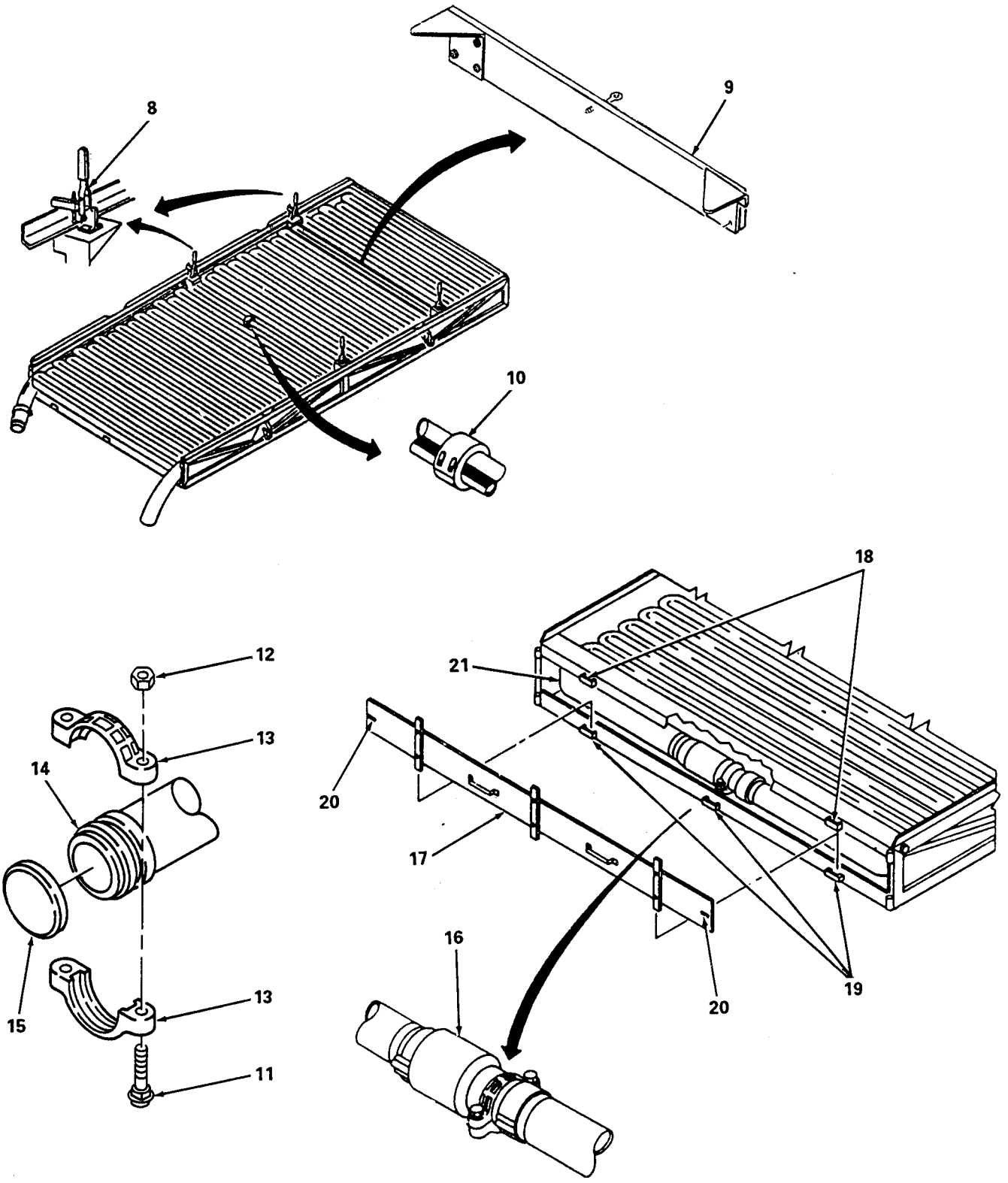


Figure 2-12. Packing Flaking Boxes (Sheet 2 of 2).

(4) Step 4.

(a) Secure hose in place by installing a pair of retaining brackets (8) one or two folds behind pull board assembly (9).

(b) Remove pull board assembly (9).

(c) Flake the next 200 feet (60 m) of hose into box, stopping just short of coupling ring (10) (coupling clamp (10) on model FIHK-100) which joins the two hose sections.

(d) Compress hose into about half of the box, using procedures in step 3 above.

(e) Secure hose with a second pair of retaining brackets (8). Remove pull board assembly.

CAUTION

Coupling ring must be centered in box to prevent hose damage.

(f) Continue flaking hose into box, and compress hose again at about 750 to 800 feet (225 m -240 m) into (about three-fourths the box length). Remove first pair of retaining brackets (8) and use them to secure hose. Remove pull board assembly.

(g) Repeat procedure stopping short of leading end of the segment using second pair of retaining brackets to secure hose. Remove pull board assembly.

(5) Step 5.

(a) Remove two bolts (11) and nuts (12) securing upper and lower pipe coupling clamp halves (13).

(b) Remove pipe coupling clamps halves (13), gasket (14) and pipe cap (15).

(c) Repeat steps (a) and (b) for opposite end of hose. Stow one pipe coupling clamp and two pipe caps (15) in displacement and evacuation kit.

(d) To prevent contamination couple leading and trailing ends of hose per paragraph 2-6c(3)h.

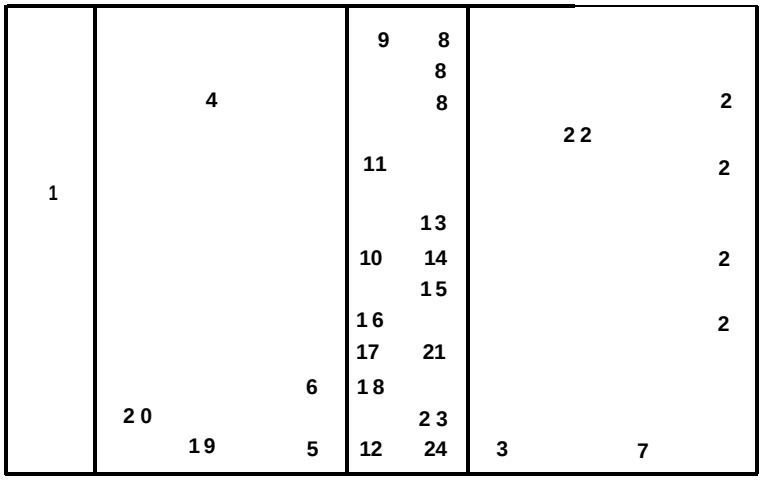
(e) When hose ends are coupled together (16), install tail gate assembly (17) onto flaking box by inserting tail gate assembly into cleats (18) on tie bar assembly. Then position tail gate assembly into cleats (19) of lower frame member, Secure tail gate assembly with latches (20) and stow breakaway (21).

(f) Remove all retaining brackets (8) and position next empty flaking box on top of full box and continue packing hoseline.

c. *Hoseline Outfit Kits.* Return all hoseline components to the kit with which they were supplied and check for shortage. Repack kits into storage chests in accordance with loading diagram attached to underside of each chest lid,

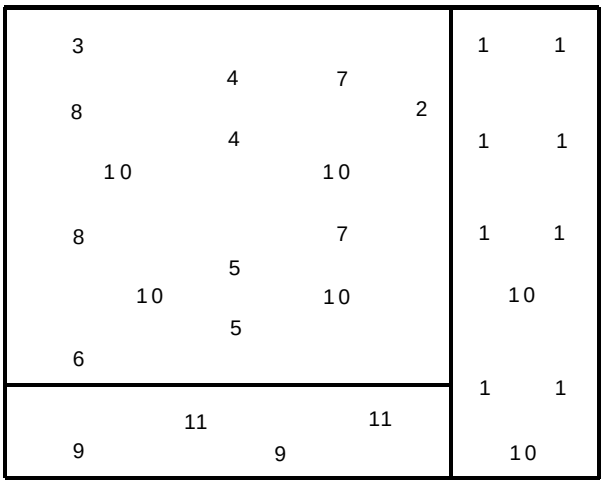
d. *Loading* Diagrams. Tables 2-5, 2-6, and 2-7 (Model ADC-1200), Tables 2-8,2-9, 2-10, 2-11 and 2-12 (Model 1461) and Tables 2-12,1, 2-12.2,2-12.3, 2-12.4, and 2-12.5 (Model FIHK-100) contain loading diagrams for each storage chest and list the contents of each kit supplied with the hoseline outfit. Kit items must be packed as diagramed to provide adequate space and tight packing for shipment.

Table 2-5. Displacement and Evacuation Kit and Repair Kit (Model ADC-1200).



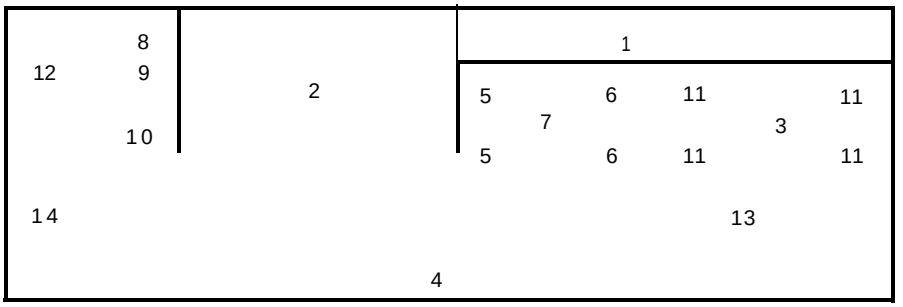
Item No.	Item Name	Qty
1	Adapter, Hose	10
2	Cap, Pipe	16
3	Coupling Clamp, Pipe	8
4	Rags, Wiping	15 Lb.
5	Coupling Ring, Assembly	2
6	Ball, Displacement	2
7	Coupling Clamp	8
8	Solvents, Dry Cleaning	3 Qt.
9	Strapping	200 Ft.
10	Strapping Seals	100
11	Tool, Banding	1
12	Tape, Vinyl	350 Ft.
13	Handle, Socket Wrench	1
14	Socket	1
15	T Handle Hex Key	2
16	Hammer, Hand	1
17	Screwdriver, Flat Tip	1
18	Knife	1
19	Receiver, Ball	1
20	Inlet, Ball	1
21	Ejector, Assembly	1
22	Hose Clamp	4
23	Adhesive, Rubber	5 Cans
24	Tape, Rubber	150 Ft.

Table 2-6. Flow Control Kit (Model ADC-1200)



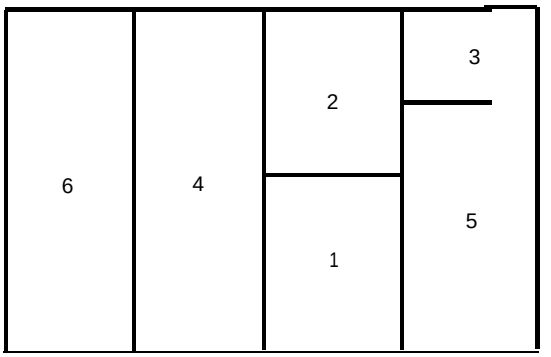
Item No.	Item Name	Qty
1	Coupling Clamp, Pipe	8
2	Steel Fish Tape	1
3	Strainer Assembly	1
4	Coupling Half, Quick Disconnect (Male)	2
5	Coupling Half, Quick Disconnect (Female)	2
6	Tee	1
7	Valve, Gate	2
8	Valve, Check	2
9	Hose Assembly 5 Ft.	2
10	Pipe Coupling, Groove-to-External Thread	2
11	pipe, Coupling, Groove-to-Internal Thread	2

Table 2-7. Suspension Kit and Packing Kit (Model ADC-1200).



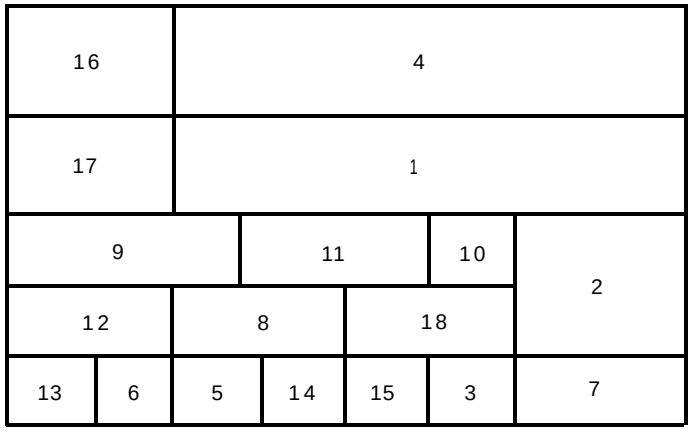
Item No.	Item Name	Qty
1	Guy Stake	14
2	Wire Rope (350 Ft.)	1
3	Manila Rope (350 Ft.)	1
4	Pullboard Assembly	1
5	Hose Retainer Bracket, Left Hand	2
6	Hose Retainer Bracket, Right Hand	2
7	Hose Saddle	60
8	Wire Rope Clamp	25
9	Shackle	60
10	Rope Thimble	4
11	Block, Tackle	4
12	Chain Hoist	1
13	Turnbuckle	4
14	Eye Bolt	1

Table 2-8. Displacement and Evacuation Kit (Model 1461).



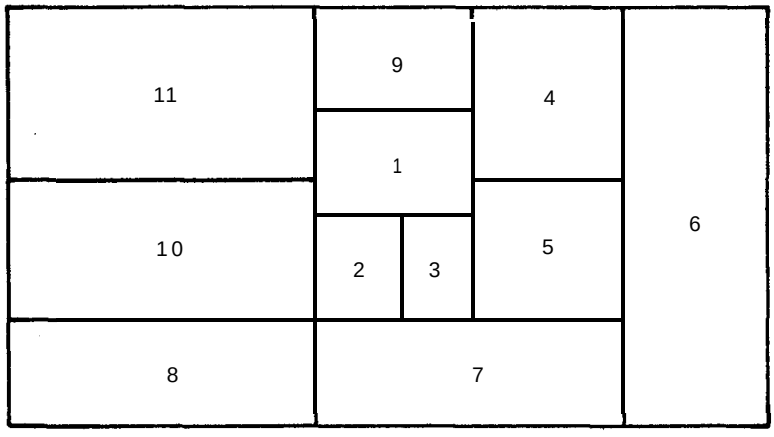
Item No.	Item Name	Qty
1	Inlet, Ball	1
2	Receiver, Ball	1
3	Ball, Displacement	1
4	Cap, Pipe	16
5	Ejector, Assembly	1
6	Coupling Clamp, Pipe	8

Table 2-9. Repair Kit (Model 1461).



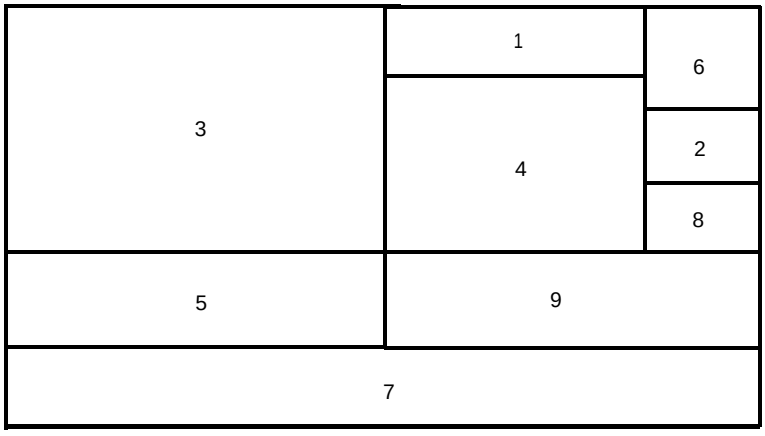
Item No.	Item Name	Qty
1	Adapter, Hose	10
2	Coupling Clamp, Pipe	8
3	Adhesive, Rubber	5 cans
4	Hose Clamps	4
5	Hammer, Hand	1
6	Knife	1
7	Tape, Vinyl	350 ft
8	Tape, Rubber	150 ft
9	Strapping	200 ft
10	Strapping Seals	100
11	Tool, Banding	1
12	Solvent, Dry Cleaning	3 qt
13	Screwdriver, Flat Tip	1
14	Socket	1
15	Handle, Socket Wrench	1
16	Rags, Wiping	5 lb
17	Coupling Ring, Assembly	2
18	T Handle Hex Key	2

Table 2-10 Flow Control Kit (Model 1461)



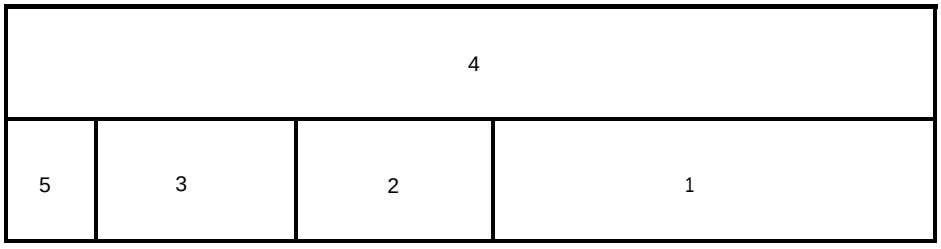
Item No.	Item Name	Qty
1	Coupling clamp, Pipe	8
2	Pipe Coupling - Grooved to External Thread	2
3	Pipe Coupling - Grooved to Internal Thread	2
4	Coupling Half, Quick Disconnect (Male)	2
5	Coupling Half, Quick Disconnect (Female)	2
6	Hose Assembly (5 Ft.)	2
7	Strainer Assembly	1
8	Steel Fish Tape	1
9	Tee	1
10	Valve, Check	2
11	Valve, Gate	2

Table 2-11. Suspension Kit (Model 1461).



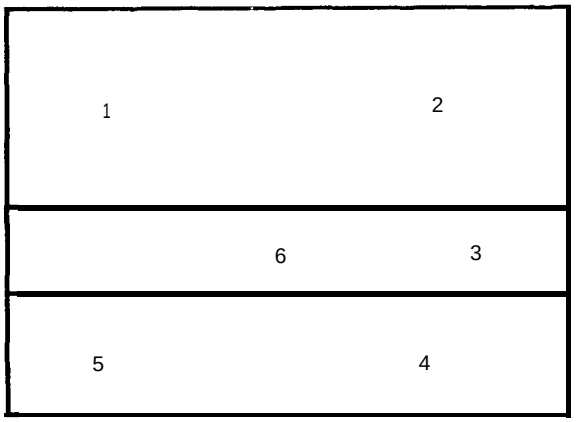
Item No.	Item Name	Qty
1	Block, Tackle	4
2	Clamp, Wire Rope	25
3	Wire Rope	350 ft
4	Manila Rope	350 ft
5	Hose Saddle	60
6	Shackle	60
7	Guy Stake	14
8	Rope Thimble	4
9	Turnbuckle	4

Table 2-12. Packing Kit (Model 1461)



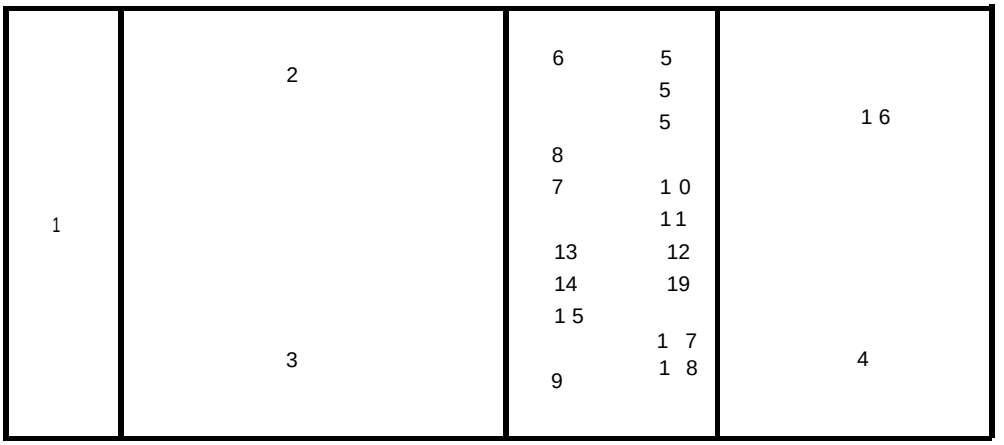
Item No.	Item Name	Qty
1	Hoist, Chain	1
2	Hose Retaining Bracket, Left Hand	2
3	Hose Retaining Bracket, Right Hand	2
4	Pullboard Assembly	1
5	Eye Bolt	1

Table 2-12.1. Displacement and Evacuation Kit (Model FIHK-100).



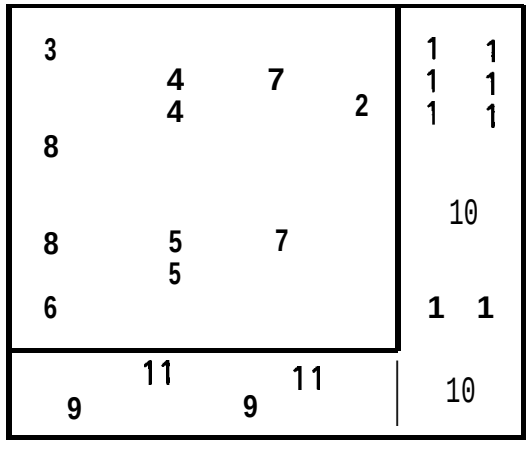
Item No.	Item Name	Qty
1	Cap, Pipe	16
2	Coupling, Grooved	11
3	Ball, Displacement	1
4	Receiver, Ball	1
5	Inlet, Ball	1
6	Ejector, Ball	1

Table 2-12.2. Repair Kit (Model FIHK-100).



