

UNDERWAY REPLENISHMENT HARDWARE AND EQUIPMENT MANUAL



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THIS MANUAL SUPERSEDES S9570-AD-CAT-010 DATED 15 SEPTEMBER 1988 AND ALL CHANGES THERETO.

PUBLISHED BY DIRECTION OF COMMANDER, NAVAL SEA SYSTEMS COMMAND

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ACQUISITION	P. GIACOBBE	<i>Paul Giacobbe</i>	PHD NSWC	4M20	23 Feb 01
TECHNICAL	P. GIACOBBE	<i>Paul Giacobbe</i>	PHD NSWC	4M20	23 Feb 01
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FOREWORD

This manual contains information on hardware and equipment used in Fuel and Cargo Connected Replenishment and in Vertical Replenishment. This manual consists of four parts:

- Part 1 — Common UNREP Equipment
- Part 2 — Underway Replenishment — Fuel
- Part 3 — Solid Cargo Connected Replenishment (CONREP)
- Part 4 — Vertical Replenishment (VERTREP)

Underway Replenishment (UNREP) of surface ships extends the endurance of deployed fleet forces by supplying essential logistic items such as fuel, weapons, stores and provisions to those forces. The primary aim of UNREP is the safe delivery of maximum cargo in minimum time allowing minimum diversion of the supported force from its assigned mission.

UNREP is currently accomplished by connected and non-connected methods. With the connected replenishment (CONREP) method cargo or personnel are transferred on wire or fiber rope rigs connecting the ships as they steam side by side. Liquid cargo (fuel) can be transferred only by CONREP methods using the Fuel-Standard Replenishment Alongside Method (Fuel-STREAM), addressed in Part 2. Solid cargo can be transferred by CONREP using Missile/Cargo STREAM and conventional methods or by Vertical Replenishment (VERTREP) which employs a helicopter. CONREP and VERTREP are covered in Parts 3 and 4, respectively. Equipment common to Liquid and Solid Cargo CONREP and to VERTREP are covered in Part 1.

The purpose of the Underway Replenishment Hardware and Equipment Manual is to provide a catalog of the loose equipment and certain components installed in UNREP systems that are used to transfer solid cargo and bulk fluids. The information provided is intended for use by operating, planning, design and administrative personnel in the fleet and at shore based or shipyard activities.

The Consolidated UNREP Equipment List (preceding Part 1) provides a category listing of equipment, tools, hardware, etc., contained in this manual. This list refers the user to the page where descriptive, functional and other data is provided.

Ships, training activities, supply points, depots, Naval Shipyards and Supervisors of Shipbuilding are requested to arrange for the maximum practical use and evaluation of NAVSEA technical manuals. All errors, omissions, discrepancies, and suggestions for improvement to NAVSEA technical manuals shall be reported to the Commanding Officer, Port Hueneme Division Naval Surface Warfare Center (Code 5E00), Port Hueneme, CA 93043-4307 on NAVSEA Technical Manual Deficiency/Evaluation Report (TMDER), NAVSEA Form 4160/1. TMDERs may be submitted via the World Wide Web at <http://nsdsa.phdnswc.navy.mil/tmder/tmder.htm>. In addition, a copy of NAVSEA Form 4160/1 is included at the end of this technical manual. All feedback comments shall be thoroughly investigated and originators will be advised of action resulting therefrom.

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PART 1 — COMMON UNREP EQUIPMENT
SECTION A — INTRODUCTION

DESCRIPTION OF PART 1

Part 1 covers only those items of equipment used for both Fueling and Solid Cargo CONREP, or Solid Cargo CONREP and VERTREP, or all three. In the case of Fueling/Solid Cargo equipment most items are used to pass the rigs or are hardware items whose use would not necessarily be restricted to UNREP. Items common to Solid Cargo CONREP and VERTREP are primarily equipment used for cargo handling. Items used with all three methods fall into the communications and night lighting category.

Part 1 contains two sections. Section A, the introduction, describes the format and scope of Part 1 and its relation to Parts 2, 3 and 4. Section B, the

equipment section, contains equipment sheets for each item of common UNREP equipment. Each equipment sheet contains a drawing or picture of the item, a description of the item, and a brief description of its function, its National Stock Number (NSN), drawing number(s) and reference(s) where additional information can be found. Where no NSN is assigned, manufacturers' part numbers are listed. As an aid to determine the complete equipment requirement for each UNREP method, cross reference lists are provided. Section B to Parts 2 and 3 have a list of items common to Fueling and Solid Cargo CONREP shown in Part 1. Section B of Part 4 has a list of VERTREP items common to Solid Cargo CONREP items.