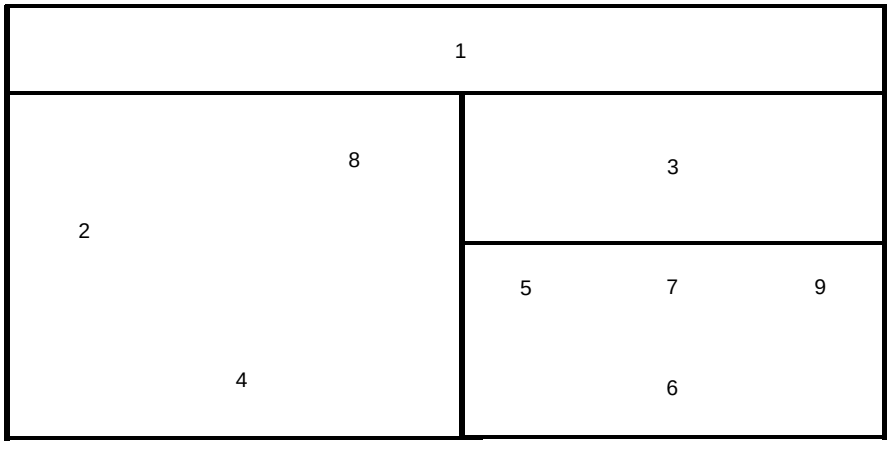
Item No.	Item Name	Qty
1	Adapter, Hose to Hose	10
2	Rags, Wiping	1 Bag
3	Gasket	3
4	Adapter, Hose Coupling	5
5	Solvent, Cleaning	3
6	Screw, Cap, Hx, Hd	10
7	Nut, Hex	10
8	Washer, Flat	10
9	Tape, Rubber	150 FT
10	Handle, Socket Wrench	1
11	Socket (9/16)	1
12	Coupling Clamp	3
13	Hammer, Hand	1
14	Screwdriver, Flat Tip	1
15	Knife, Craftsman	1
16	Clamp, Hose	4
17	Adhesive, Rubber	5
18	Tape, Vinyl Plastic	350 FT
19	Socket (3/4)	1

Table 2-12.3. Flow Control Kit (Model FIHK- 700).



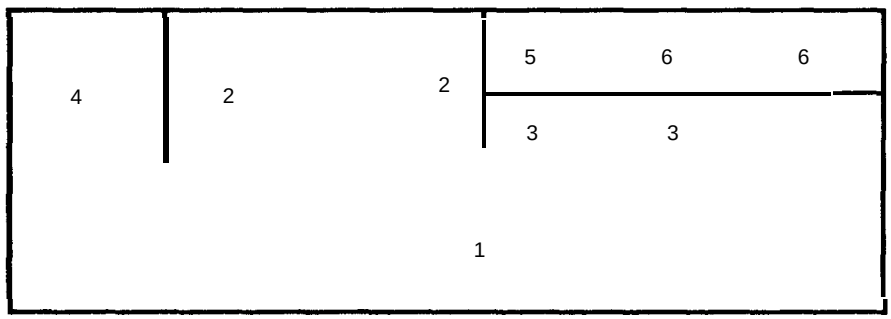
Item No.	Item Name	Qty
1	Coupling Clamp, Pipe	8
2	Tape, Fish	1
3	Strainer Assembly	1
4	Coupling Half, Internal	2
5	Coupling Half, External	2
6	Tee, Pipe	1
7	Valve, Gate	2
8	Valve, Check	2
9	Hose Assembly, 5 Inch	2
10	Coupling, Half, Male	2
11	Coupling, Half, Female	2

Table 2-12.4. Suspension Kit (Model FIHK-100).



Item No.	Item Name	Qty
1	Steel Pickets	14
2	Wire Rope (350 Ft.)	1
3	Manila Rope (350 Ft.)	1
4	Hose Saddle	60
5	Wire Rope Clamp	25
6	Shackle	60
7	Wire Rope Thimble	4
8	Block, Tackle	4
9	Turnbuckle	4

Table 2-12.5. Packing Kit (Model FIHK-100).



Item No.	Item Name	Qty
1	Pull Assembly	1
2	Hose Retainer Bracket, Left Hand	2
3	Hose Retainer Bracket, Right Hand	2
4	Chain, Hoist	1
5	Bolt, Eye, Turnbuckle	1
6	Nut, 1/2-13	2

2-13. Coupling Rings. Models ADC-1200 and 1416

a. *General.* Coupling rings can be used to secure grooved-to-grooved connections.

b. *Use of Coupling Rings.* The coupling ring is used as follows (figure 2-13):

(1) Using T handle hex key from repair kits, remove four screws (1) to open coupling ring halves (2).

(2) Slide gasket (3) onto grooved connector so that seal is flush with end of connection.

(3) Align connectors (4), slide gasket (3) over joint and center it in place. Ensure hoseline layline (5) align if applicable.

(4) Install coupling ring halves (2) and screws (1). Tighten evenly, alternating between screws until ring is secure.

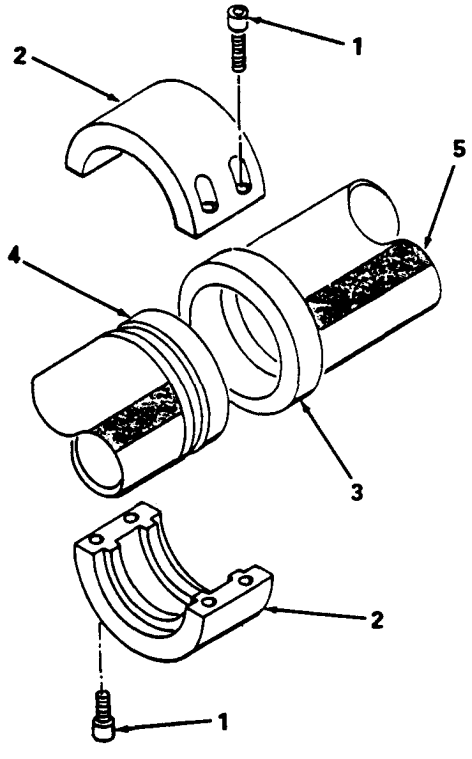


Figure 2-13. Removal and Installation of Coupling Rings.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS.

2-14. **Terrain Restrictions.** The hoseline outfit is not suitable for use on extremely difficult terrain such as marshes, swamps, and rocky areas.

2-15. **Cold Weather.** The hoseline outfit is not for use at temperatures below 40 degrees F (4 degrees C).

CHAPTER 3

OPERATOR MAINTENANCE INSTRUCTIONS

OVERVIEW

This chapter contains operator level maintenance instructions.

Section I. OPERATOR MAINTENANCE INSTRUCTIONS

3-1. General. Keep all lubricants in closed containers and store in a clean dry area away from excessive heat. Do not allow dust, dirt, or other foreign matter to mix with the lubricants. Keep the lubrication equipment clean and ready for use. Before lubricating the equipment wipe all lubrication points to remove dirt and grease. After lubricating,clean all lubricatins points of any spilled or excessively applied lubricant to prevent accumulation of dirt and foreign matter. Keep all external surfaces and parts not requiring lubrication free of lubricants. Lubricate components of the hoseline outfit in accordance with the following instructions.

a. Chest Assemblies. (Figure 3-1)

(1) Apply a coat of general purpose oil to hinge (1).

(2) Apply a coat of general purpose oil to latches (2).

(3) Apply a coat of general purpose oil to pivot points of handles (3).

(4) Apply a coat of general purpose oil to lid supports (4).

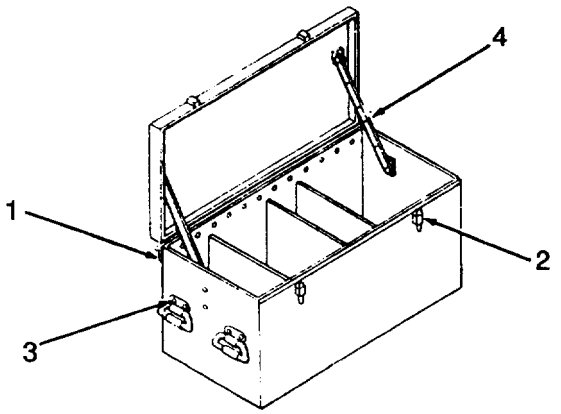


Figure 3-1. Chest Assemblies, Lubrication.

b. *Tackle Block* (Figure 3-2)

(1) Apply a coat of general purpose oil to pin (1).

(2) Apply a coat of general purpose oil to sheave (2).

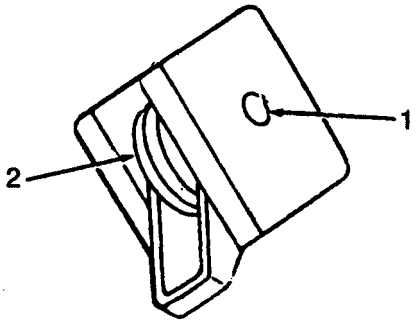


Figure 3-2. Tackle Block, Lubrication.

c. *Hoist Chain.* (Figure 3-3)

(1) Apply either machine oil or gear oil to load chain (1). Wipe off excess, but allow lubricant to remain between links where wear occurs.

(2) Apply a few drops of oil to guide roller shafts (2).

(3) Apply a few drops of oil to neck of hook (3).

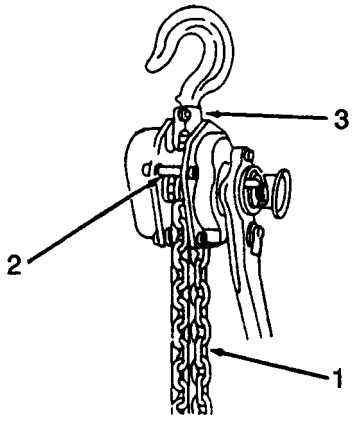


Figure 3-3. Hoist Chain, Lubrication.

d. *Hose Retaining Bracket.* (figure 3-4)

Apply a coat of general purpose oil to pivot point of clamp (1).

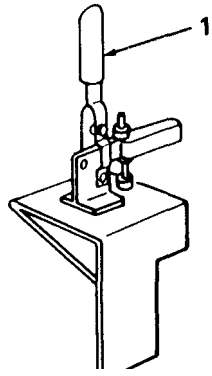


Figure 3-4. Hose Retaining Bracket, Lubrication.

e. *Swivel Joint.* (figure 3-5)

Grease swivel point (1) with grease conforming to MIL-G-4343C.

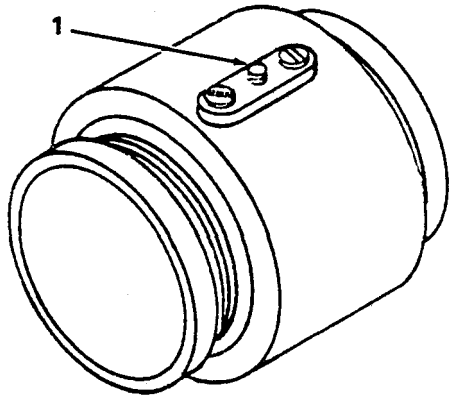


Figure 3-5. Swivel Joint, Lubrication (Model ADC-1200).

Section II. OPERATOR TROUBLESHOOTING PROCEDURES

3-2. **General.** This section contains troubleshooting information for locating and correcting the common malfunctions which may be encountered during the operation or maintenance of the hoseline outfit. The major trouble that may occur during operation of the hoseline outfit are engine or pump failure, leaks or blockages. Troubleshooting for the engine and pump is covered in the applicable Technical Manual for the pumping assembly being utilized. Refer to applicable Technical Manual for troubleshooting of the engine or pump.

3-3. **Operator Troubleshooting Procedures.** To troubleshoot the hoseline outfit, refer to Table 3-1, Troubleshooting.

a. Each malfunction is followed by a list of tests or inspections which will help in determing corrective actions to take. Perform the tests/inspections and corrective actions in order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective action, notify your supervisor.

SYMPTOM INDEX

Table 3-1. Operator Troubleshooting Procedures.

Malfunction Test or Inspection Corrective Action

1. NO FUEL FLOW.

Step 1. Inspect hoseline for security of all coupling clamps and rings. Check for damaged couplings, rings or defective gaskets.

Replace defective parts.

Step 2. Check entire length of hoseline for any breaks, leaks or seepage through hose wall.

Repair hose by using repair kit if defects noted.

Step 3. Check entire length of hoseline for kinks or objects on hoseline.

Remove kinks or objects.

Table 3-1. Operator Troubleshooting Procedures (cont).

Malfunction	Test or Inspection	Corrective Action
	Step 4. Inspect strainer for clogged screen.	Clean strainer.
	Step 5. Check that applicable valves are open and for flow direction.	Open valves or correct flow direction.
	Step 6. Check pump for operating.	Refer to applicable technical manual.
2. TACKLE BLOCK WON'T FUNCTION.		
	Step 1. Inspect for proper rigging.	Correct rigging.
	Step 2. Inspect sheave for freedom of movement.	a. Lubricate as required. b. Replace Block, Tackle.
3. CHAIN HOIST WON'T FUNCTION.		
	Step 1. Inspect chain for binding.	Free chain
	Step 2. Inspect ratchet for breaks, cracks or distortions.	Replace Chain Hoist.
4. GATE VALVE WON'T OPEN OR CLOSE.		
	Inspect gate valve for defects.	Replace gate valve.
5. INLET BALL WON'T PASS THROUGH HOSELINE.		
	Inspect for kinks, sharp bends or other restrictions.	Straighten hoseline and remove restriction.

Section III. OPERATOR MAINTENANCE

Paragraph Page

3-4. **General.** This section contains operator level maintenance procedures as authorized by the MAC in Appendix B of this manual.

3-5. Flaking Box Assembly.

This task covers: Replace

INITIAL SETUP

Tools

Packing Kit (Appendix C, Section 11, Item 6 or 10) as applicable

Replace. (Figure 3-6).

(1) Slide two latches (1) from flaking box (2).

(2) Lift tailgate assembly (3) up and away from flaking box (2).

(3) Remove hose assemblies (4) from flaking box (2).

(4) Install hose assemblies (4) in new flanking box (2). Refer to paragraph 2-12, step b for repacking of hoseline

(5) Install tailgate assembly (3) on flaking box (2).

(6) Slide two latches (1) into flaking box (2).

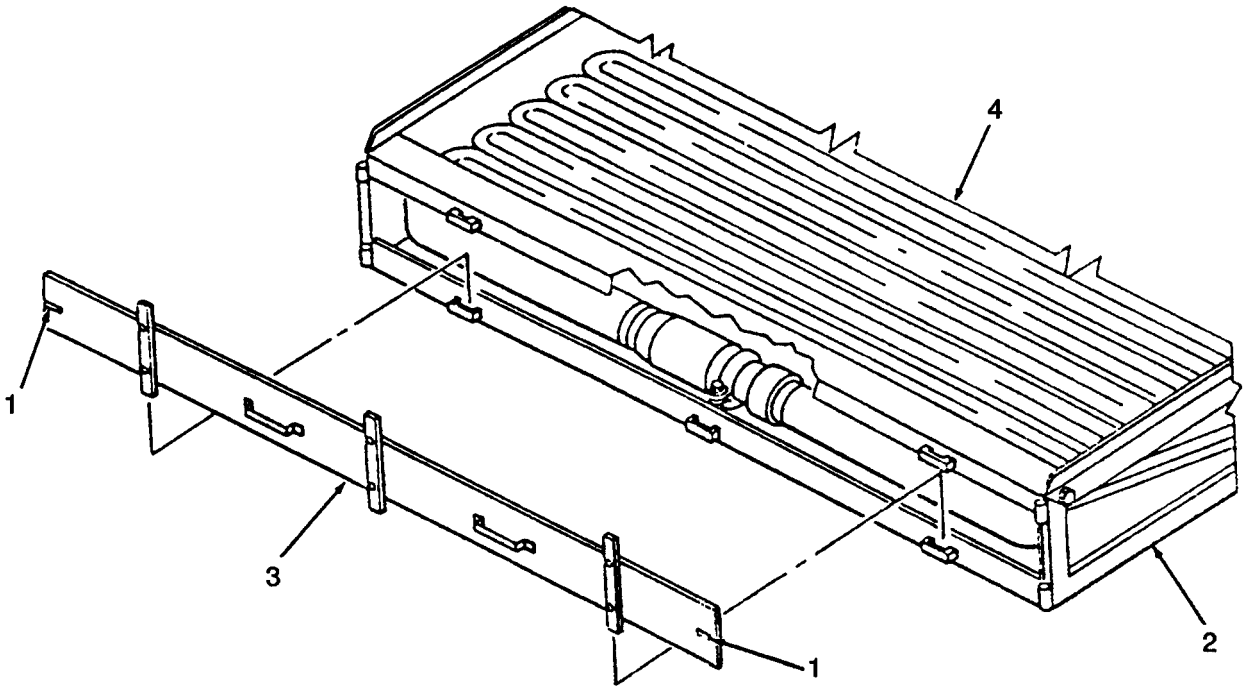


Figure 3-6. Flaking Box Assembly, Replace.

3-6. Hose Assembly.

This task covers: Repair

INITIAL SETUP

Tools	*Materials/Parts*
Repair Kit (Appendix C, Section II, Item 4 or 9) as applicable	Emery Paper (Item 4, Appendix E)

Repair.

(1) *Minor leaks.* **(Figure 3-7)**

WARNING

Do not smoke, carry an open flame, or use any heat producing device near hoseline during hoseline repair. Failure to observe this warning can result in fire, explosion, and death.

(a) **Reduce pressure so that leak is diminished. Do not shutoff pressure completely or hose will flatten, making repairs more difficult.**

(b) Rotate damaged side (1) to top.

(c) Place support, planks or blocks (2) under hose (3) on both sides of damaged area. Leave about 6 inches (152.4 mm) clearance below damaged area.

WARNING

Potential health hazards result from inhalation of petroleum solvent vapors and from contact of solvent with skin. Use rubber gloves and hand cream for protection, and work with adequate ventilation

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F-138°F (38°C-60°C).

(d) **Clean an area approximately 6 inches (0.52 mm) wide on either side of damaged area with dry cleaning solvent.**

(e) Apply a thin coat of rubber cement to cleaned area and allow it to become tacky. This will take approximately 5 minutes.

NOTE

Wrap tape as tightly as possible without causing buckling or distortion.

(f) Wrap vinyl tape (4) around hose (3) in a spiral pattern. Each wrap should overlap approximately one-half of preceding wrap. Tape should extend 4 inches (101.6 mm) beyond both sides of damaged area.

(g) Spiral wrap rubber tape (5) in opposite direction of vinyl tape. Each wrap should overlap one-halt of preceding wrap.

(h) Sprial wrap a third layer with vinyl tape (6) in same direction as first layer of vinyl tape. This tape wrap should extend 6 inches (152 mm) behond both sides of damaged area.

(i) Check hose (3) for leaks.

(j) If check indicates that there are no leaks present, return hose (3) to service, If hose (3) continues to leak during check, perform repair procedure, step (2).

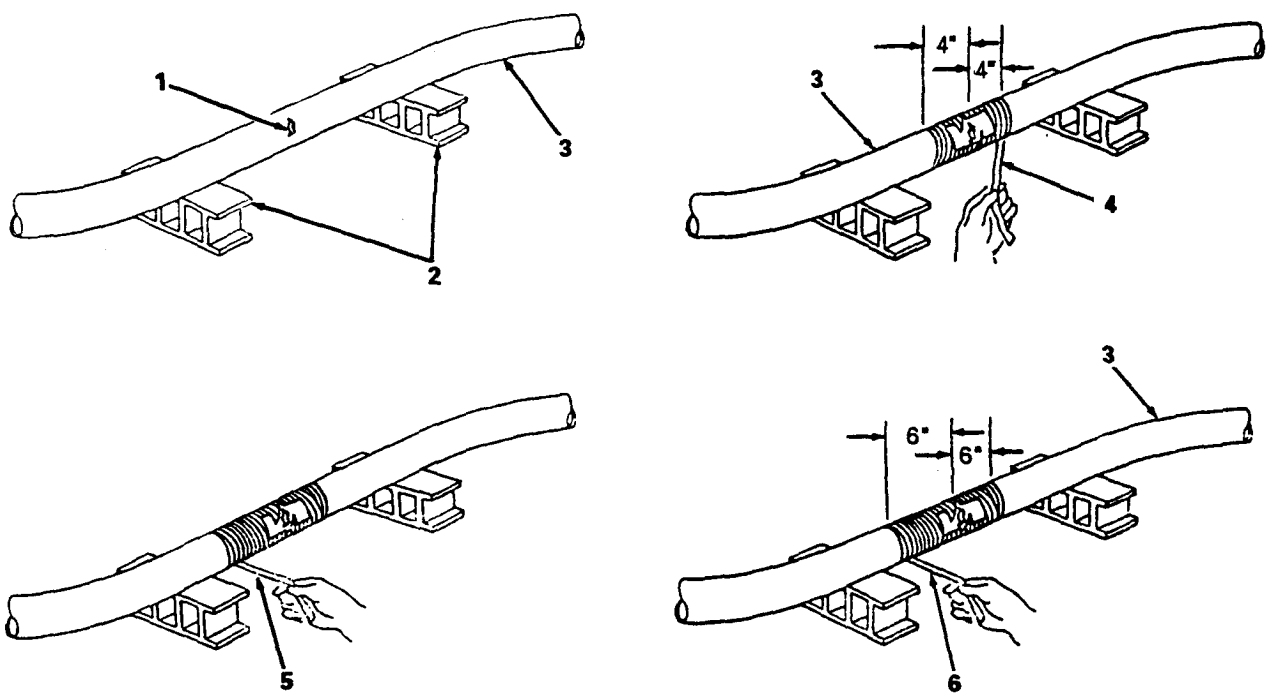


Figure 3-7. Minor Leaks, Repair.

(2) Major breaks and ruptures (Models ADC-1200 and 1461) (figure 3-8)

(a) Shut down hoseline completely. Remove all pressure on hoseline.

(b) Apply hose clamps on both sides of break, split, or hole, 3 feet (0.9 m) beyond damaged areas.

NOTE

Always mark, score and cut hose squarely and leave no ragged ends.

(c) Cut hose (1) approximately 6 inches (152 mm) from edge of damaged area, and examine interior for further damage. Cut hose back again, if necessary, to reach undamaged area. Hose must be cut squarely and evenly.