PART 1

COMMON UNREP EQUIPMENT

SECTION B

EQUIPMENT

APPAREL, SAFETY

**DESCRIPTION**

Wearing Apparel consists of the following items:

Orange colored, inherently buoyant, vest type life jacket, (AIULP), Auto -Inflatable Utility Life Preserver. Inflatable MK-1 Vest Type Life Preserver.

Construction type (safety) helmet equipped with
 chin strap
 jersey or vest
 work gloves
 safety shoes
 knife
 whistle
 chemical light.

Safety helmets and jerseys/vests shall be color coded in accordance with the effective edition of NWP 4-01.4.

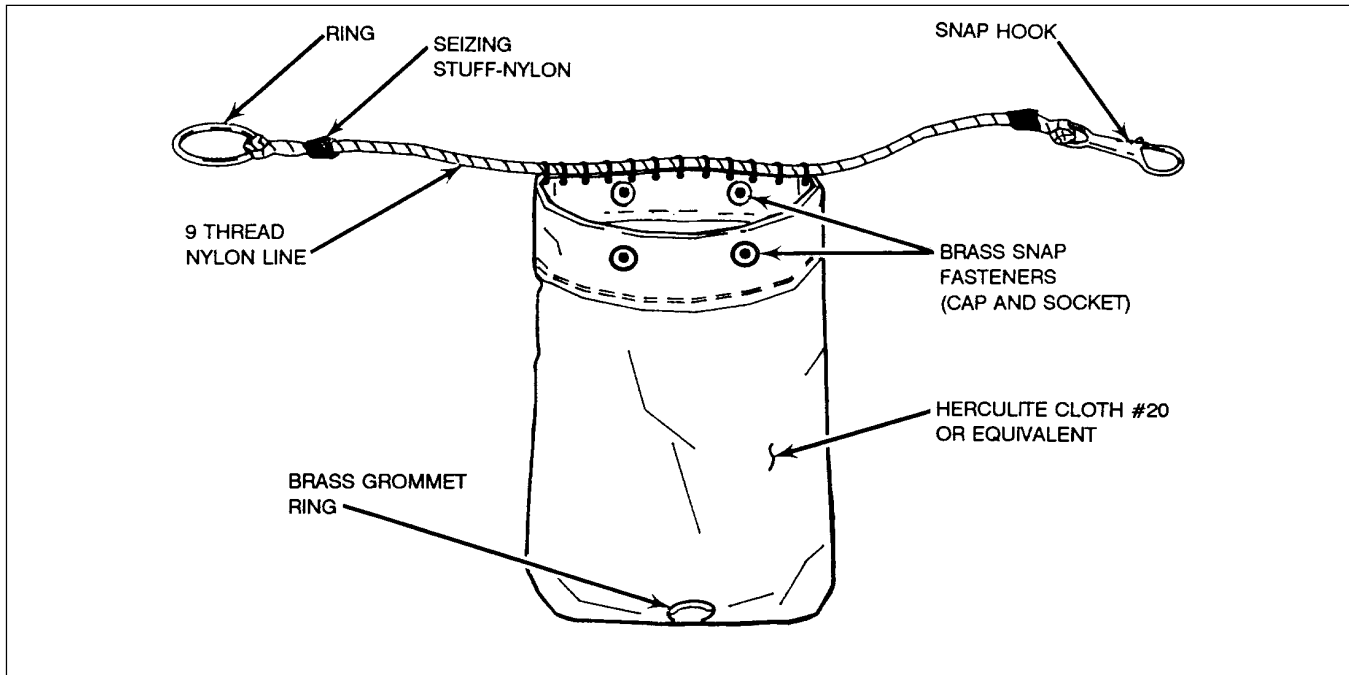
FUNCTION

Special apparel is used for the protection and safety of personnel engaged in UNREP operations and to identify personnel performing specific functions. Additional items, peculiar to VERTREP are listed in Part 4.

REFERENCE

Underway Replenishment (NWP 4-01.4)
 AEL 2-200035005
 NSTM CH-077
 (Personnel Protection Equipment)

BAG, SHOT LINE RETURN

**DESCRIPTION**

The Shot Line Return Bag consists of a nylon and vinyl chloride cloth bag of Herculite cloth #20 or equivalent with a brass grommet ring in the bottom and two brass snap fasteners at the top for closing the bag. The bag is sewn to a 9 thread nylon line which has a ring spliced to one end and a snap hook spliced to the other.