(d) Drain hose ends into appropriate container and wipe ends dry.

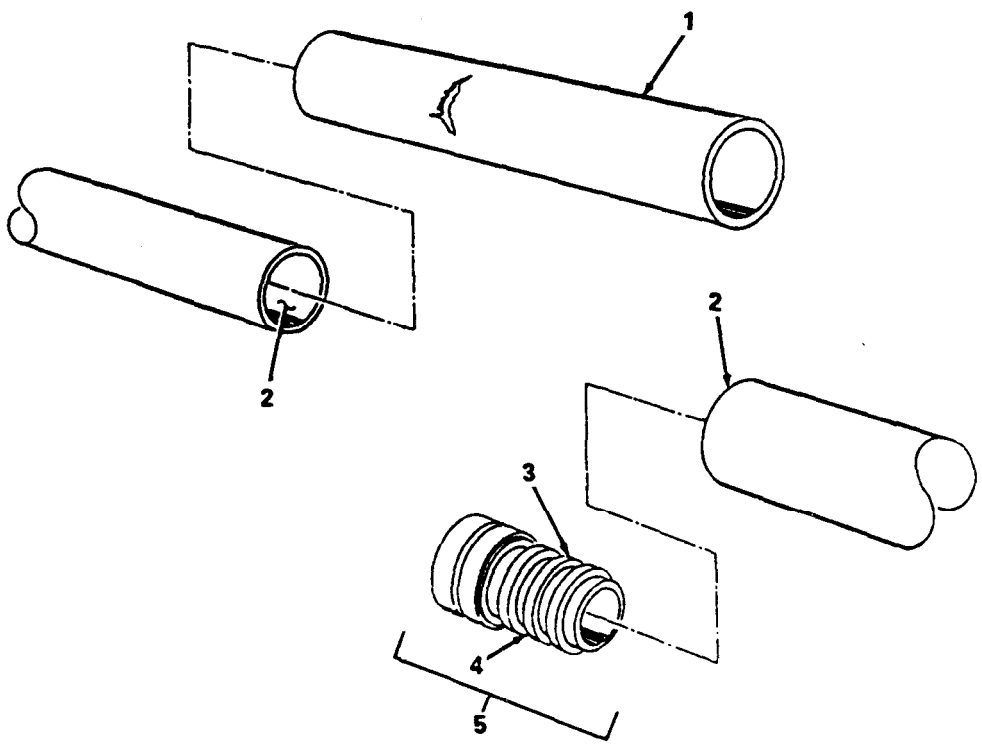


Figure 3-8. Major Breaks and Ruptures, Repair (Models ADC-1200 and 1461) (Sheet 1 of 2).

WARNING

Potential health hazards result from inhalation of petroleum solvent vapors and from contact of solvent with skin. Use rubber gloves and hand cream for protection, and work with adequate ventilation.

Dry cleaning solvent used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 1000 F-138°F (38°C-60°C).

(e) Apply 6 inches(152 mm) of dry cleaning solvent to the inside of both hose ends (2) and dry thoroughly.

(f) Apply rubber cement to cut (raw) area of one hose end (2).

(g) Apply a coat of rubber cement to shank (3) of hose adapter up to shoulder (4).

(h) Immediately insert hose adapter (5) into hose end so that cement acts as a lubricant. It it is necessary to pound adapter into hose, place a wooden block overselling faces of adapter to prevent any damage. Ensure that adapter is inserted in hose up to shoulder.

(i) Secure adapter (5) using three double-wrap steel bands (6) as follows:

1 Cut 30 inches (762 mm) of strapping, slide seal (7) on band, bend approximately 1 1/2 inches of band under seal, bring end of band around hose and again through seal.

2 Continue band around hose once more and again through seal. This provides double banding.

3 Position band (8) approximately 5 inches (127 mm) from end of adapter (9). Place band in open slot of tool nose (10) in slide (11). With thumb on band gripper lever (12), apply tension by turning handle (13) on tool. After tension is created, it is not longer necessary to hold band gripper lever as it locks itself under tension.

4 Place finger on band at bridge (14) while turning tool handle (15). When band stops moving, stop turning handle seal.

CAUTION

Failure to back off with tension handle throughout entire rolling operation may result in breaking of band.

5 Roll tool (16) over seal, backing off with tension handle (17) through entire course of roll. There is no loss of tension. As band releases, it is used up in the bend.

6 Pull cutting handle (18) to cut band.

7 Remove tool (19); holding stub (20) of band down with thumb.

8 Clinch stubby hammering down buckle ears (21).

9 Repeat steps 1 through 6, placing a second band 3.5 inches (88.9 mm) from adapter end and a third band 2 inches (50.8 mm) from adapter end.

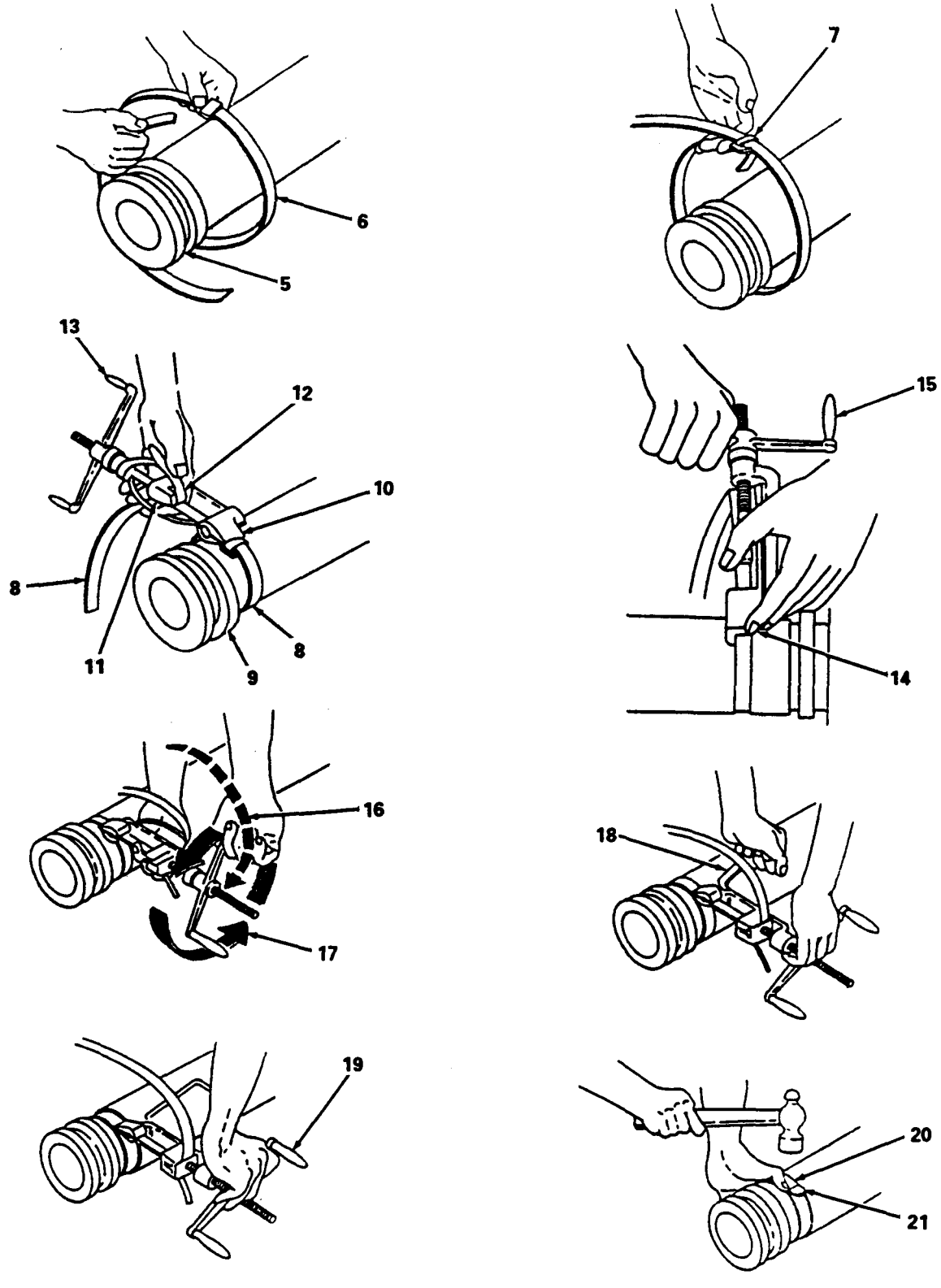


Figure 3-8. Major Breaks and Ruptures, Repair (Models ADC-1200 and 1461) (Sheet 1 of 2).

(j) Apply a second coat of rubber cement to cut (exposed) edge of hose.

(k) Repeat steps (f) through (j) on remaining hose end.

NOTE

Lay line must run straight the entire length of each 500-foot hose section.

(l) If damaged area in (c) was small, couple adapter together using either a pipe coupling clamp (paragraph 2-6, step c) or a coupling ring (paragraph 2-13). Use lay line to align hose before securing coupling.

(m) If the damage area removed is large, insert a new section of hose into hoseline.

(n) Check hose for leaks.

(o) If check indicates that there are no leaks present, return hose for service, if hose continues to leak during check, replace hose.

(2.1) *Major breaks* and *ruptures (Model FIHK-100)* (figure 3-8.1)

(a) Install hose clamps (1 and 2) about 3-feet upline and downline from damaged section of hose (3). Tighten hose clamps until hose is pinched closed.

CAUTION

To ensure hose does not leak after repair, mark and cut hose squarely. Do not leave ragged or uneven edges.

(b) Cut out damaged section of hose (3) with knife. If leak is caused by a small puncture, cut hose at puncture.

(c) Drain hose ends into suitable container and wipe ends dry.

(d) Inspect inside of hose ends (4 and 6) for damage. Cut hose ends back again, as required, to ensure all damaged hose material is removed.

WARNINGS

- Potential health hazards result from inhalation of petroleum solvent vapors and contact of solvent with skin. Use rubber gloves and hand cream for protection, and work in well ventilated area.
- Dry cleaning solvent used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged contact. Do not use near open flame or excessive heat. Flash point of solvent is 100º F-138º F (38ºC--60ºC).

(e) Using wiping rag and dry cleaning solvent, wipe inside of both hose ends (3 and 4). Reach back at least 6-inches inside hose ends. Dry hose ends thoroughly with dry wiping rag.

(f) Remove two clamp sections (7) from adapter (5).

(9) Apply rubber cement to cut (raw) area of hose end (4).

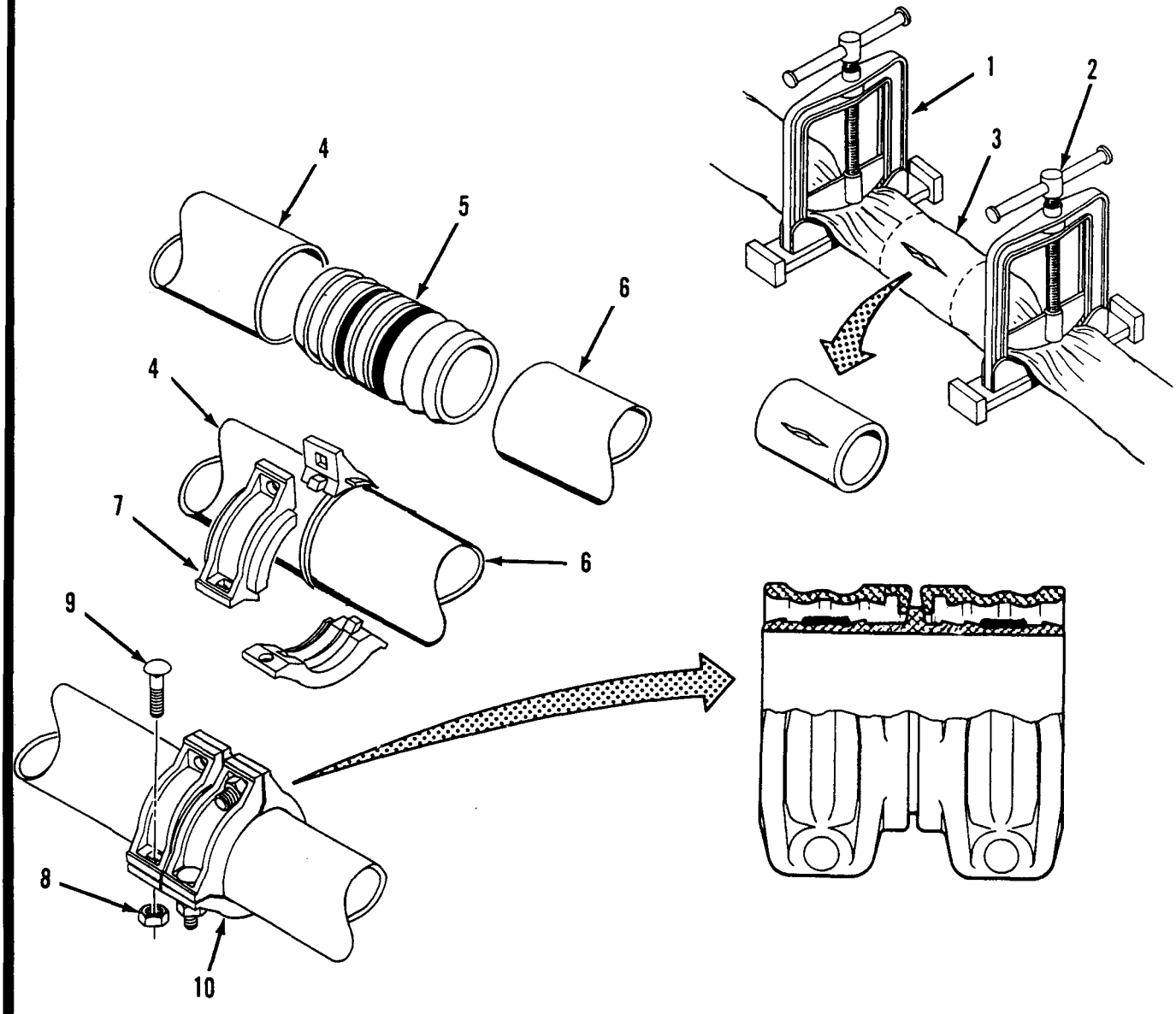


Figure 3-8.1. Hose to Hose Adapter (Model FIHK-100).

(h) Apply a coat of rubber cement to shank of adapter (5).

CAUTION

If it is necessary to pound adapter into hose end, place a wood block over sealing face of adapter to prevent damage to adapter.

(i) Immediately insert adapter (5) into hose end (4). Push adapter into hose until hose end contacts shoulder of adapter as shown.

(j) Apply rubber cement to cut (raw) area of hose end (6).

(k) Apply a coat of rubber cement to shank on other end of adapter (5).

CAUTION

To prevent damage to hose, do not pound adapter into remaining hose end.

(l) Immediately insert adapter (5) into hose end (6). Push adapter into hose until hose end contacts shoulder of adapter as shown.

(m) Position three clamp sections (7) around hose end (4) and adapter (5). Make sure clamp sections mate with groove in adapter as shown.

(n) Install three bolts (9) and nuts (8) to secure clamp sections (7) to adapter (5).

(o) Repeat steps (7) and (8) to install repair clamp (10) on hose end (6).

(p) Remove hose clamps (1 and 2).

(q) Test repaired section of hose for leaks.

(3) *Repair of adapter sealing faces.* (figure 3-9)

NOTE

Care must be taken not to leave any scratches or marks across sealing surface.

(a) Using medium coarse emery paper (l), remove any nicks, dents or burrs on sealing faces (2) of grooved-end couplings.

(b) If damage cannot be smoothed out, coupling must be replaced.

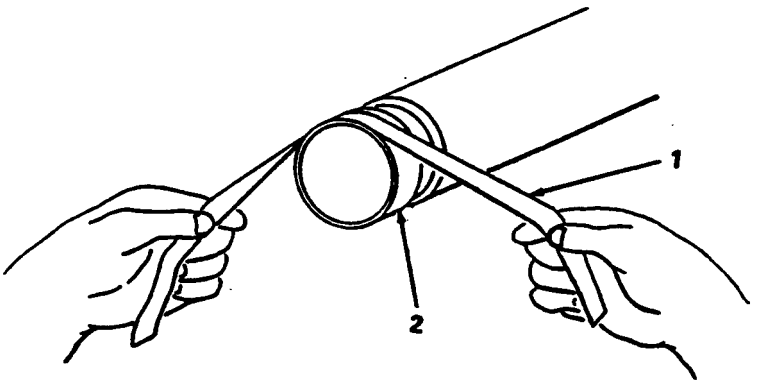


Figure 3-9. Adapter Sealing Faces, Repair.

3-7. **Displacement and Evacuation and Repair Kits.**

This task covers: Replace

Replace.

NOTE

For Model ADC-1200, components of the displacement and evacuation kit and repair kit are stored in one chest assembly. For Models 1461 and FIHK-100, components of the displacement and evacuation kit and repair kit are stored in two separate chest assemblies. Replacement of kit components in each chest assembly is the same.

(1) Remove all components of the displacement and evacuation and repair kits from their chest assembly.

(2) Inspect all components of the kits and replace any damaged components

3-8. **Displacement and Evacuation and Repair Kits.**

This task covers: Replace

Replace.

NOTE

For Model ADC-1200, components of the displacement and evacuation kit and repair kit are stored in one chest assembly. For Models 1461 and FIHK-100, components of the displacement and evacuation kit and repair kit are stored in two separate chest assemblies. Replacement of each chest assembly is the same.

(1) Remove and store components of displacement and evacuation and/or repair kits from the chest assembly.

(2) Inspect chest assembly for damage. Replace chest assembly if damaged and notify maintenance.

3-9. **Suspension and Packing Kits.**

This task covers: Replace

Replace.

NOTE

For Model ADC-1200, components of the suspension kit and packing kit are stored in one chest assembly. For Models 1461 and FIHK-100, components of the suspension kit and packing kit are stored in two separate chest assemblies. Replacement of kit components in each chest assembly is the same.

(1) Remove all components of the suspension and packing kits from their chest assembly.

(2) Inspect all components of the kits and replace any damaged components.

3-10. **Suspension and Packing Kit Chest Assemblies**

This task covers: Replace

Replace.

NOTE

For Model ADC-1200, components of the suspension kit and packing kit are stored in one chest assembly. For Models 1461 and FIHK-100 components of the suspension kit and packing kit are stored in two separate chest assemblies. Replacement of each chest assembly is the same.

(1) Remove and store compoennts of suspension and packing kits from the chest assembly and store kits.

(2) Inspect chest assembly for damage. Replace chest assembly if damaged and notify maintenance.

3-11. Flow Control Kit.

This task covers: Replace (Model ADC-1200 and 1461)

Replace.

(1) Remove all components of the flow control kit from the chest assembly.

(2) Inspect all components of the kit and replace any damaged components.

3-I2. Gate Valve Assembly.

This task covers: Replace

INITIAL SETUP

Tools	*Equipment Condition:*
Repair Kit (Appendix C, Section II, Item 4 or 9) as applicable	Pump shut down (refer to applicable TM).

Replace. (figure 3-10)

(1) Apply hose clamp (1) on each side of gate valve (2).

(2) Remove two bolts (3) and nuts (4) securing lower half of pipe coupling clamp (5) and upper half of pipe coupling clamp (6) on one side of gate valve.

(3) Remove pipe coupling clamp halves and gasket (7),

(4) Drain residual fuel into appropriate container.

(5) Repeat procedures 2 and 3 for the opposite side of gate valve.

(6) Install new gate valve. Place gasket (7) over one hose end, make certain gasket is flush with end.

(7) Align gate valve and hose coupling.

(8) When couplings are in proper alignment, slide gasket (7) over joint and center in place.

(9) Position lower coupling half (5), then position upper coupling clamp half (6).

(10) Install two bolts (3) so that nuts (4) will be exposed on the upper coupling clamp half.

(11) Hand-tighten nuts evenly, then, using a wrench, tighten nuts evenly until the coupling faces just meet.

(12) Continue tightening nuts evenly until both bolts are secure.

(13) Repeat procedures 6 through 12 for opposite side of gate valve,

(14) Remove both hose clamps (1).

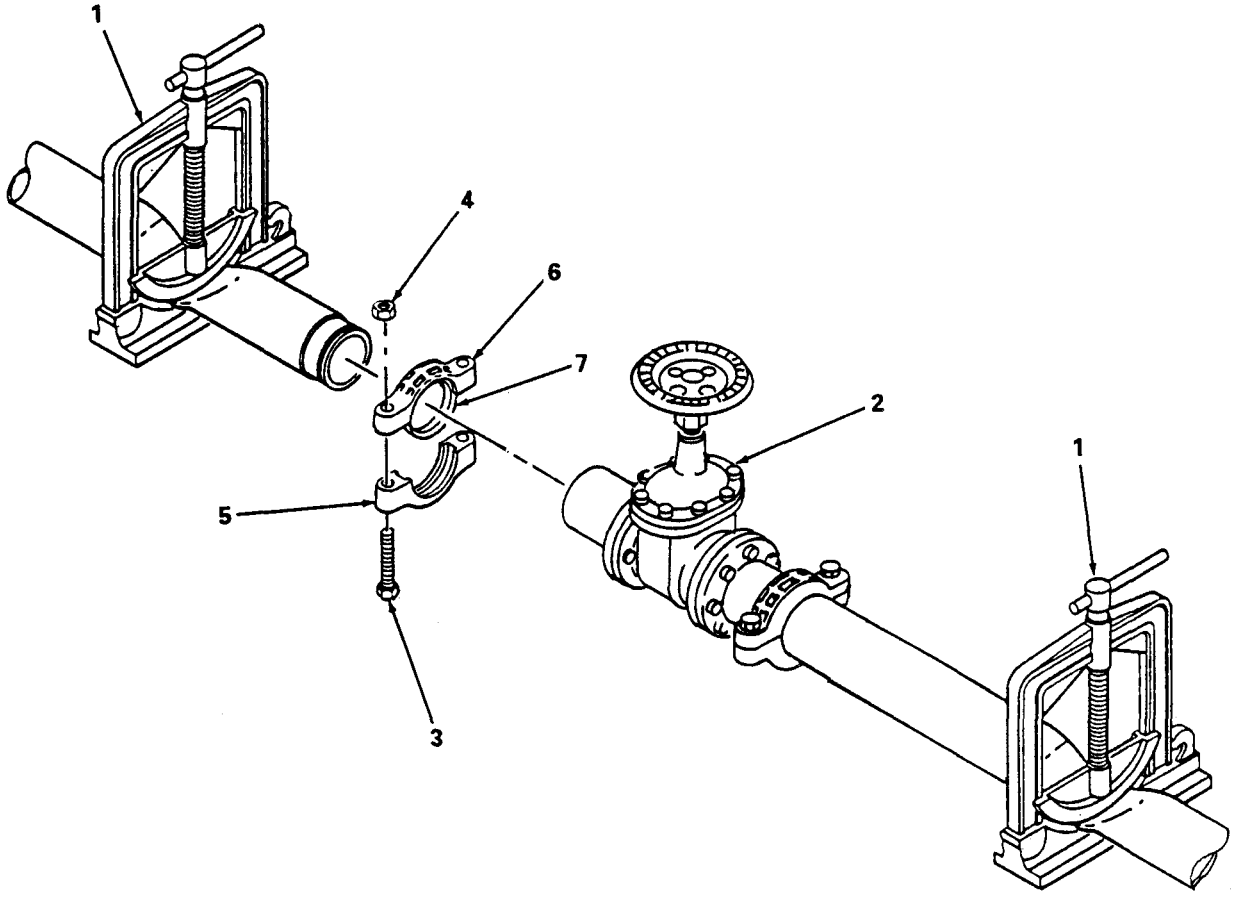


Figure 3-10. Gate Valve Assembly, Replace.

3-13. Check Valve Assembly.

This task covers: Replace

INITIAL SETUP

Tools	*Equipment Condition*
Repair Kit (Appendix C, Section 11, item 4 or 9) as applicable	Pump shut down (refer to applicable TM).

Replace. (figure 3-11)

(1) Apply hose clamp (1) on each side of check valve (2).

(2) Remove two bolts (3) and nuts (4) securing lower half of pipe coupling clamp (5) and upper half of pipe coupling clamp (6) on one side of check valve.

(3) Remove pipe coupling clamp halves and gasket (2).

(4) Drain residual fuel into appropriate container.

(5) Repeat procedures 2 and 3 for the opposite side of check valve.

(6) Install new check valve, Place gasket (7) over one hose end, make certain gasket is flush with end.

(7) Align check valve and hose couplings.

(8) When couplings are in proper alignment, slide gasket (7) over joint and center it in place.

(9) Position lower coupling clamp half (5), then position upper coupling clamp half (6).

(10) Install two bolts (3) so that nuts (4) will be exposed on the upper coupling clamp half.

(11) Hand-tighten nuts evenly, then using a wrench, tighten nuts evenly until the coupling faces just meet.

(12) Continue tightening nuts evenly until both bolts are secure.

(13) Repeat procedures 6 through 12 for opposite side of check valve.

(14) Remove both hose clamps (1).

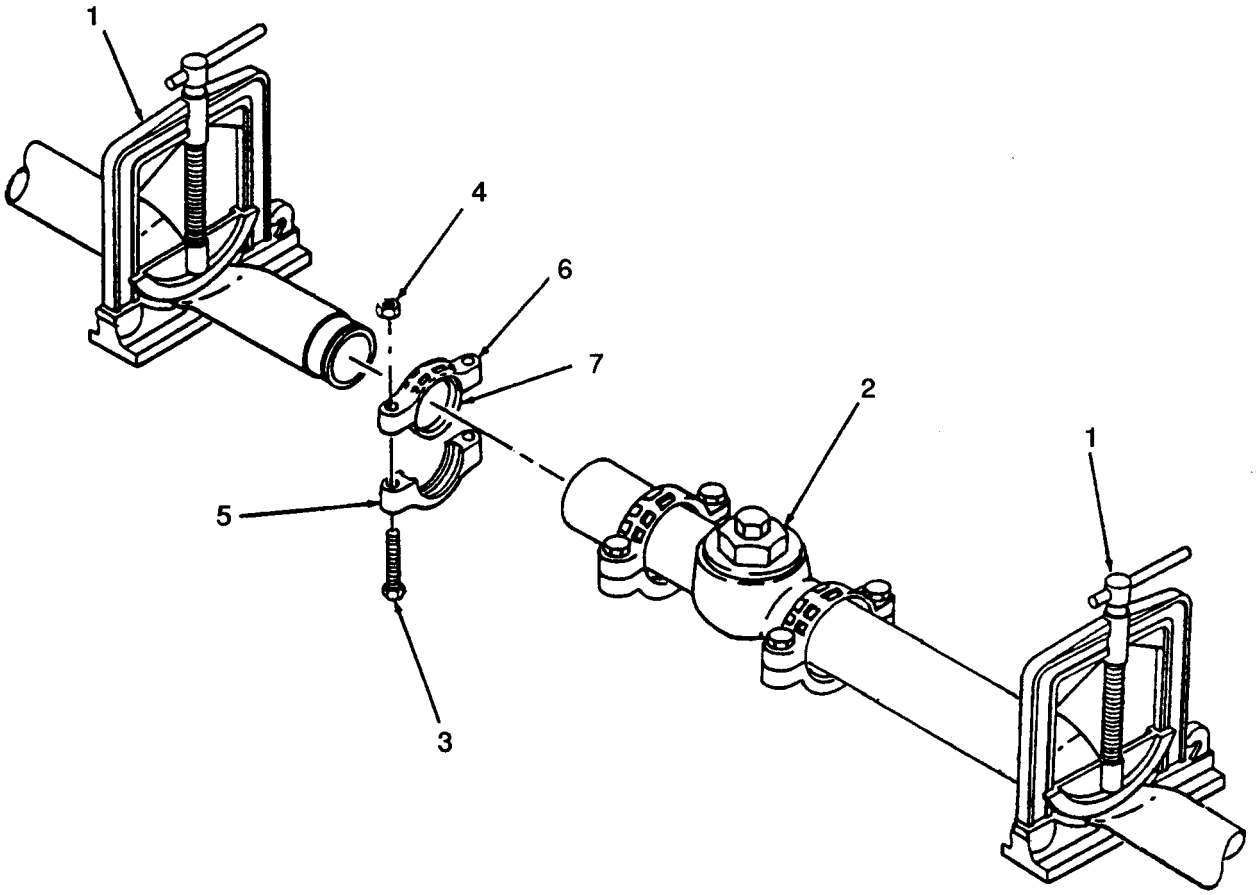


Figure 3-11. Check Valve Assembly, Replace.

3-14. Strainer Assembly.

This task covers: a. Replace b. Service c. Install

INITIAL SETUP

Tools	*Equipment Condition*
Repair Kit (Appendix C, Section II, item 4 or 9) as applicable	Pump shut down (refer to applicable TM).

a. Remove (Figure 3-12)

(1) Isolate strainer (1) i.e. close valves on each side.

(2) Remove two bolts (2) and nuts (3) securing lower half of pipe coupling clamp (4) and upper half of pipe coupling damp (5) on one side of strainer.

(3) Remove pipe coupling damp halves and gasket (6).

(4) Drain residual fuel into appropriate container.

(5) Repeat procedures (2) and (3) for the opposite side of strainer.

b. Service.

WARNING

Dry cleaning solvent used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F-138°F (38°C-60°C).

(1) Clean strainer assembly (7) with dry cleaning solvent and rag dry thoroughly.

(2) Inspect strainer assembly (7) and replace if cracked, broken or otherwise damaged.

c. *Install.*

(1) Place gasket (6) over one hose end, make certain gasket is flush with end.

(2) Align strainer and hose couplings.

(3) When couplings are in proper alignment, slide gasket (6) over joint and center it in place.

(4) Position lower coupling damp half (4), then position upper coupling clamp half (5).

(5) Install two bolts (2) so that nuts (3) will be expossed on the upper coupling clamp (5).

(6) Hand-tighten nuts evenly, then using a wrench, tighten nuts evenly until the coupling faces just meet.

(7) Continue tightening nuts evenly until both bolts are secure.

(8) Repeat procedures (1) through (7) for opposite side of strainer.

(9) Open valves.

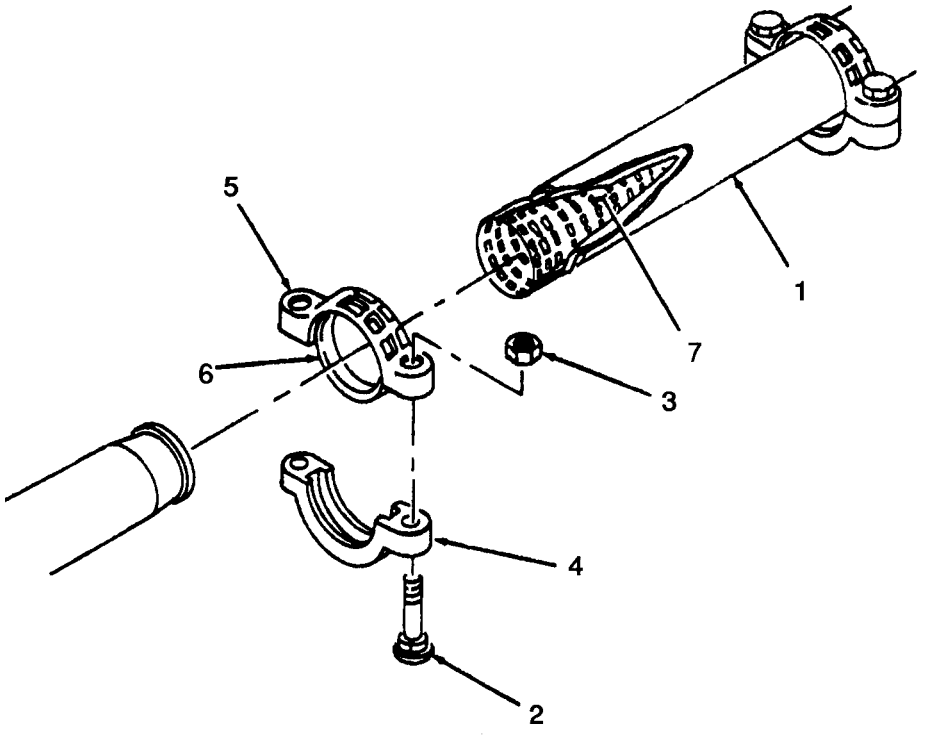


Figure 3-12. Strainer Assembly, Service and Replace.

3-15. Flow Control Kit Chest Assemblies.

This task covers: Replace (Model ADC-1200 and 1461)

Replace.

NOTE

The flow control kit chest assemblies are made up of two chest assemblies. One for the model ADC-1200 and one for model 1461. The replacement of each chest assembly is the same.

(1) Remove and store components of flow control kit from the chest assembly and store kit.

(2) Inspect chest assembly for damage. Replace chest assembly if damaged, and notify maintenance.

3-16. Roadway Crossing Guard.

This task covers: Replace

INITIAL SETUP

Tools

Repair Kit (Appendix C, Section II, item 4 or 9) as applicable

Replace. (Figure 3-13)

WARNING

Dry cleaning solvent used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F-138°F (38°C-60°C).

(1) Clean roadway crossing guard (1) with dry cleaning solvent and dry thoroughly.

(2) Inspect roadway crossing guard (1) and replace if cracked or badly distorted.

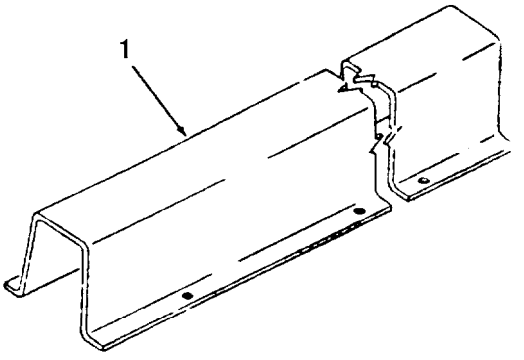


Figure 3-13. Roadway Crossing Guard, Replace.

CHAPTER 4

UNIT MAINTENANCE

OVERVIEW

This chapter contains those maintenance instructions that unit level maintenance is authorized to perform.

Section I. REPAIR PARTS; SPECIAL TOOLS; TEST, MEASUREMENT, DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

4-1. **Special Tools, TMDE and Support Equipment.** For a listing of special tools, TMDE, and support equipment authorized for use on this equipment, refer to the Repair Parts and Special Tools List, TM 10-3835-219-24P and the maintenance allocation chart (MAC), Appendix B of this manual.

4-2. **Repair Parts.** Repair parts are listed and illustrated in the Repair Parts and Special Tools List for Fuel Handling Hoseline Outfit, TM 10-3835-219-24P

Section II. SERVICE UPON RECEIPT

4-3. **Inspection.**

a. inspect flaking boxes for broken or damaged panels and bent or damaged frame members.

b. inspect sling assembly for broken or frayed wire rope, twisted or cracked lift eye, U-bolts for cracks and security and hooks for cracks and condition.

c. Inspect kit chests for broken or bent handles, broken, bent, or loose latches, broken or damaged hinges, and for dents, breaks or any other distortions.

d. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA PAM 738-750.

e. Check to see whether the equipment has been modified.

4 4 . **Lubrication,** Upon receipt of equipment, perform operator's lubrication instructions and PMCS.

4-5. **Testing.** Perform unit level PMCS and operators Before (B) PMCS before starting fueling operations. Start fuel operations and observe operation.

Section III. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

4-6. **General.** Unit level maintenance PMCS are done to ensure that the Fuel Handling Hoseline Outfit is in top operating condition. A comprehensive PMCS program reduce equipment downtime and increases the operational readiness of the equipment.

4-7. **PMCS Procedures.** Unit level PMCS are in Table 4-1. The numbers in the Item No. column show the order in which the checks or services should be performed. These numbers should be used when recording deficiencies and shortcomings on DA Form 2404, Equipment Inspection and Maintenance Worksheet. The dot (•) in the interval column indicates when a check or service should be performed.

Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS).

W - Weekly M - Monthly Q - Quarterly H - Hourly

Item	Interval W	M	Q	H	Item to be inspected Procedure	Equipment is not ready/available if:
1			•		Hose Assembly Test hose assembly. Refer to para. 4-12.	Fails test.

Section IV. UNIT TROUBLESHOOTING

4-8. General. This section contains troubleshooting procedures to determine the probable cause of observed equipment malfunctions. Tests or inspections are provided to isolate the faulty component and corrective actions are provided to eliminate the malfunction.

4-9. Unit Troubleshooting Procedures. There are no unit troubleshooting procedures for this section.

Section V. UNIT MAINTENANCE PROCEDURES

4-10. General. This section contains unit level maintenance procedures as authorized by the MAC in appendix B of this manual.

4-11. **Flaking Box Assembly.**

This task covers: **Repair**

INITIAL SETUP

Tools

Drill (Appendix B, Section III, item 2)
Riveter (Appendix B, Section III, Item 3)

Equipment Condition

Hose removed (para. 3-5).

Materials/Parts

Solvent, drycleaning (Item 7, Appendix E)
Rags, Wiping (Item 5, Appendix E)
Rivet (TM 10-3835-219-24P)
Pin, Cotter (TM 10-3835-219-24P)

Repair. (Figure 4-1)

(1) **Drill out rivets (1) securing four panels (2) to frame (3) and remove panels.**

(2) **Remove cotter pin (4), shackle pin (5) and remove shackte (6).**

(3) **Remove nut (7) and remove eyebolt (88).**

(4) **Remove two bolts (9), lift tie bar (10) and remove tie bar.**

(5) **Lift tailgate (11) and remove.**

(6) **If any frame member requires welding, refer to higher level of maintenance.**

WARNING

Dry cleaning solvent used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F-138°F (38°C-60°C).

(7) **Clean all components with dry cleaning solvent and dry thoroughly.**

(8) **Inspect shackle pin (5), shackle (6), eyebolt (8) from cracks or breaks and replace if damaged.**

(9) **Install tailgate (11) on tie bar (10).**

(10) Position tie bar (10) and secure with two bolts (9).

(11) Install eyebolt (8) and secure with nut (7).

(12) Install shackle (6), shackle pin (5) and secure with cotter pin (4).

(13) Using old panels as template, drill holes in new panels. Secure new panels to frame (3) with rivets(1).

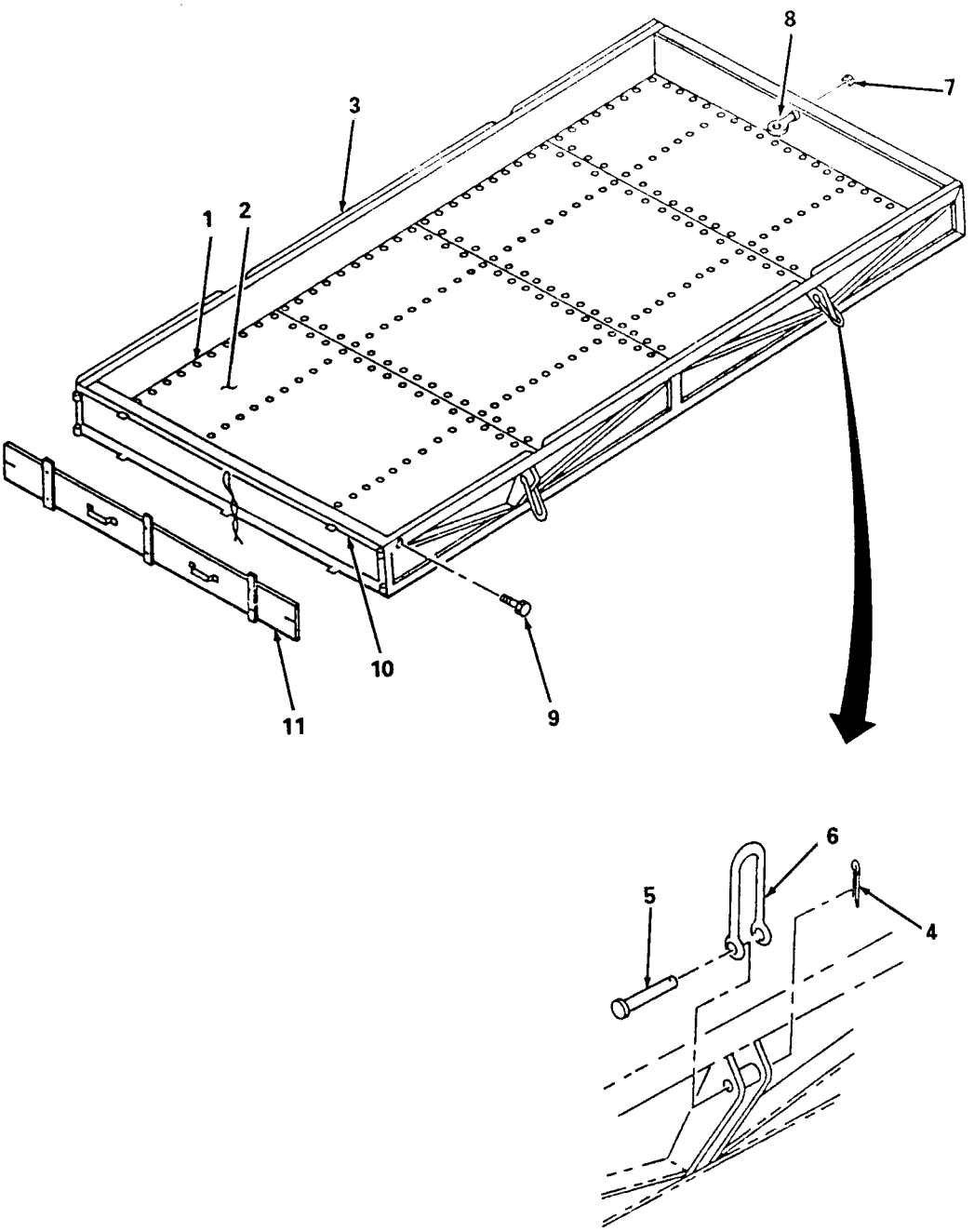


Figure 4-1. Flaking Box Assembly, Repair.

4-12. Hose Assembly.

This task covers: Test

INITIAL SETUP

Tools

Flow Control Kit (Appendix C, Section 11, Item 7)
Displacement and Evacuation Kit
(Appendix C, Section 11, Item 3 or 9) as applicable
Pump Assembly (Appendix D)

Test. (figure 4-2)

NOTE

Use only water to pressure test hose assembly

(1) Inspect hose assembly covers (1) for cuts, abrasion, burns, rodent damage and mildew or chemical attack.

(2) Inspect couplings for corrosion, damage or frozen swivels, overall condition of metal and condition of gaskets.

(3) Damaged hose must be removed from test area and, repaired before being pressure tested.

(4) Select a test area that will allow connection of hydrostatic test equipment to an adequate water source.

(5) Surface of test area should be level, smooth and free of any materials that can damage hose by cutting or abrading.

CAUTION

At no time shall the total layout exceed 500 feet (150 m).

(6) Hose must be tested one length at a time.

(7) Make sure hoselines are layed out straight and without kinks or twists.

(8) Connect one end of hoseline (1) to discharge valve (2) on pump (3). (Reference 2-7b)

CAUTION

A hose test valve should be used to prevent an excessive pressure surge to the equipment should a hose burst during test.

(9) Connect hoseline (1) at hose test valve at approximately 10 inches (154.0 mm) to 15 inches (381.0 mm) from coupling.

WARNING

A baffle, composed of metal, wood or sandbags, approximately 3 feet (0.91 m) wide and 3 feet (0.91 m) high, should be placed between the water inlet of hose and operator controlling hydrostatic pressure to protect operator in case of a coupling retention.

(10) Attach shutoff nozzle on test caps (4) with a petcock to coupling at end of hoseline (1).