FUNCTION

The bag is used to transfer the excess shot line from the delivery ship to the receiving ship. It is then used to transfer the projectile and all of the shot line back to the delivery ship.

DRAWING NUMBER

Shot Line Return Bag 805-2556883

DIMENSIONS

Nylon Line	9 thread, 18 inches long
Ring, Galv Stl	5/16-inch dia. stock, 2 inches I.D.
Bag	10 inches long, 8 inches wide

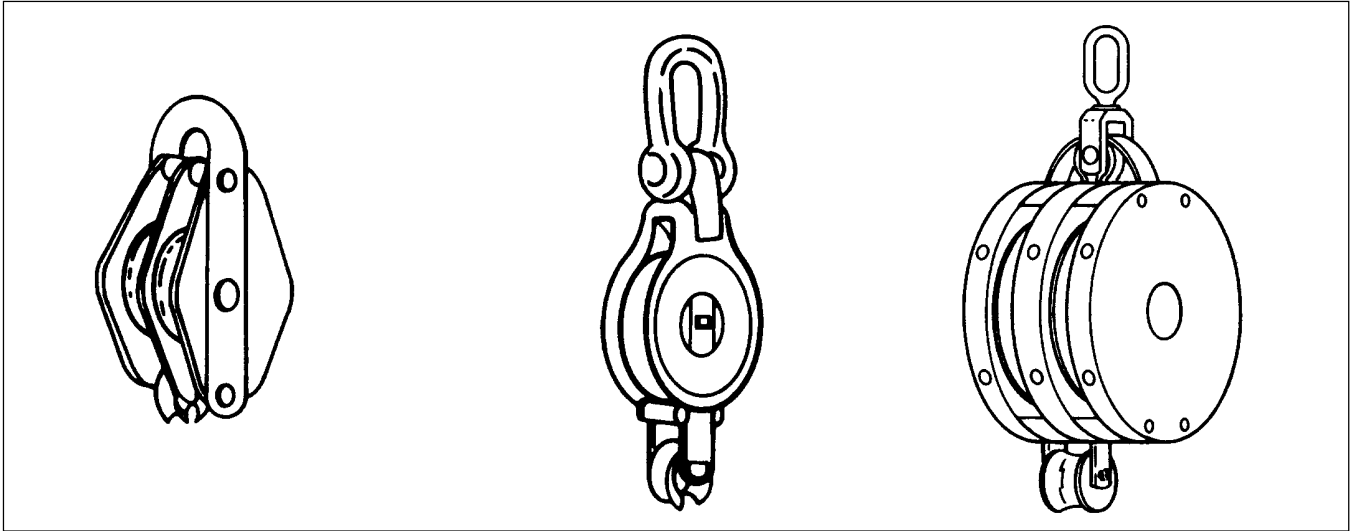
REFERENCE

Underway Replenishment (NWP 4-01.4)

NATIONAL STOCK NUMBER

Bag, Assembly	2090-01-310-7796
Cloth, Herculite #20 or Equivalent	8305-00-616-0020
Grommet Ring, Brass	5325-00-231-6588
Snap Fastener, Cap, Brass	5325-00-276-4950 or 5325-00-891-9073
Snap Fastener, Socket, Brass	5325-00-276-4972
Nylon Line, 9 Thread, MIL-R-17343	4020-00-641-8898
Snap Hook – CRES	5340-00-200-8823

BLOCKS, FIBER ROPE

**DESCRIPTION**

Blocks for fiber rope are manufactured in various types and sizes and are used in all alongside underway connected replenishment rigs. The numbers, types and sizes are dependent upon the individual installation and rig.

Blocks for use with fiber rope consist of a shell of wood or steel with one or more metal sheaves, usually steel or bronze. Block size is usually stated in terms of approximate length of cheek (shell). A useful thumb rule is that the size of the block in inches is three times the circumference of the manila rope and the sheave diameter is twice this circumference. Thus, a block for use with 3-inch manila would be a 9-inch block and its sheave would be 6 inches in diameter.

The use of synthetic rope in general rigging applications has led to the development of blocks, which are better suited to the characteristics of synthetic rope. These blocks are generally of the same configuration but have sheaves of aluminum bronze or a material more compatible with the

synthetic rope. The sheave pins, straps, hooks, and other parts are strengthened as required to accommodate the greater working capacities of synthetic rope.