WARNING

In making service pressure test, special care must be exercised to remove all air from hose before nozzle or test cap valve is closed and pressure becomes greatly compressed, and hose can ship violently, if pressure is suddenly released by a hose burst. A blown-off coupling or coupling ring can act like a high velocity missile which can result in serious injury or damage to property.

It should be understood that development of test pressures introduces a serious accident potential even when recommended procedures are followed.

(11) Directly in back of nozzle or coupling, secure hose in order to avoid any possible whipping or uncontrolled reaction of hoseline that may occur when hoseline is subject to hydrostatic pressure.

(12) After filling hoseline, observe each end of each length of hose at coupling to ensure coupling does not slip during test.

(13) Check all couplings for leakage, replace gaskets and/or straps as required.

WARNING

Open and close nozzles and valves gradually to prevent water hammer and pressure surges which may burst hose and, in turn, causes bodily injury. Water hammer is the surge of pressure caused when a high velocity flow of water is abruptly shut off. The pressure exerted by the flowing water against the closed system can be as much as seven times the static pressure.

(14) Slowly raise pressure to 150 psig (10.55 kg/cm^2).

(15) Hold at this pressure for 5 minutes.

WARNING

Never straddle hose while under pressure and never stand at either end in line with hose.

(16) During the time hose is under pressure, inspect entire length of hose for any leaks or defects.

(17) After inspection and the 5 minute pressure hold, slowly reduce pressure.

(18) Close pump discharge valve and open nozzle or test cap to drain hose.

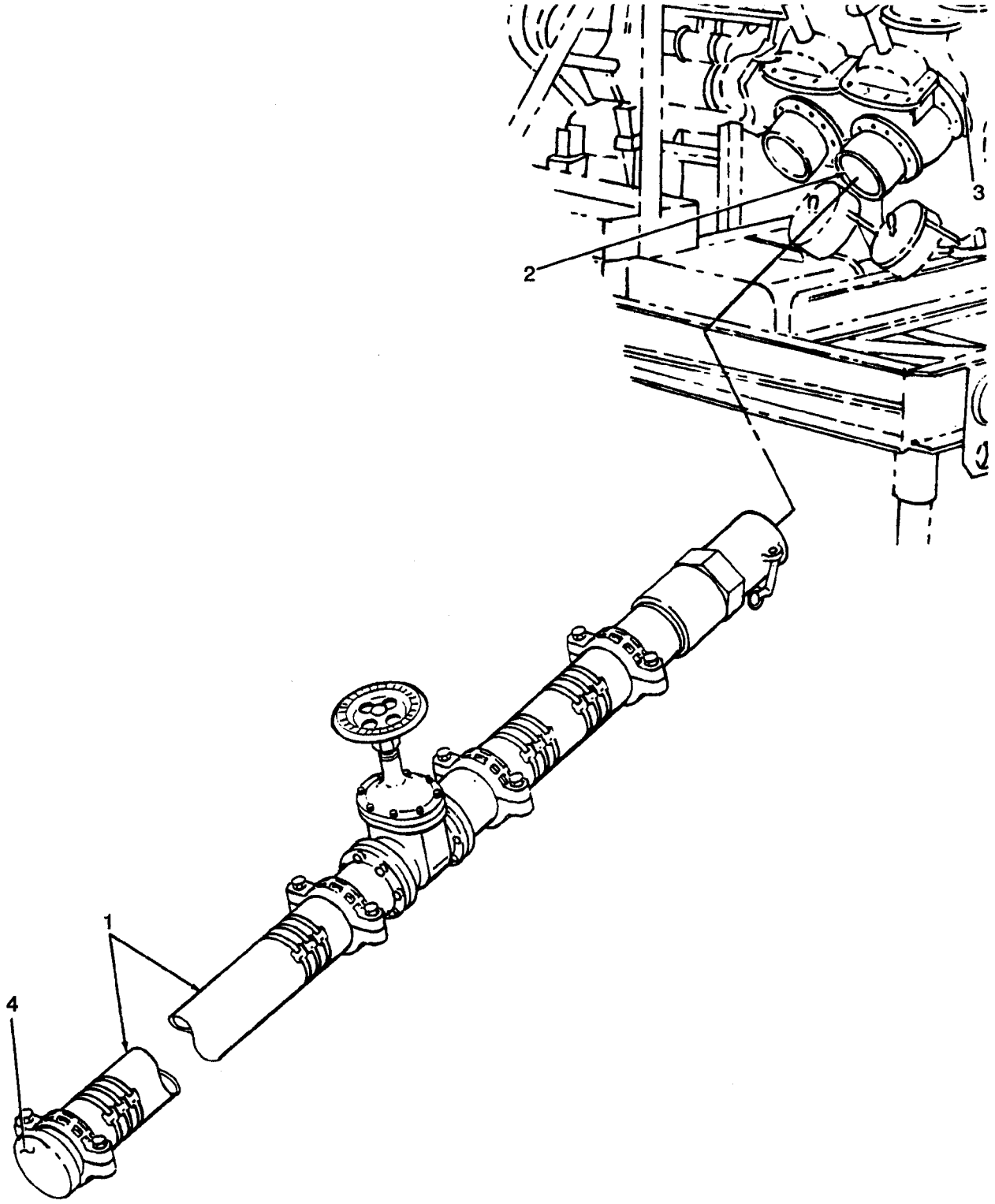


Figure 4-2. Hose Assembly, Test

Section VI. PREPARATION FOR SHIPMENT OR STORAGE

4-13. General. This section contains procedures to place fuel handling hoseline outfit into short term or administrative storage.

4-14. Preparation for Shipment or Storage.

a. *Long Term Storage.* (Figure 4-3)

(1) *Hoseline outfit.* The hoseline outfit must be kept off the ground on shipping pallets, skids or tarpaulins.

(2) *Hoseline.* Hoseline packaged as supplied or boxed after use, must be Stored orunder cover in a supply warehouse or tent where it is relatively cool, dark and free from dampness and mildew. Storage temperature should be 50 to 70°F (10-21°C) with a maximum temperature of 100° (58°C). Do not store hoseline near sources of heat, such as radia tors, base heaters, etc. Do not store under conditions of high or low humidity.

(3) *Hoseline kits.* All hoseline kits are stored in their original storage containers and preserved as follows:

(a) Displacement and evacuation kit and repair kit.

1 Completely wrap the land-sealing surface of grooved end fittings with a single wrap of barrier material conforming to MIL-B-121, Type II, Class 2. The wrap must be flush with end of fitting and extend back beyond groove not less than one quarter of an inch.

2 Cover wrap of barrier material with a single wrap of tape conforming to PPP-T-60, Type IV. The tape must be of a width that willi completely cover the barrier material and extend not less than one eighth of an inch beyond end of fitting and extend back beyond barrier material not less than one ham of an inch.

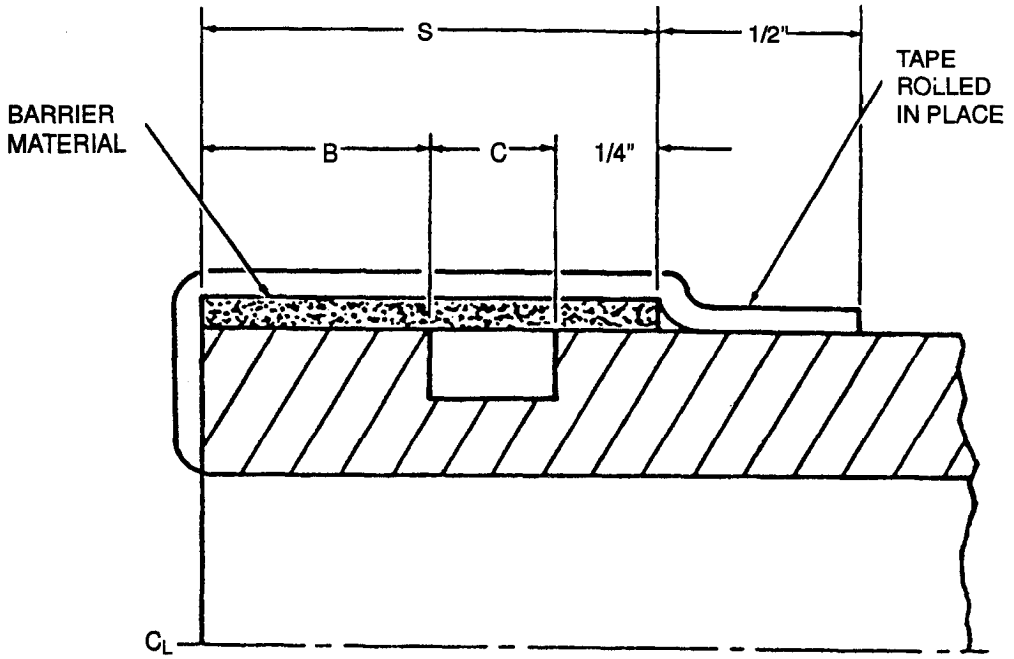
3 Roll tape extending beyond end of fitting and wrap in place against end wall of fitting and against fitting.

4 For Model No. ADC-1200, coat all unpainted metal components with contact preservative, Type P-1 or P-19 in accordance with MIL-P-116.

5 For Model No. 1461, coat all unpainted metal components with contact preservative, Type F or G, as applicable, in accordance with MIL-T-704.

6 Place all components in chest in accordance with Table 2-5, Table 2-8, or Table 2-9, as applicable.

7 Close chest and seal edges of chest lid with tape conforming to PPP-T-60, Type IV.



S – LANDING SEALING SURFACE
B – LAND
C – GROOVE

Figure 4-3. Long Term Storage.

(b) Flow control kit.

1 Completely wrap the land-sealing surface of grooved end fittings with a single wrap of barrier material conforming to MIL-B-121, Type II, Class 2. The wrap must be flush with end of fitting and extend back beyond groove not less than one quarter of an inch.

2 Cover wrap of barrier material with a single wrap of tape conforming to PPP-T-60, Type IV. The ape must be of a width that will completely cover the barrier material and extend not less than one eighth of an inch beyond end of fitting and extend back beyond barrier material not less than one half of an inch.

3 Roll tape, extending beyond end of fitting and wrap in place against end wall of fitting and against fitting.

4 Place all components in chest in accordance with Table 2-6 or Table 2-10, as applicable.

5 Close chest and seal edges of chest lid with tape conforming to PPP-T-60, Type IV.

(c) Suspension kit and packing kit.

1 For Model No. ADC-1200, coat all unpainted metal components with contact preservative, Type P-1 or P-19, in accordance with MIL-O-116.

2 For Model No. 1461, coat all unpainted metal components with contact preservative, Type F or G, as applicable, in accordance with MIL-T-704.

3 Place all components in chest in accordance with Table 2-7, Table 2-11, or Table 2-12, as applicable.

4 Close chest and seal edges of chest lid with tape conforming to PPP-T-60, Type IV.

(4) *Flaking boxes.* Empty flaking boxes should be stored undercover and kept off the ground on shipping pallets, skids, or tarpaulin.

b. Short Term Shipment.

(1) *Kits and roadway crossing guards packing.*

(a) Remove all components from kit chests.

WARNING

Wear eye protection when blowing solvent from parts. Compressed air used for cleaning purposes must not exceed 30 psi (2.1 kg/cm^2). Do not direct compressed air against the skin. Use goggles or full face shield.

Potential health hazards result from inhalation of petroleum solvent vapors and from contact of solvent with skin. Use rubber gloves and hand cream for protection, and work with adequate ventilation.

Dry cleaning solvent used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F-138°F (38°C-60°C).

(b) Clean inside and outside of chests with dry cleaning solvent and dry thoroughly.

(c) Using loading diagram attached to underside of chests' lids, place kit items in chests as diagrammed

(d) Close and latch chest lids.

(e) Clean roadway cross guards.

(f) Pack the 20 guards, five per box, into four fiberboard boxes.

(g) Hose down flaking boxes and wipe dry.

(2) Loading of hoseline outfit on forty foot semi-trailer.

(a) Attach three flaking boxes together with retaining pins.

CAUTION

Open end of hooks must face outward to prevent damage to flaking box.

(b) Attach lift sling hooks to lifting shackles at bottom of flaking box.

WARNING

Stand clear of load being lifted in case of failure to lift sling, lift device or flaking box shackle.

Do not exceed capacity of lifting device. Ensure it has a minimum lifting capacity of 6,000 lbs. (2700 Kg).

Do not lift flaking boxes with a fork lift. Use only the special lift sling provided to lift flaking boxes. Do not lift more than three flaking boxes at a time.

(c) Lift flaking boxes onto trailer and center on trailer bed.

(d) Load three stacks of three high and one stack of four high.

(e) Place a 2 x 4 board, 60 inches long, flat, face up on trailer bed against last stack.

(f) Nail board to trailer bed with 20 eight-penny nails staggered and equally spaced along board.

(g) Load chests and secure.

(h) Load roadguard crossing boxes and sling and secure.

4-15. Administrative Storage.

a. Placement of equipment in administrative storage should be for short periods of time when a shortage of maintenance effort exists. Items should be in mission readiness within 24 hours or within the time factors as determined by the directing authority. During the storage period appropriate maintenance records will be kept.

b. Before placing equipment in administrative storage, current maintenance services and Equipment Serviceable Criteria (ESC) evaluations should be completed, shortcomings and deficiencies should be corrected, and all Modification Work Orders (MWO's) should be applied.

c. Storage Site Selection. Inside storage is preferred for items selected for administrative storage. If inside storage is not available, trucks, vans, conex containers and other containers maybe used.

CHAPTER 5

DIRECT SUPPORT MAINTENANCE

OVERVIEW

This chapter contains information for maintenance of the Fuel Handling Hoseline Outfit by Direct Support Maintenance personnel.

Section I. REPAIR PARTS; SPECIAL TOOLS; TEST, MEASUREMENT, DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

5-1. **Special Tools, TMDE and Support Equipment.** For a listing of special tools, TMDE, and support equipment authorized for use on this equipment, refer to the Repair Paris and Special Tools List, TM 10-3835-219-24P and the Maintenance Allocation Chart (MAC), Appendix B of this manual.

5-2. **Repair Parts.** Repair parts are listed and illustrated in the Repair Parts and Special Tools List for Fuel Handling Hoseline Outfit, TM 10-3835-219-24P

Section II. DIRECT SUPPORT MAINTENANCE

5-3. **General.** This section contains direct support maintenance procedures as authorized by the MAC in Appendix B of this manual.

5-4. Displacement and Evacuation and Repair Kit Chest Assemblies.

This task consists of: Repair

INITIAL SET-UP

Tools
Drill (Appendix B, Section III, Item 2)
Riveter (Appendix B, Section III, Item 3)

Materials/Parts
Solvent, Dry Cleaning (Item 7, Appendix E)
Rags, Wiping (Item 5, Appendix E)

Materials/Parts(cont)
Rivets (refer to TM 10-3835-219-24P)

Equipment Condition
Kit components removed (para 3-7)

Repair. (figure 5-1)

NOTE

For Model ADC-1200, components of the displacement and evacuation kit and repair kit are stored in one chest assembly. For Models 1461 and FIHK-100, components of the displacement and evacuation kit and repair kit are stored in two separate chest assemblies. The size of each chest assembly varies. The repair of each chest is the same.

(1) Inspect all components and chest assembly and replace if damaged.

(2) Drill out rivets (1) on each side of chest and disconnect lid supports (2).

(3) While supporting lid (3), drill out rivets (7) attaching hinge (5) to chest (6) and remove lid.

(4) Place lid (3) on bench and drill out rivets (7) attaching hinge (5) to lid (3).

(5) Drill out rivets (8) on each side of lid and disconnect lid support (2) from lid (3) and remove support.

(6) Drill out rivets (9) attaching handles (10) to chest (6) and remove handles.

(7) Drill out rivets (11) attaching lower latch half (12) to chest (6) and remove latch half.

(8) Drill out rivets (13) attaching upper latch half (14) to lid (3) and remove latch half.

(9) Weld any cracks, breaks or holes in chest (6) and partitions (15)

WARNING

Dry cleaning solvent used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100 °F-138°F (38°C-60°C).

(10) Clean all items with dry cleaning solvent, and dry thoroughly.

(11) Align rivet holes and clamp upper latch (14) to lid (3) and rivet latch to lid with rivets (13).

(12) Align rivet holes and clamp lower latch (12) to chest (6) and rivet latch to chest with rivets (11).

(13) Align rivet holes and clamp handles (10) to chest (6) and rivet handles to chest with rivets (9).

(14) Align rivet holes and clamp lid supports (2) to lid (3) and rivet lid supports to lid with rivets (8).

(15) Align rivet holes and clamp hinge (5) to lid (3) and rivet hinge to lid with rivets (7).

(16) Align rivet holes and clamp hinge (5) to chest (6) and rivet hinge to chest with rivets (4).

(17) Align rivet holes and clamp lid support (2) to chest (6) and rivet lid supports to chest with rivets (1).

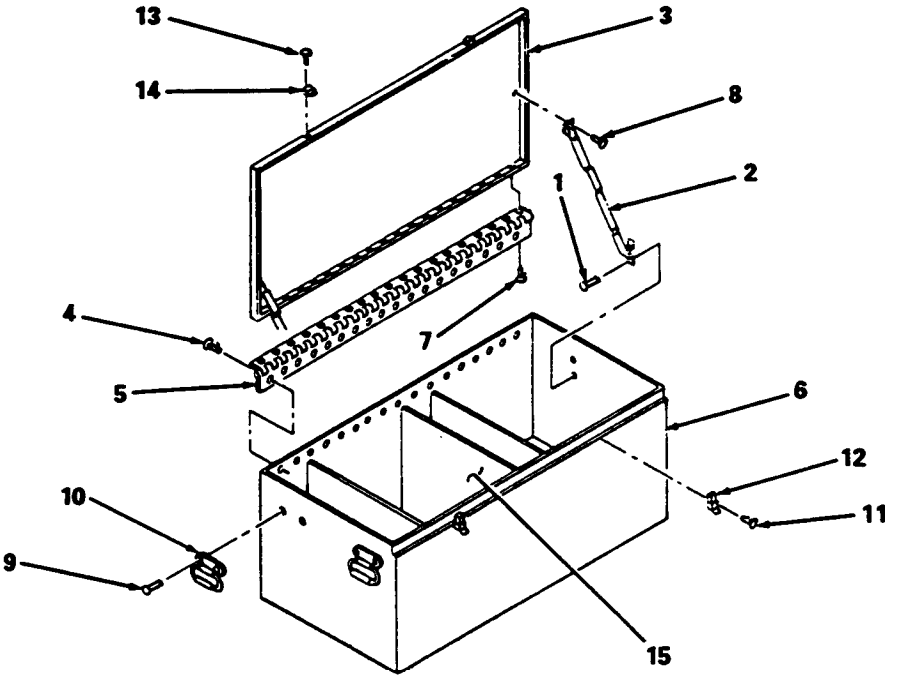


Figure 5-1. Displacement and Evacuation and Repair Kit Chest Assembly Repair.

5-5. Suspension and Packing Kits Chest Assembly.

This task consists of: Repair

INITIAL SET-UP

Tools
Drill (Appendix B, Section III, Item 2)
Riveter (Appendix B, Section III, Item 3)

Materials/Parts
Solvent, Dry Cleaning (Item 7, Appendix E)
Rags, Wiping (Item 5, Appendix E)

Materials/Parts(cont)
Rivets (Refer to TM 10-3835-219-24P)

Equipment Condition
Kit components removed (para 3-7)

Repair. (figure 5-2)

NOTE

For Model ADC-1200, components of the suspension and packing kits are stored in one chest assembly. For Models 1461 and FIHK-100, components of the suspension kit and packing kit are stored in two separate chest assemblies. The repair of each chest is the same.

(1) Inspect all components and chest assembly and replace if damaged.

(2) Drill out rivets (1) on each side of chest and disconnect lid supports (2).

(3) While supporting lid (3), drill out rivets (7) attaching hinge (5) to chest (6) and remove lid.

(4) Place lid (3) on bench and drill out rivets (7) attaching hinge (5) to lid (3).

(5) Drill out rivets (8) on each side of lid and disconnect lid support (2) from lid (3) and remove support.

(6) Drill out rivets (9) attaching handles (10) to chest (6) and remove handles.

(7) Drill out rivets (11) attaching lower latch half (12) to chest (6) and remove latch half.

(8) Drill out rivets (13) attaching upper latch half (14) to lid (3) and remove latch half.

(9) Weld any cracks, breaks or holes in chest (6) and partitions (15)

WARNING

Dry cleaning solvent used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100 °F-138°F (38°C-60°C).

(10) Clean all items with dry cleaning solvent, and dry thoroughly.

(11) Align rivet holes and clamp upper latch (14) to lid (3) and rivet latch to lid with rivets (13).

(12) Align rivet holes and clamp lower latch (12) to chest (6) and rivet latch to chest with rivets (11).

(13) Align rivet holes and clamp handles (10) to chest (6) and rivet handles to chest with rivets (9).

(14) Align rivet holes and clamp lid supports (2) to lid (3) and rivet lid supports to lid with rivets (8).

(15) Align rivet holes and clamp hinge (5) to lid (3) and rivet hinge to lid with rivets (7).

(16) Align rivet holes and clamp hinge (5) to chest (6) and rivet hinge to chest with rivets (4).

(17) Align rivet holes and clamp lid supped (2) to chest (6) and rivet lid support to chest with rivets (1).

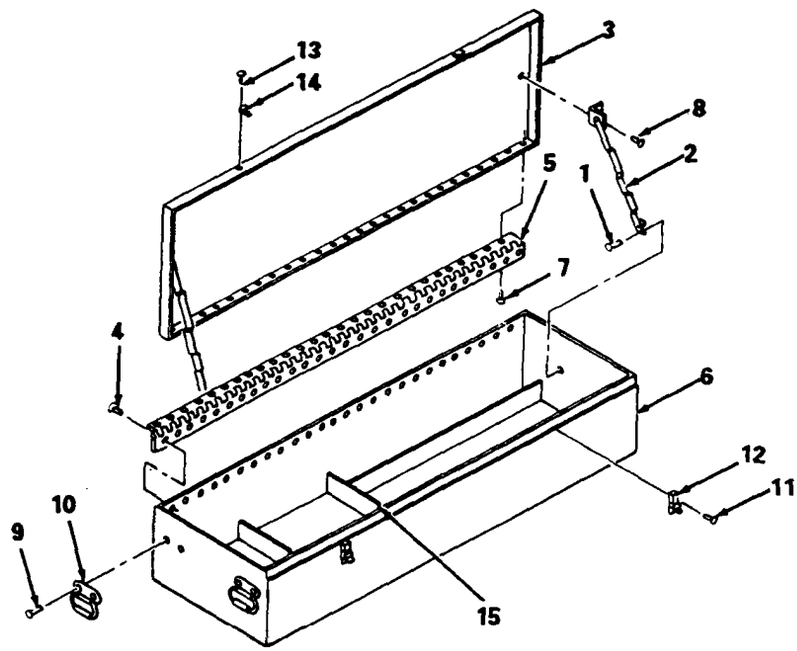


Figure 5-2. Suspension and Packing Kits Chest Assembly Repair.

5-6. Flow Control Kit Chest Assembly.

This task consists of: Repair

INITIAL SET-UP

Tools
Drill (Appendix B, Section III, Item 2)
Riveter (Appendix B, Section III, Item 3)

Materials/Parts
Solvent, Dry Cleaning (Item 7, Appendix E)
Rags, Wiping (Item 5, Appendix E)

Materials/Parts(cont)
Rivets (Refer to TM 10-3835-219-24P)

Equipment Condition
Kit components removed (para 3-7)

Repair. (figure 5-2)

NOTE

The flow control kit chest assembly is made up of three chest assemblies. One chest assembly for Model ADC-1200 and two chest assemblies for Model 1461. Components of the flow control kit for Model FIHK-100 are contained in one chest assembly. The size of each chest assembly varies. The repair of each chest assembly is the same.

(1) Inspect all components and chest assembly and replace if damaged.

(2) Drill out rivets (1) on each side of chest and disconnect lid supports (2).

(3) While supporting lid (3), drill out rivets (7) attaching hinge (5) to chest (6) and remove lid.

(4) Place lid (3) on bench and drill out rivets (7) attaching hinge (5) to lid (3).

(5) Drill out rivets (8) on each side of lid and disconnect lid support (2) from lid (3) and remove support.

(6) Drill out rivets (9) attaching handles (10) to chest (6) and remove handles.

(7) Drill out rivets (11) attaching lower latch half (12) to chest (6) and remove latch half.

(8) Drill out rivets (13) attaching upper latch half (14) to lid (3) and remove latch half.

(9) Weld any cracks, breaks or holes in chest (6) and partitions (15)

WARNING

Dry cleaning solvent used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F-138°F(38°C-60°C).

(10) Clean all items with dry cleaning solvent, and dry thoroughly.

(11) Align rivet holes and clamp upper latch (14) to lid (3) and rivet latch to lid with rivets (13).

(12) Align rivet holes and clamp lower latch (12) to chest (6) and rivet latch to chest with rivets (11).

(13) Align rivet holes and clamp handles (10) to chest (6) and rivet handles to chest with rivets (9).

(14) Align rivet holes and clamp lid supports (2) to lid (3) and rivet lid supports to lid with rivets (8).

(15) Align rivet holes and clamp hinge (5) to lid (3) and rivet hinge to lid with rivets (7).

(16) Align rivet holes and clamp hinge (5) to chest (6) and rivet hinge to chest with rivets (4).

(17) Align rivet holes and clamp lid support (2) to chest (6) and rivet lid support to chest with rivets (1).

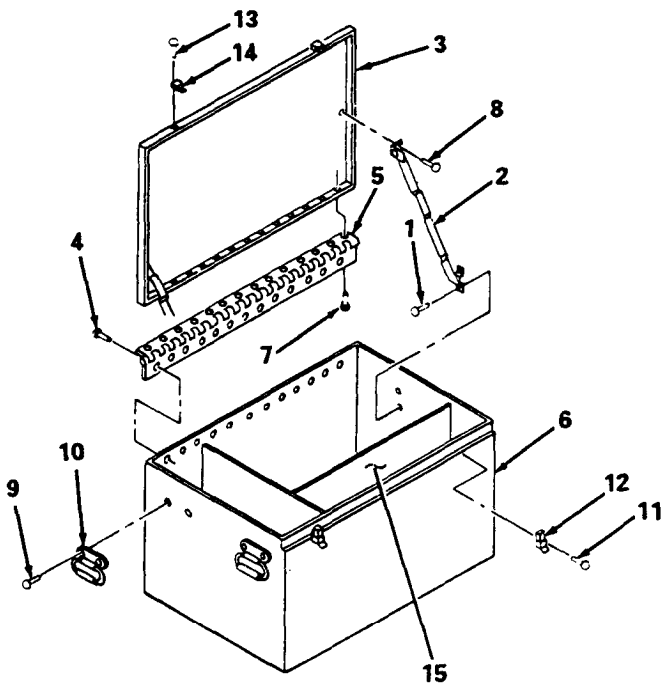


Figure 5-3. Flow Control Kit Chest Assembly, Repair.

CHAPTER 6

GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

OVERVIEW

This chapter provides procedures for maintenance of the fuel Handling Hoseline Outfit by General Support maintenance personnel.

Section I. REPAIR PARTS; SPECIAL TOOLS; TEST, MEASUREMENT, DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

6-1. **Special Tools, TMDE and Support Equipment.** For a listing of special tools, TMDE, and support equipment authorized for use on this equipment, refer to the Repair Parts and Special Tools List, TM 10-3835-219-24P and the Maintenance Allocation Chart (MAC), Appendix B of this manual.

6-2. **Repair Parts.** Repair parts are listed and illustrated in the Repair Parts and Special Tools List for Fuel Handling Hose line Outfit, TM 10-3835-219-24P.

Section II. GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

6-3. **General.** This section contains general support maintenance procedures as authorized by the MAC in Appendix B of this manual.

6-4. Sling Assembly.

This task covers: a. Repair b. Test

INITIAL SETUP

Tools	*Materials/Parts*
General Mechanics Tool Kit (Appendix B, Section III, item 1	Solvent, Dry Cleaning (Item 17, Appendix E) Rags, Wiping (Item 10, Appendix E)

a. *Replace.* (figure 6-1)

(1) Remove eight U-bolt nuts (1) and four washers (2).

(2) Remove two U-bolts (3) from spreader bar (4) and release upper leg assembly (5).

(3) Slide lower leg assemblies (6) and support rings (7) from spreader bar (4).

WARNING

Wear eye protection when blowing solvent from parts. Compressed air used for cleaning purposes must not exceed 30 psi (2.1 kg/cm^2). Do not direct compressed air against the skin. Use goggles or full face shield.

Potential health hazards result from inhalation of petroleum solvent vapors and from contact of solvent with skin. Use rubber gloves and hand cream for protection, and work with adequate ventilation.

Dry cleaning solvent PD-680 used to clean park is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100ºF-138ºF (38ºC-60ºC).

(4) Clean sling assemblies components with dry cleaning solvent and dry thoroughly.

(5) Inspect sling lift rings for cracks or breaks and replace if damaged.

(6) Inspect U-bolts (3) for cracks or breaks and replace if damaged.

(7) Inspect lower leg assemblies (6) for broken strands, worn thimbles (8) and replace if damaged.

(8) Inspect lift hooks (9) for cracks, breaks and distortions. Inspect throat opening of hooks. If opening is more than 15 percent in excess of nominal, more than a 10 degree twist from the plane of the unbent hook, or wear exceeds 10 percent of the original dimension, or if damaged, replace hooks.

(9) Inspect wire rope for broken or worn outside wires, reduction of rope diameter below nominal value, corroded, broken, or frayed wires at end connections. Check for severe kinking, crushing, cutting or unstranding. Replace wire rope if damaged.

(10) Inspect spreader bar (4) for cracks, or breaks and replace if damaged.

(11) Slide lower leg assemblies support rings (7) onto spreader bar (4).

(12) Align rings (7) between U-bolt holes and install u-bolts (3) through thimbles (8) of upper leg assemblies (5).

(13) Install U-bolts (3) through holes in spreader bar (4) and secure with four washers (2) and eight nuts (1). Torque nuts to 165 ft-lbs (20.29 m).

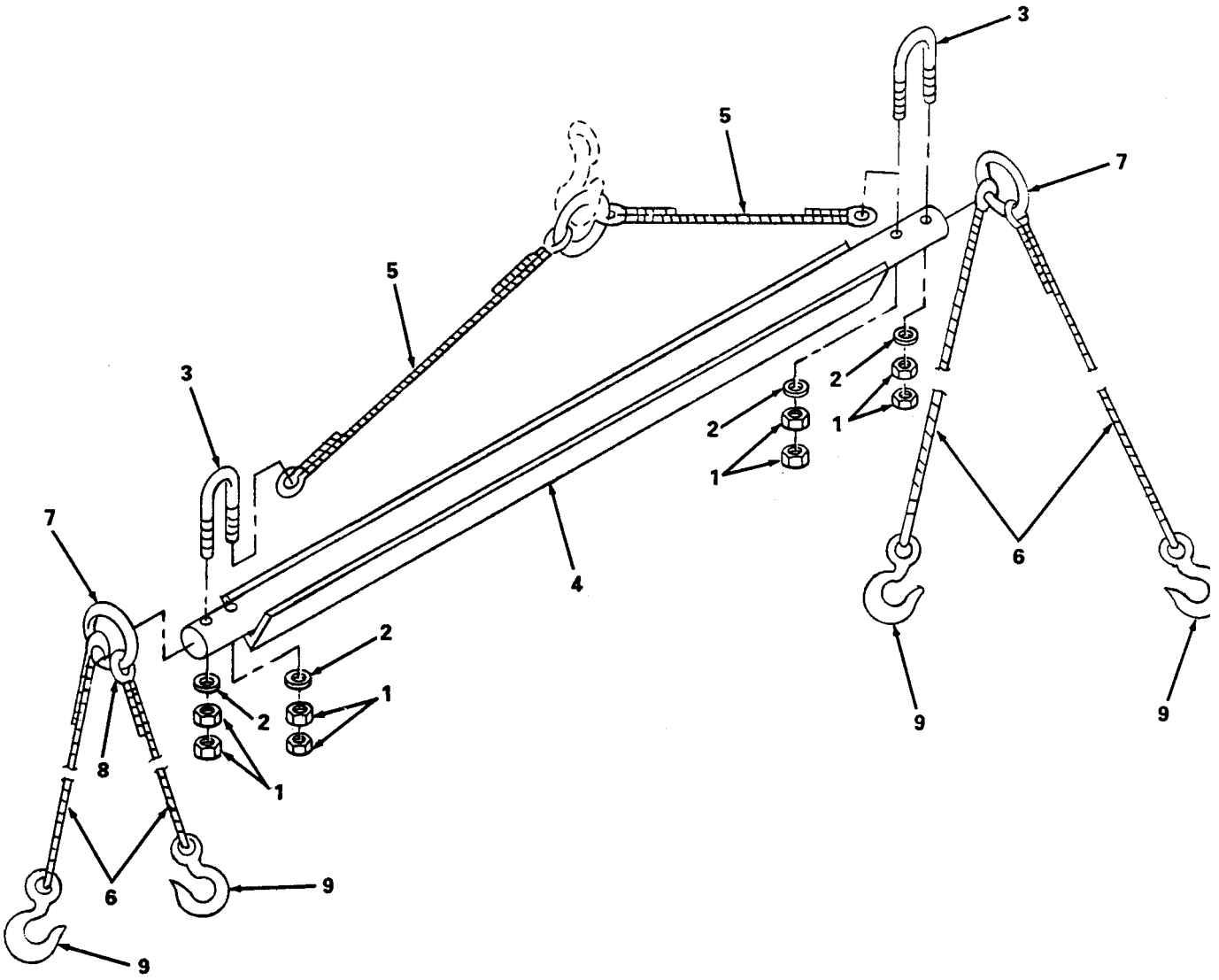


Figure 6-1. Sling Assembly, Repair.

b. Testing.

(1) Upon completion of repair to a sling assembly it must be load tested at 6,000 pounds (2,700 Kg).

(2) Test loads may be a calibrated load indicator, a calibrated dynamometer, weights that maybe locally fabricated, or any available item of proper weight.

(3) All load testing devices, such as a load indicator or dynamometer, shall have a valid calibration label affixed in a noticeable place.

(4) All locally fabricated weights and available items used for load testing must be verified for proper weight by the use of a calibrated scale.

WARNING

Stand clear of load being lifted in case of failure to lift sling or lift device.

(5) Load test assembly by lifting a 6,000 pound (2,700 kg) weight.

(6) Upon successful completion of a load test, sling assembly will be assigned a load rating of 100 percent.

(7) The load rating shall become a part of the maintenance records of the equipment and entered in accordance with DA PAM 738-750, The Army Maintenance Management System (TAMMS)

6-5. Chain Hoist.

This task covers: a. Repair b. Test

INITIAL SETUP

Tools	*Materials/Parts*
General Mechanics Tool Kit (Appendix B, Section III, Item 1)	Solvent, Dry Cleaning (Item 17, Appendix E) Rags, Wiping (Item 10, Appendix E) Oil, Lubricating (Item 6, Appendix E)

a. Repair. (figure 6-2)

(1) *Disassembly.*

(a) Remove four nuts (1) and washers (2) securing gear case (3) and remove gear case (3).

(b) Remove split pin (4) slotted nut (5) and washer (6).

(c) Remove free wheeling knob (7) and cam guide (8).

(d) Slide grip (9) off lever assembly.

(e) Remove nut (10), screw (11) and washer (12).

(f) Remove three screws (13) and washers (12). Remove outside half of lever assembly (14) with nameplate (15) installed.

(g) Remove change-over spring (16), spring shaft (17), change-over panel (18) and female thread assembly (19). Then, remove inside half of lever assembly (14).

(h) Remove four nuts (20) and washers (21) attaching brake cover (22) to slide plate A assembly (35). Remove brake cover (22).

(i) Remove two friction plates (23) and ratchet disc (24).

(j) Remove top pin (25), then remove top hook assembly (26) with safety lever assembly (27) installed.

(k) Remove two snap rings (28), two pawls (29) and two pawl springs (30).

(l) Remove pinion (31), spring seat (32), coil spring (33) and friction disc (34).

(m) Remove slide plate A assembly (35).

(n) Remove guide rollers (36), two stripper collars (37), stripper (38), load chain (39) with bottom hook assembly installed.

(o) Remove split pin (40), slotted nut (41) and chain pin (42) to remove bottom hook assembly (43) and safety assembly (27)

(p) Remove chain stopper link (44) only when required.

(q) Remove load sheave (45), two No. 2 gears (46), and load gear (47) from slide plate B assembly (48).

WARNING

Wear eye protection when blowing solvent from parts. Compressed air used for cleaning purposes must not exceed 30 psi (2.1 kg/cm^2). Do not direct compressed air against the skin. Use goggles or full face shield.

Potential health hazards result from inhalation of petroleum solvent vapors and from contact of solvent with skin. Use rubber gloves and hand cream for protection, and work with adequate ventilation.

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100ºF-138ºF (38ºC-60ºC).

(r) Clean all components with dry cleaning solvent and dry thoroughly.

(s) Inspect all gears for damage or excessive wear. Replace if worn or damaged.

(t) Inspect for bent or damaged hooks. Replace bent or damaged hooks.

(u) Inspect chain for twists, excessive wear or damage. Replace if worn or damaged.

(v) Inspect all components for damage or excessive wear. Replace worn or damaged component.

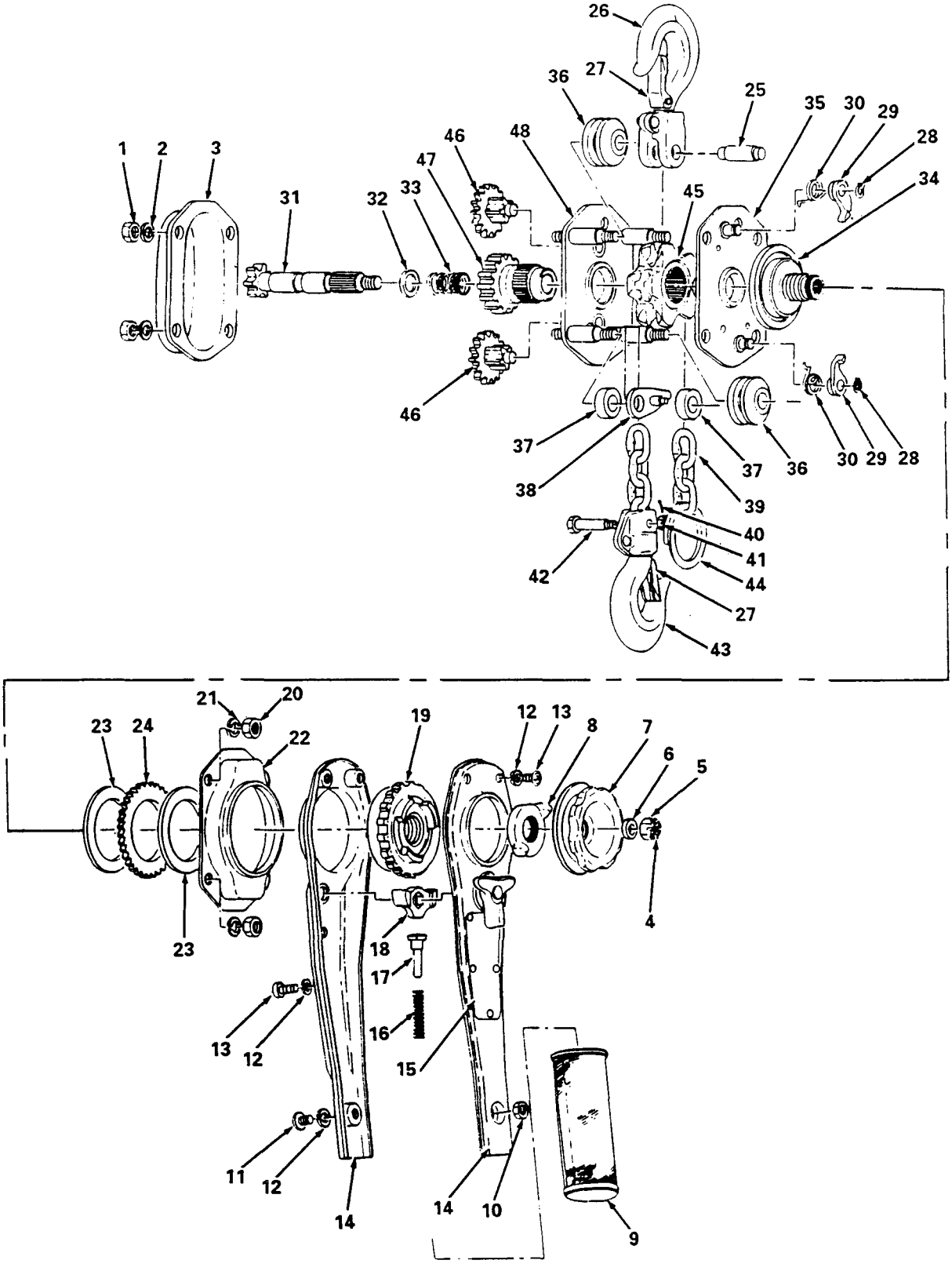


Figure 6-2. Chain Hoist, Disassembly.

(2) *Assembly.* (figure 6-3)

(a) Install load gear (47), two No. 2 gears (46) and load sheave (45) in slide plate B assembly (48).

(b) Attach chain stopper link (44), if removed.

(c) Position bottom hook assembly (43) and safety assembly (27) and secure with chain pin (42), slotted nut (41) and split pin (40).

(d) install load chain (39), stripper (38), two stripper collars (37) and guide rollers (36).

(e) Position slide plate A assembly (35).

(f) Install friction disc (34), coil spring (33), spring seat (32) and pinion (31).

(g) Install two pawl springs (30), pawls (29) and secure with snap rings (28).

(h) Position top hook assembly (26) and safety lever assembly (27) and secure with top pin (35).

(i) Install one friction plate (23), ratchet disc (24) and remaining friction plate (23).

(j) Position brake cover (22) to slide plate A assembly and secure with four washers (21) and nuts (20).

(k) Position inside half of lever assembly (14). Then, install female thread assembly (19), change-over pawl (18), spring shaft (17) and change-over spring (16).

(l) Position outside half of lever assembly (14), with nameplate (15), and secure with three washers (12) and screws (13).

(m) Install one washer (12), screw (11) and nut (10).

(n) Slide grip (9) on lever assembly.

(o) Install cam guide (8) and free wheeling knob (7).

(P) Install washer (6), slotted nut (5) and split pin (4).

(q) Position gear case (3) and secure with four washers (2) and nuts (1).

(r) Lubricate per paragraph 3-1.c.

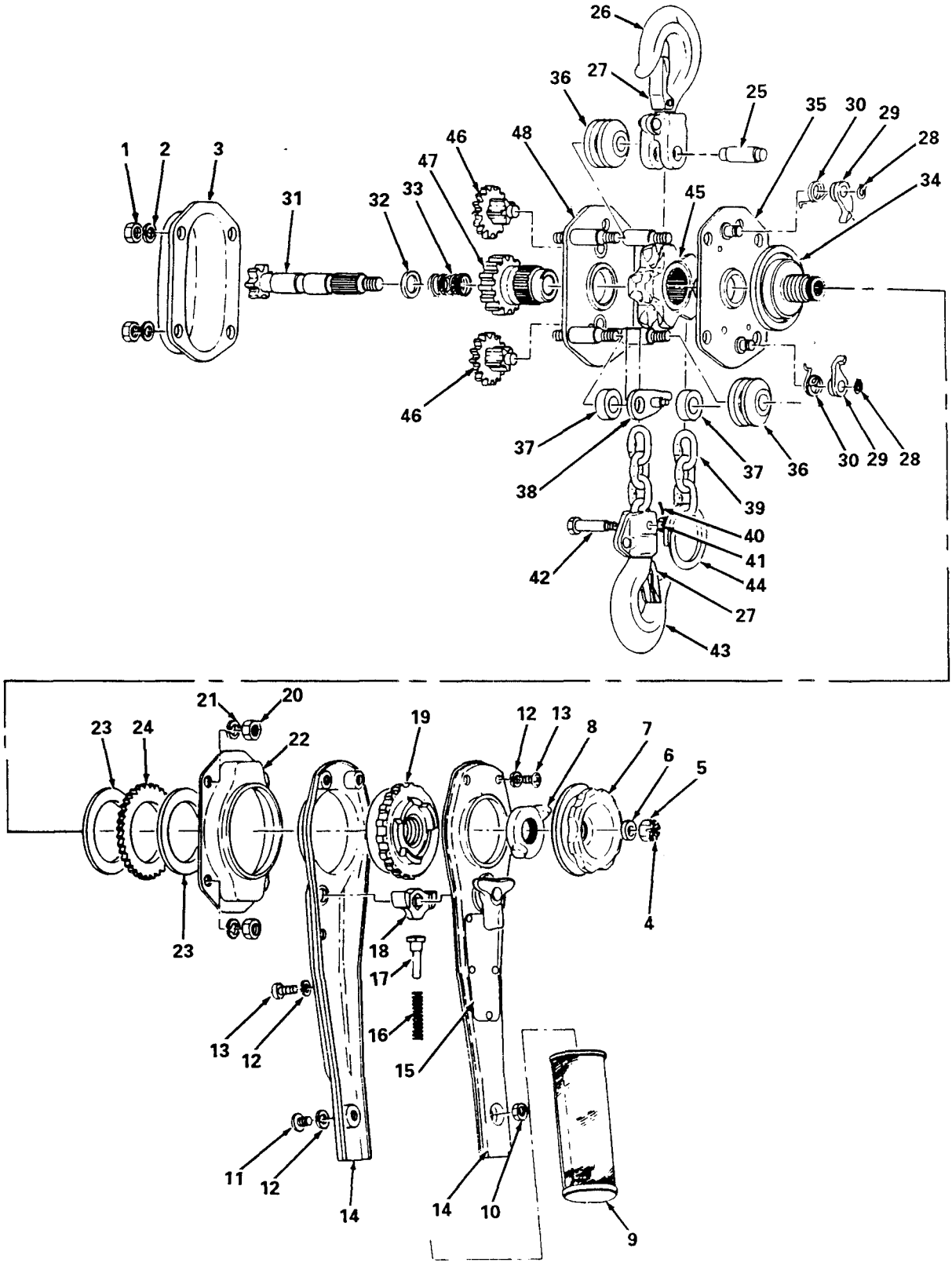


Figure 6-3. *Chain Hoist, Assembly.*

b. *Test.*

(1) Upon completion of repair to a chain hoist, it must be static overload tested at 3000 pounds (1,362 kg).

(2) Suspend hoist chain extended. Raise load approximately 12 inches.

(3) Hold suspended test load by using hoist brake, for a period of 10 minutes.

(4) Evidence of failure or permanent deformation of hoist parts shall be cause for rejection of static overload test.

(5) Perform dynamic overload test by loading hoist to 3,750 pounds (1,730 kg) then, hoist and lower the load.

(6) With test load clear of ground, operate in each direction, a minimal length of 1 foot of load chain. Perform at a minimum hand speed of 10 feet per minute (ft/min).

(7) Evidence of failure, permanent deformation or excessive wear of hoist parts shall be cause for rejection of dynamic overload test.

(8) Test hoist efficiency by loading hoist to 1500 pounds, then raise and load through any conveniently measured distance.

6-6. Gate Valve Assembly (Model ADC-1200 and 1461).

This task consists of Repair

INITIAL SET-UP

Materials/Parts
- Oil, Lubricating (Item 3, Appendix E)
- Solvent, Dry Cleaning (Item 7, Appendix E)
- Rags, Wiping (Item 5, Appendix E)

Materials/Parts (cont)
- Packing (Refer to TM10-3835-219-24P)
- Gasket (Refer to TM10-3835-219-24P)

Repair. (figure 6-4)

(1) Remove nut (1) securing handwheel (2) and remove handwheel.

(2) Remove packing nut (3), spring (4), and packing gland (5).

(3) Remove and discard packing (6).

(4) Remove eight capscrews (7) and lockwashers (8).

(5) Remove bonnet (9) from body (10).

(6) Remove and discard gasket (11).

(7) Remove valve stem (12), disc stem (13), two valve seats (14), and two discs (15) from body (10).

WARNING

Prior to the cleaning of any parts have an industrial hygienist or safety personnel review the procedures and personal protective equipment to be used in the cleaning operations.

Potential health hazards result from inhalation of petroleum solvent vapors and from contact of solvent with skin. Use rubber gloves and hand cream for protection, and work with adequate ventilation.

Dry cleaning solvent used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F-138°F (38°C-60°C).

(8) Clean valve assembly components with dry cleaning solvent and dry thoroughly.

(9) Inspect packing nut (3), replace if cracked or damaged.

(10) Inspect components for damage. Replace worn or damaged components.

(11) Install valve stem (12), disc stem (13), and two discs (15) into bonnet (9).

(12) Install two valve seats (14) into body (10).

(13) Install bonnet (9) with new gasket (11) on body (10) and secure with eight capscrews (7) and lockwashers (8).

(14) Apply a light coat of general purpose oil to valve stem (12) and slide new packing (6)into bonnet.

(15) Install packing gland (5), spring (4) and packing nut (3). Thread packing nut (3) onto bonnet (9) until secure.

(16) Install handwheel (2) and secure with nut (1).

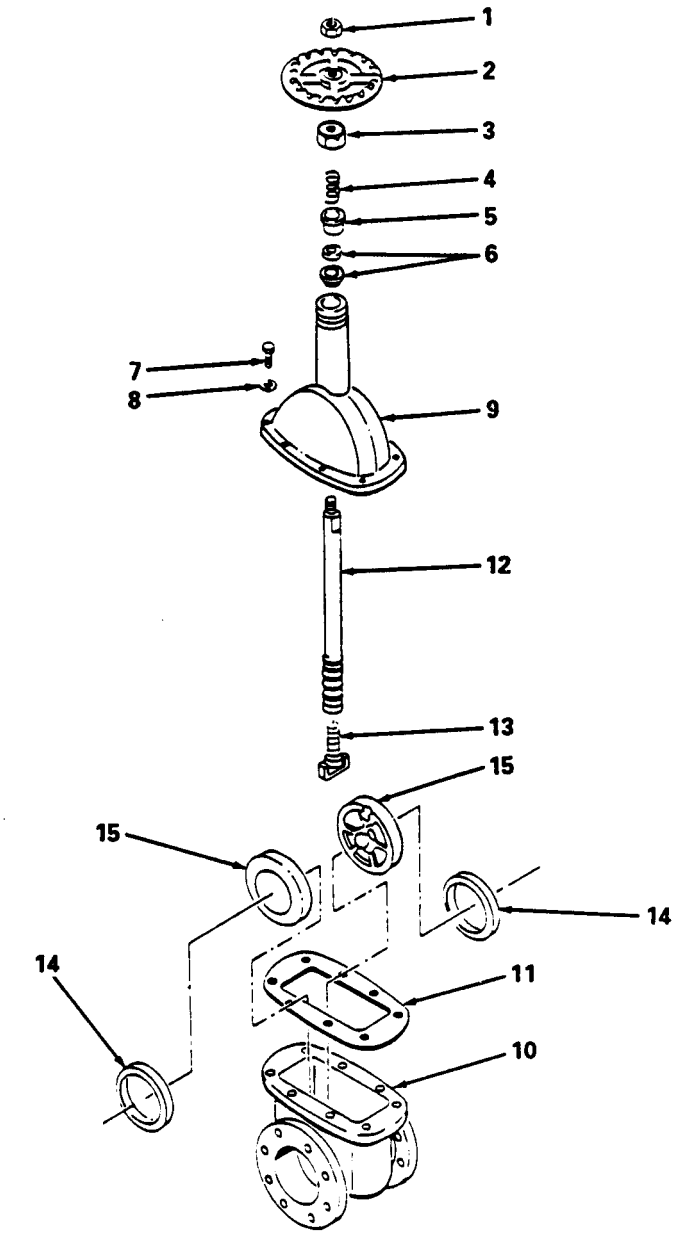


Figure 6-4. Gate Valve Assembly, Repair (Models ADC-1200 and 1641).

6-7. **Gate Valve Assembly (Model FIHK-100).**

This task consists of: a. Disassembly b. Cleaning c. Inspection d. Repair e. Assembly

INITIAL SET-UP4	
Material/Parts:	*Tools:*
Wiping Rag (Item 5, App E)	General Mechanics Tool Kit (Item 1, App B)
Lockwasher (16) (Item 13, App E)	Equipment Condition:
Lockwasher (8) (Item 16, App E)	Gate valve assembly removed
Packing Ring (Item 14, App E)	
Flange Gasket (Item 12, App E)	
Bonnect Gasket (Item 15, App E)	

NOTE

Ensure that all parts identified as mandatory replacement parts are discarded and replaced with new components.

a. *Disassembly.*

Remove gate valve. Refer to figure 6-5.

(1) Remove eight nuts (1), lockwashers (2), flat washers (3), screws (4) and flat washers (5).

(2) Separate adapter (6) and gasket (7) from gate valve (15).

(3) Remove eight nuts (8), lockwashers (9), flat washers (10), screws (11) and flat washers (12).

(4) Separate adapter (13) and gasket (14) from gate valve (15).

Disassemble gate valve. Refer to figure 6-6.

(5) Remove nut (1) and handwheel (2) from stem (13).

(6) Remove packing nut (3), gland spring (4), packing gland (5) and packing ring (6) from top of bonnet(n)

(7) Remove eight nuts (7), lockwashers (8), screws (9) and flat washers (10) from valve body (18) and bonnet (11).

NOTE

If needed, tap bonnet with mallet to loosen sealing surfaces.

(8) Remove bonnet (11), gasket (12), and attached parts from valve body (18).

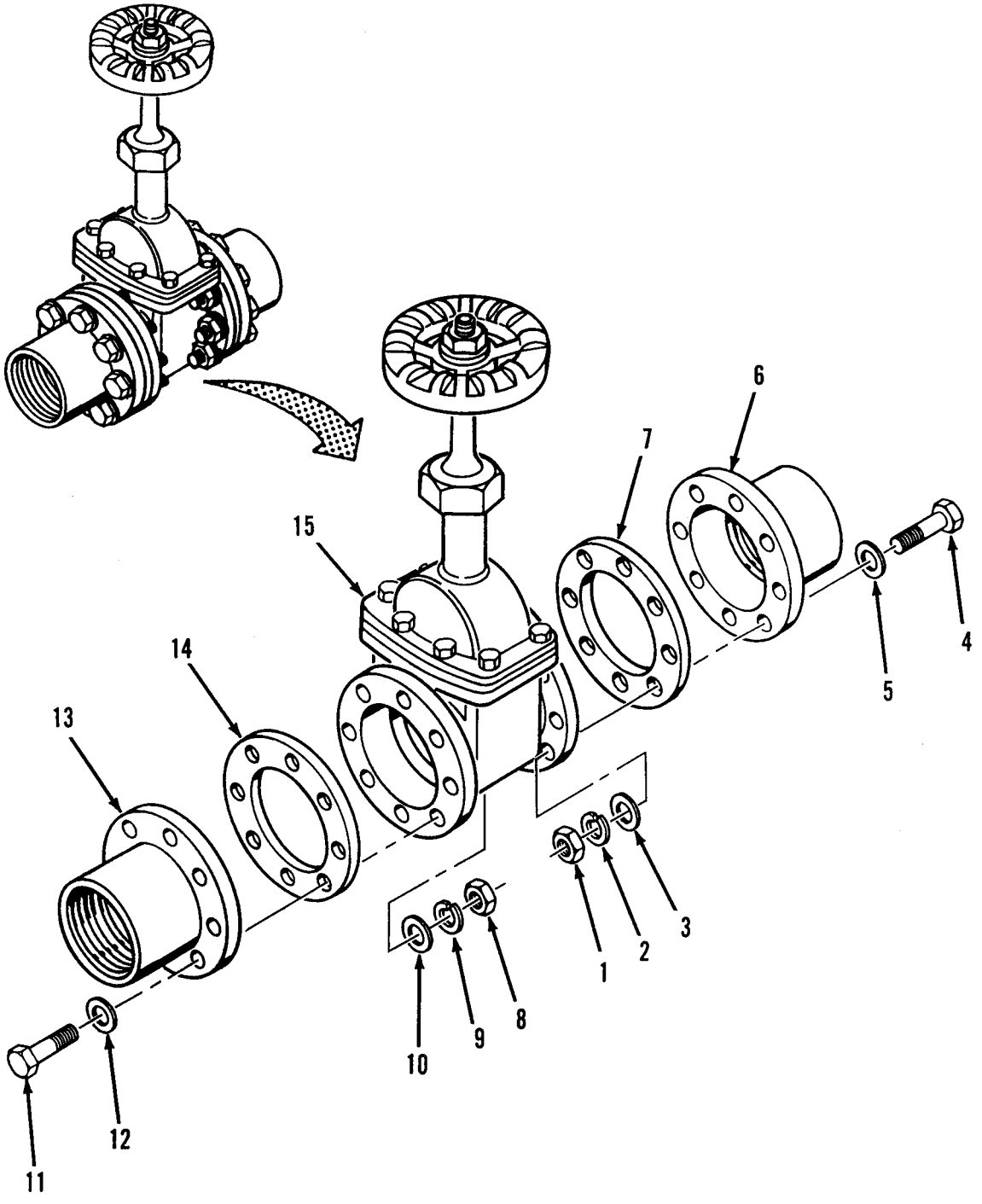


Figure 6-5. Gate Valve Disassembly (Model FIHK-100).

(9) Remove two screws (14) and separate discs (15 and 16) from disc riser (17).

(10) Remove disc riser (17) from stem (13).

(11) Unscrew stem (13) from bottom of bonnet (1 1).

b. Cleaning.

WARNINGS

- Prior to the cleaning of any parts, have an industrial hygienist or safety personnel review the procedures and personal protective equipment to be used in the cleaning operation.
- Potential health hazards result from inhalation of petroleum solvent vapors and from contact of solvent with skin. Use rubber gloves and hand cream for protection, and work with adequate ventilation.
- Dry cleaning solvent, used to clean parts, is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F-138°F (38°C-60°C).

(1) Clean all valve components with dry cleaning solvent

(2) Dry components with clean wiping rag.

c. Inspection.

(1) Inspect bonnet (11) and valve body (18) for cracks, scored mating surfaces, stripped threads and corrosion.

(2) Inspect for bent stem (13) and galled or stripped threads.

(3) Inspect sealing surfaces of discs (15 and 16) and valve body (18) for deep scratches and cracks.

(4) Inspect adapters (6 and 13, figure 6-5) for cracks and damaged sealing surfaces.

d. Replace. damaged or defective parts. Replace all sealing Components.

e. Assembly.

Assemble gate valve. Refer to figure 6-6.

(1) Screw stem (13) all the way into bottom of bonnet (11), then back out stem three full turns. Do not allow stem to move from this position.

(2) While holding stem (13) in place, screw disc riser (17) onto stem until bottom of riser is flush with end of stem.

(3) Position discs (15 and 16) on riser (17) and install two screws (14).

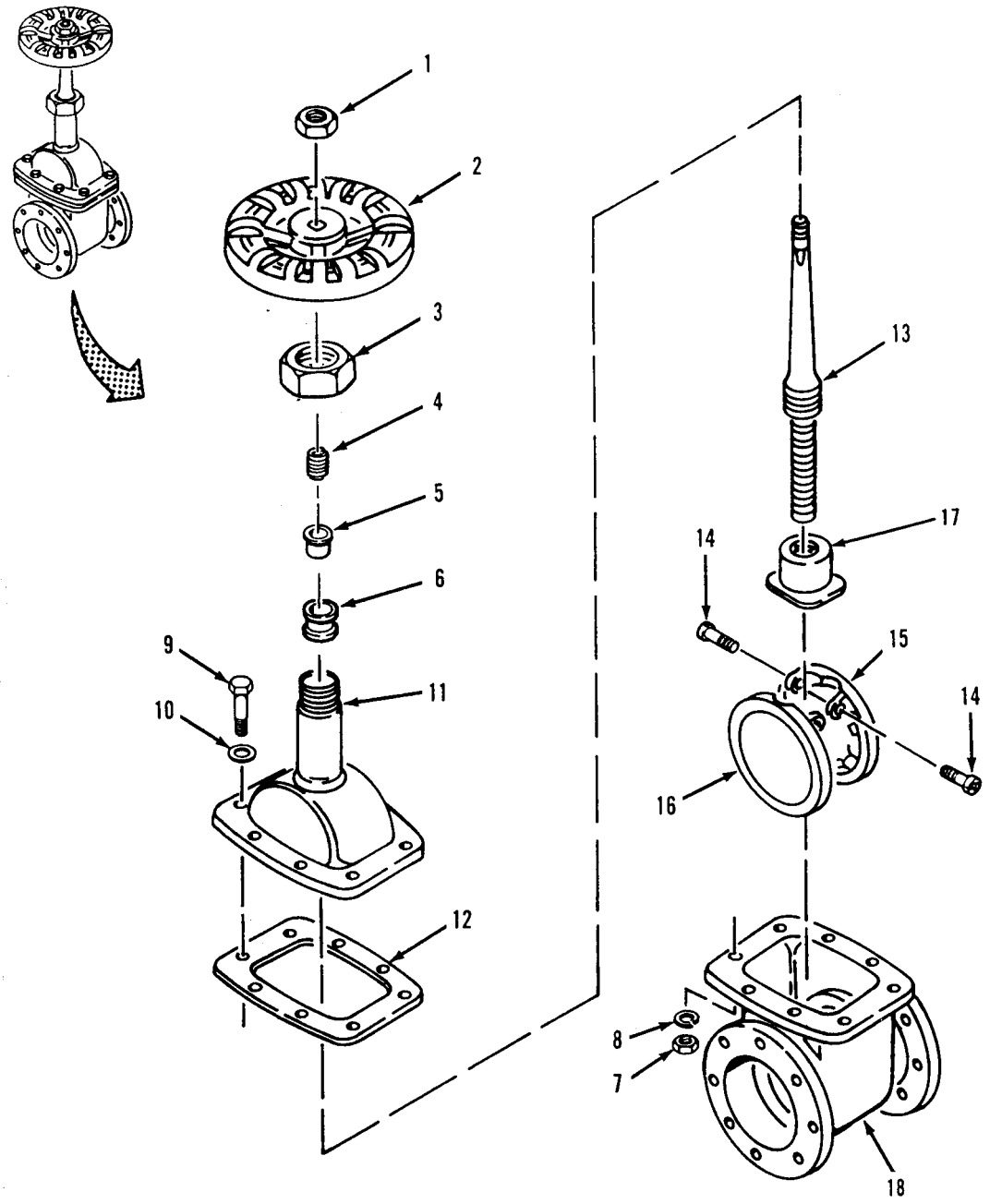


Figure 6-6. Gate Valve Repair (Model FIHK-100).

(4) While preventing stem (13) from turning in bonnet (11), turn discs (15 and 16) and riser (17) left (counterclockwise) onto stem util top of discs contact flanged bottom of bonnet.

(5) Position gasket (12) on valve body (18).

(6) While holding stem (13) in position, lower bonnet (11) and discs (15 and 16) into valve body (18). Do not rotate discs more than 1/4 turn to aline discs with body.

(7) Install eight flat washers (10), screws (9), lockwashers (8) and nuts (7) in valve body (18) and bonnet (11).

(8) Slide packing ring (6) over stem (13) and down into bonnet (11).

(9) Slide packing gland (5) and gland spring (4) over stem (13).

(10) Slide packing nut (3) over stem (13) and tighten onto top of bonnet (11).

(11) Position handwheel (2) on stem (13) and secure with nut (1).

Install gate valve. Refer to figure 6-5.

(12) Position gasket (14) and adapter (13) on gate valve (15).

(13) Install eight flat washers (12), screws (11), flat washers (10), lockwashers (9) and nuts (8).

(14) Position gasket (7) and adapter (6) on gate valve (15).

(15) Install eight flat washers (5), screws (4), flat washers (3), lockwashers (2) and nuts(1).

(16) Install gate valve in fuel system and check for leaks.

APPENDIX A

REFERENCES

A-1. **Scope.** This appendix contains all forms, lubrication orders, pamphlets and technical manuals referenced in this manual.

A-2. **Forms.**

Equipment Inspection and Maintenance Worksheet . . . .DA Form 2404
Recommended Changes to Publications . . . .DA Form 2028-2
Transportation Discrepancy Report (TDR) . . . . .SF 361
Report of Discrepancy (ROD) . . . . . .SF 364 . . . .
Quality Deficiency Report (QDR) . . . . . .SF 368

A-3. **Pamphlets.**

The Army Maintenance Management System (TAMMS) . . . .DA Pam 738-750
Consolidated Index of Army Publications and Blank Forms . . . .DA Pam 25-30

A-4. **Technical Manuals.**

Operator's, Unit, Intermediate Direct Support and Intermediate General Support Maintenance Repair Parts and Special Tools List . . . . . .TM 10-3835-219-24P
Preparation for Storage or Shipment . . . .TM 38.230
Destruction of Army Equipment . . . .TM 750-244-3

A-5. **Technical Bulletins.**

Safety Inspection and Testing of Lifting Devices . . . .TB 43-0142

A-6. **Safety .. . .** FM21-11

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. **Maintenance Allocation Chart (MAC).** This MAC assigns maintenance functions in accordance with the Three Level Maintenance Concept.

B-2. **Use of the Maintenance Allocation Chart, Section II.**

a. The MAC assigns maintenance functions based on the following considerations:

(1) Skills available.

(2) Work time required.

(3) Tools and test equipment required and/or available.

b. If a lower level of maintenance identified in column (4) of the MAC cannot perform all tasks of a single maintenance function (e.g., test, repair), then the higher level that can perform other tasks of that function is also indicated.

c. Higher maintenance levels are automatically authorized to perform maintenance functions assigned to a lower maintenance level.

d. Higher maintenance levels will perform the maintenance functions of lower maintenance levels when required or directed by the Command who has authority to direct such tasking.

e. Assignment of a maintenance function in the MAC does not carry automatic authorization to carry the related spare or repair parts in stock. Information to requisition or secure parts will be as specified in the associated RPSTL.

f. Normally, there will be no deviation from the assigned level of maintenance. However, in cases of operational necessity, maintenance functions assigned a higher level may, at the request of the lower level, be assigned to the lower level on a one-time basis, if specifically authorized by the maintenance officer of the higher level to which the function is assigned. In such a case, the special tools, equipment, etc., required by the lower level to perform this function will be furnished by the higher level assigned the function. Also, transfer of a function to a lower level does not relieve the higher level of responsibility for the function, so the higher level will provide technical supervision and inspection of the function being performed at the lower level.

B-3. **Maintenance Functions.** Maintenance functions will be limited to and defined as follows:

a. *Inspect.* To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. *Test.* To verify serviceability an detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. *Service.* Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate), to preserve, to drain, or to replenish fuel, lubricants, chemical fluids, or gases.

d. *Adjust.* To maintain within prescribed limits, by bringing into proper or exact position, or besetting the operating characteristics to the specified parameters.

e. *Aline.* To adjust specified variable elements of an item to bring about optimum or desired performance.

f. *Calibrate.* To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipment used in precision measurement. Consists of comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. *Install.* The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. *Replace.* The act of substituting a serviceable like type part, a subassembly, or module (component or assembly) for an unserviceable counterpart.

i. *Repair.* The application of maintenance services (inspect, test, service, adjust, aline, calibrate, or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j *Overhaul.* The maintenance effort (service/action) necessary to restore an item to a completely serviceable operational condition as prescribed by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul does not normally return an item to a like new condition.

k. *Rebuild.* Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

B-4. Explanation of Columns in the MAC, Section II.

a. *Column (1). Group Number.* Column 1 lists function group code numbers which are assigned to identify maintenance significant components, assemblies, subassemblies, and modules to their next higher assembly.

b. *Column (2). Component/Assembly.* Column 2 contains the item names of components, assemblies, subassemblies, and modules for which group numbers (column 1) are assigned and for which maintenance is authorized.

c. *Column (3). Maintenance Function.* Column 3 lists the functions to be performed on items listed in Column 2. (Function definitions are contained in paragraph A-3.)

d. Maintenance Level. The maintenance levels, Unit, Direct Support and General Support, and Depot, are allotted separate subcolumns within column 4. Entry of a work time figure (such as 1.0, 0.2) in a subcolumn indicates that that level is authorized to perform the function listed in column 3, and the average time required to do the function is the work time figure. If the number or complexity of tasks within a maintenance function varies from one maintenance level to another, the applicable work time for each level will be entered for that function. The work time figure represents the average time it takes to restore a component/assembly to a serviceable condition under a typical field operating environment.

e. Column (5). Tools and Equipment. Column 5 specifies, by code, common tool sets (not individual tools from those sets), common TMDE, and special tools, TMDE, and support equipment required to perform a designated function. The code in Column 5 keys to the listing in Section Ill of the MAC.

f. Column (6). Remarks. This column when applicable, contains a letter code which is keyed to an explanation of the code contained in Section IV of the MAC.

B-5. Explanation of Columns in the MAC, Section III.

a. Column (1). Tool or Test Equipment Reference Code. The tool or test equipment reference code correlates with a code used in the MAC, Section H, Column 5.

b. Column (2). Maintenance Category. The lowest category of maintenance authorized to use the tool or test equipment.

c. Column (3). Nomenclature. Name or identification of the tool or test equipment.

d. Column (4). National/NATO Stock Number. The national stock number of the tool or test equipment.

e. *Column (5). Tool Number.* The manufacturer's part number.

B-6. Explanation of Columns in the MAC, Section IV.

a. Column (1). Reference Number. The code recorded in column 6, Section II.

b. Column (2). *Remarks.* This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	Unit O	Direct Support F	General Support H	Depot D	(5) Tools and Eqpt.	(6) Remarks
01	Sling Assembly	Inspect	1.0					A	
		Repair				1.0			C
		Test				0.5			B
02	Hose and Flaking Box Assembly								
	Flaking Box Assembly	Inspect	0.1						A
		Replace	1.5						
		Repair		2.0					D,H
	Hose Assembly	Inspect	1.0						A
		Repair	1.5						E
		Test		0.5					
03	Displacement and Evacuation and Repair Kits	Inspect	1.0						A
		Replace	0.5						H
04	Chest Assy, Displacement and Evacuation and Repair Kits	Inspect	0.1						A
		Replace	0.5						
		Repair			1.5				D, F
05	Suspension and Packing Kits	Inspect	0.1						A
		Replace	0.5						H
	Hoist, Chain	Inspect	0.1						A
		Repair				1.0			H
		Test				0.5			B
06	Chest Assembly, Suspension and Packing Kit	Inspect	0.1						A
		Replace	0.5						
		Repair			1.5				D, F
07	Flow Control Kit	Inspect	0.1						A
		Replace	0.5						H

MAINTENANCE ALLOCATION CHART (cont)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level Unit C	Unit O	Direct Support F	General Support H	Depot D	(5) Tools and Eqpt.	(6) Remarks
	Gate Valve Assembly	Inspect	0.3						A
		Replace	0.5						
		Repair				1.5			G, H
	Check Valve Assembly	Inspect	0.1						A
		Replace	0.5						H
	Strainer Assembly	Inspect	0.2						A
		Service	0.5						
		Replace	0.5						H
08	Chest Assembly, Flow Control Kit	Inspect	0.1						A
		Replace	0.5						
		Repair			1.0				D, F
09	Roadway Crossing Guard	Inspect	0.1						A
		Replace	0.1						

Section III. TOOLS AND TEST EQUIPMENT REQUIREMENTS FOR FUEL HANDLING HOSELINE OUTFIT

Tool or test equipment ref code (1)	Maintenance category (2)	Nomenclature (3)	National NATO stock number (4)	PN Tool number (5)
1	O	Tool Kit, General Mechanics AUTOMOTIVE	5180-00-177-7033	(50980) SC5180-80-CL-N26
2	F, H	Shop Equipment, Automotive Maintenance and Repair: Common #1 (Less Power)	4910-00-754-0654	(50980) SC4910-95CLA74
3	F	Riveter, Hand	5120-01-289-5310	(10054) HP-2

Section IV. REMARKS

Reference code	Remarks
A	Visual inspection
B	Weight test
C	Fabricate new assembly
D	Welding
E	Repair hose leaks
F	Replacement of hinges, supports, handles and latches
G	Replacement of packing
H	Component replacement

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

C-1. Scope.

This appendix lists components of end item and basic issue items for the 4-inch Hoseline Kit to help you inventory items required for safe and efficient operation.

C-2. General.

The Components of End Item and Basic Issue Items List are divided into the following sections:

a. Section II. Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the 4-inch Hoseline Kit in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the system during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

C-3. Explanation of Columns.

The following provides an explanation of columns found in the tabular listing:

a. Column (1) - Illustration Number (Illus Number). This column indicates the number of the illustration in which the item is shown.

b. Column (2) - National Stock Number. Indicates the national stock number assigned to the item and will be used for requisitioning purposes.

c. Column (3) - *Description.* Indicates the Federal item and name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE (in parentheses) followed by the part number. If item needed differs for different models of this equipment, the model is shown under the "Usable On" heading for this column. These codes are identified as follows:

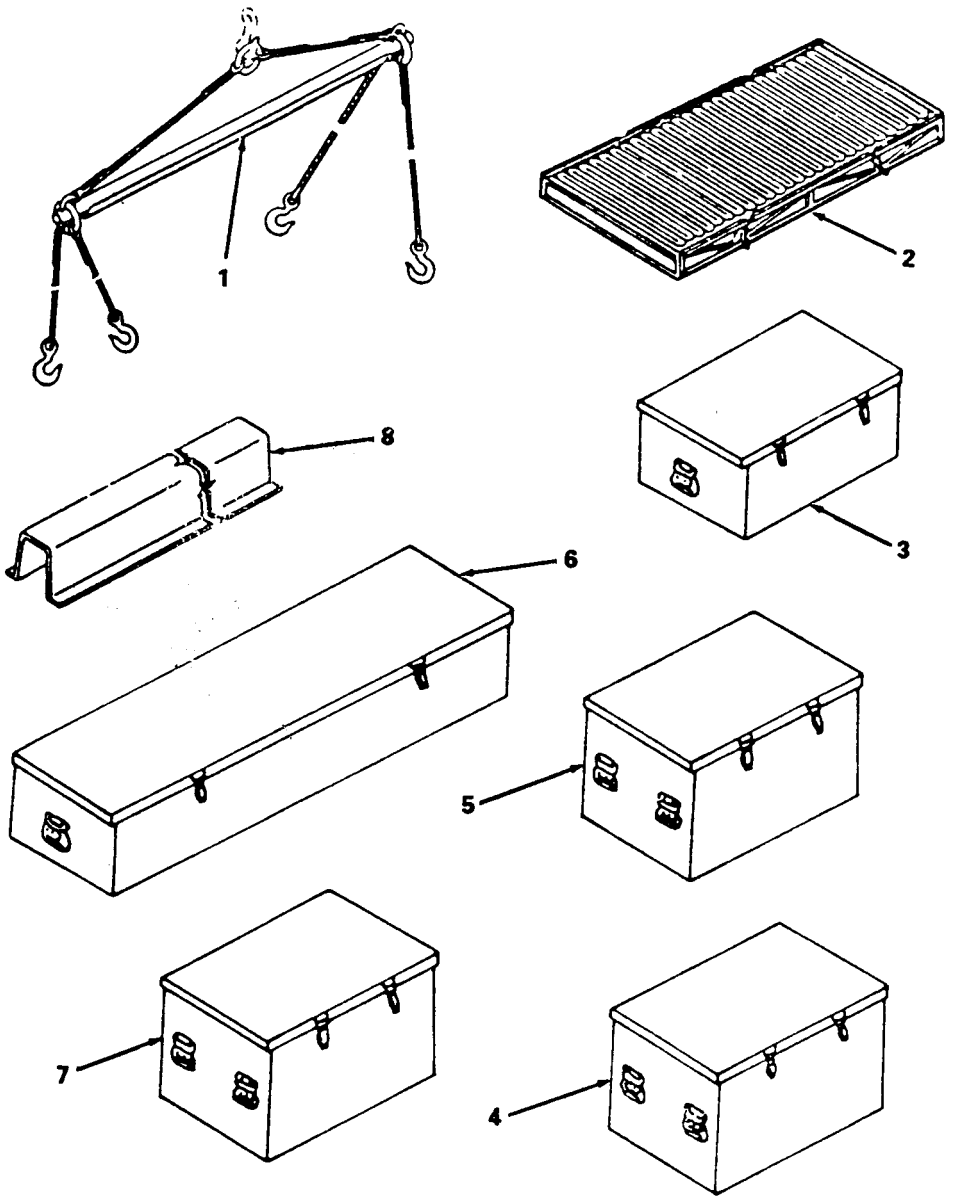
Model ADC-1200	DLK
Model 1461	EKM
Model FIHK-100	FHJ

d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).

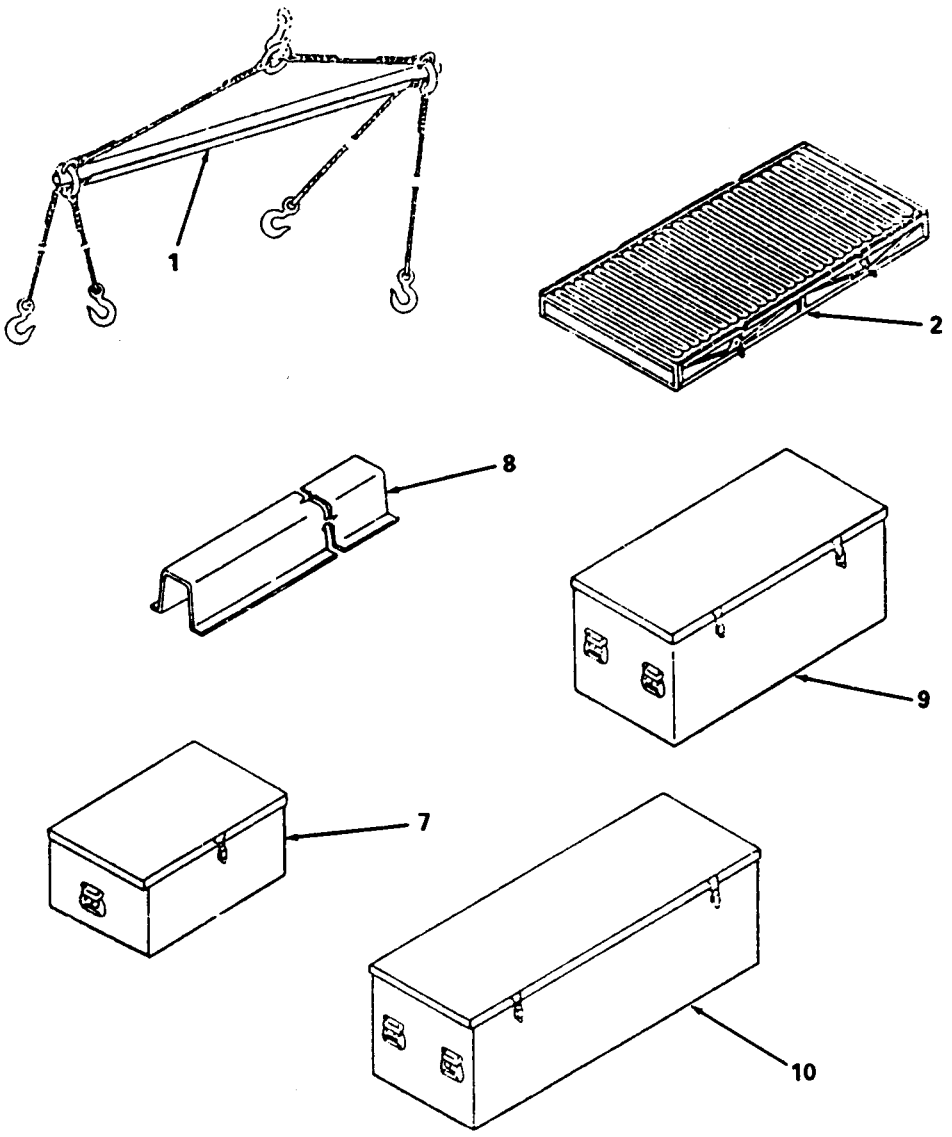
e. Column (5) - Quantity required (Qty rqd). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. COMPONENTS OF END ITEMS

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE and Part Number	Usable on Code	(4) U/M	(5) QTY. RQD
1	3940-00-967-5976	SLING ASSEMBLY, Lifting (97403) 1321 2E7102		EA	1
2		HOSE ASEMBLY AND FLAKING BOX (97403) 13200E5940		EA	13
3	3835-00-226-0509	DISPLACEMENT AND EVACUATION KIT, Hoseline (81349) MIL-D-52349	EKM, FHJ	EA	1
4		REPAIR KIT, Hoseline (97403) 13229E9888	EKM, FHJ	EA	1
5	3835-00-686-1008	SUSPENSION KIT, Hoseline (81349) MIL-S-52347	EKG, FHJ	EA	1
6	3835-00-686-1004	PACKING KIT, Hoseline (97403) MIL-P-52348	EKM, FHJ	EA	1
7	3835-00-686-1006	FLOW CONTROL KIT, Hoseline (81349) MIL-F-52345		EA	1
8	3835-00-967-9029	GUARD, Roadway (97403) 13200E4793		EA	20
9	3835-00-226-0509	DISPLACEMENT AND EVACUATION AND REPAIR KIT, Hoseline (81349) MIL-D-52349 (81349) MIL-R-52343	DLK	EA	1
10		SUSPENSION AND PACKING KIT, Hoseline (81349) MIL-S-52347 (97403) 13200E62330	DLK	EA	1



(MODEL 1461 AND FIHK-100)



(MODEL ADC-1200)

Section III. BASIC ISSUE ITEMS

(1) Illus. number	(2) National stock number	(3) Description CAGEC and part number	Usable on code	(4) U/I	(5) Qty rqr
1		TM 10-3835-219-14 Hoseline Outfit, Fuel Handling 4-Inch Diameter		EA	1
2	8415-00-641-4601	Gloves, Checmical and Oil Protective (81348) ZZ-G-381		PR	1
3	4240-00-052-3776	Goggles, Industrial (58356) A-A-110		PR	1
4	4240-00-022-2946	Protector, Aural (48912) 95635		EA	1

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

Section II. INTRODUCTION

D-1. **Scope.** This appendix lists additional items you are authorized for the support of the Hoseline Outfit.

D-2. **General.** This list identifies items that do not have to accompany the Hoseline Outfit and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

D-3. **Explanation Of Listing.** National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. the items are listed in alphabetical sequence by item name under the type document (i.e., CTA, MTOE, TDA, or JTA) which authorizes the item(s) to you.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) stock number	Description CAGEC and part number	Usable on code	U/M	Qty auth
	(–) Authorized items			
4310-00-984-5741	Compressor, Air		Ea	1
4320-01-067-0223	Pumping Assembly (Regulated) (97403) 13226 E2289		Ea	1

APPENDIX E

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTIONS

E-1. **Scope.** This appendix lists expendable supplies and materials you need to operate and maintain the Fuel Handling Hoseline Outfit. These items are authorized to you by CTA 50-970, Expendable Items (Except Medial, Class V, Repair Parts, and Heraldic Items). items you are authorized for the support of the Hoseline Outfit.

E-2. **Explanation of Columns.**

a. *Colunm (1) – Item Number.* This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use Oil, Item 1, App E").

Column (2) – Leve/. This column identifies the lowest level of maintenance that requires the listed item, (Enter as applicable).

C - Operator/Crew
O - Unit Maintenance
F - Direct Support Maintenance - Intermediate Maintenance
H - General Support Maintenance - Intermediate Maintenance
D - Depot Maintenance

c. *Column* (3) - *National* Stock *Number.* This is the National stock number assigned to the item; use it to request or requisition the item.

d. *Column (4) - Description.* Indicates the Federal item name, and, if required, a description to identify the item. The last line for each item indicates the Contractor and Government Entry Code (CAGEC) in parentheses followed by the part numbers.

e. *Column [5) – Unit of Measure (U/M).* Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level	(3) National stock number	(4) Description	(5) U/M
1	O	8040-00-266-0856	Adhesive, Rubber (81348) MMM-A-182 Type 1	Cn
2	O	9150-00-754-2959	Grease, Ball and Roller	Cn
3	O	9150-00-186-6681	Oil, Lubricating (15958) ALLIEDC030	Qt
4	O	5350-00-186-8856	Paper, Emery (58536) A-A-1049	Pkg

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (cont)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
5	O	7920-00-205-1711	Rags, wiping (58536) A-A-531	Lb
6	O	5340-00-244-7327	Seals, Strapping (70847) C256	Bx
7	O	6850-00-664-5685	Solvent, Cleaning (81346) ASTM D235 TY1	Qt
8	O	5340-00-245-9440	Strapping (70847) C206	Rl
9	O	7510-00-634-2802	Tape, Pessure Sensitive Adhesive, Rubber (58536) A-A-1689	Rl
10	O	8030-00-889-3535	Tape, Teflon (81349) MI L-T-27730	Ea
11	O	7510-00-145-0002	Tape, Vinyl (81349) PPP-T-66	Rl
12	G	5330-01-141-1864	Gasket, Flange ((97403) 1322 0E1069-1	Ea
13	G	5310-00-637-9451	Lockwasher (96906) MS35338-46	Ea
14	G	5365-01-262-1339	Packing Ring (41592) 235 RF02082P	Ea
15	G	5330-01-262-1340	Gasket, Bonnet (41592) 235 RF2092G	Ea
16	G	5310-01-265-5044	Lockwasher (41592) 235RF02212W	Ea

☆U.S. GOVERNMENT PRINTING OFFICE: 1993 - 755-028/80368

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Subject — Paragraph

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V , W , X , Y , Z

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the Secretary of the Army
01108

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☆ U.S. GOVERNMENT PRINTING OFFICE: 1994 - 300-421/82180

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)
PFC JOHN DOE
COA, 3d ENGINEER BN
FT. LEONARDWOOD, MO 63108

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 10-3835-219-14	27 April 1992	HOSELINE OUTFIT, FUEL HANDLING

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO
6	2-1 a		
B1		4-3	
125	line 20		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

In line 6 of paragraph 2-1a the manual states the engine has 6 Cylenders. The engine on my set only has 4 Cylenders. Change the manual to show 4 Cylenders.

Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a shim - Please Correct one or the Other.

I ordered a gasket, item 19 on figure B-16 by NSN 2910-08-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is Wrong. Please give me a good NSN

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
JOHN DOE, PFC (268) 317-7111

SIGN HERE: John Doe
JOHN DOE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

DRSTS-M Overprint 1, 1 Nov 80

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

TEAR ALONG PERFORATED LINE

REVERSE OF DA FORM 2028-2 Reverse of DRSTS-M Overprint 2, 1 Nov 80

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FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

COMMANDER
U.S. ARMY AVIATION AND TROOP COMMAND
ATTN: AMSAT-I-MP
4300 GOODFELLOW BOULEVARD
ST. LOUIS, MO 63120-1798

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile -

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply* by
inches	centimeters	2,540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C