FUNCTION

Blocks are used in UNREP rigs primarily as fairleads for the various fiber lines which are used in the makeup of the rig. In some applications such as the jigger tackle, they serve to provide a mechanical advantage for line handling.

DIMENSIONS

Varies according to application.

NATIONAL STOCK NUMBER

See Afloat Shopping Guide, Class 3940

REFERENCE

Blocks, (for Fiber Rope)

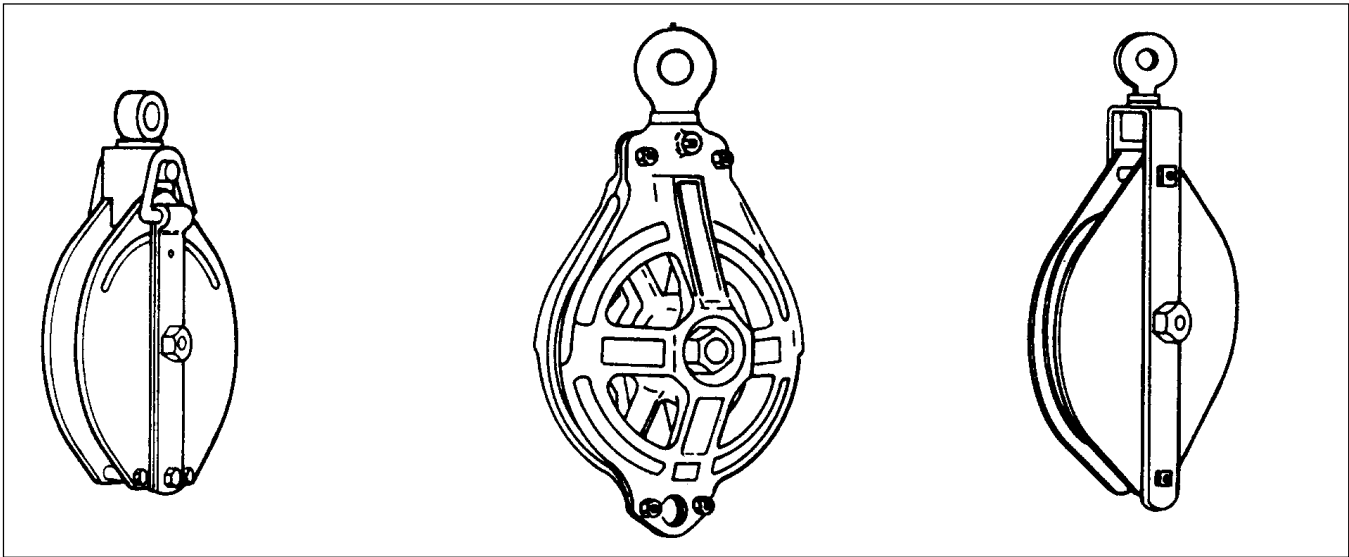
Military Specification MIL-B-24200

Applicable Ship's Rigging Drawings

Boatswain's Mate 3 and 2, Training Course Manual
NAVEDTRA 12100

NSTM CH-571 Underway Replenishment

BLOCKS, WIRE ROPE

**DESCRIPTION**

Wire Rope Blocks of various types and sizes are used in the several transfer rigs for underway connected replenishment. The numbers, types and sizes are dependent upon the individual installation. Blocks are classified as standard or Navy type and non-standard or commercial type. Blocks manufactured for the Navy have stamped or cast on the shell: USN, working load, proof test, and size of rope to be used with the block.

Blocks for use with wire rope are constructed principally of steel and are galvanized and/or painted to minimize corrosion. Block size is stated in terms of the sheave diameter. Heavily stressed blocks are rated also by safe working load. Cargo hoister blocks used in the Burton rig must have roller bearings. For a given application the sheave diameter should be as large as practical considerations permit in order to minimize the bending stress imposed on the wire

rope. A useful rule of thumb is that the minimum ratio of the diameter of the sheave at the bottom of the score (tread diameter) to the diameter of the wire rope used, should be 14:1 for the 6 x 37 wire rope used in UNREP rigs. Thus, for 3/4-inch wire, the sheave diameter should be not less than 10.5 inches.

FUNCTION

Wire rope blocks are used as specified in the ships rigging plans and as described in NWP 4-01.4 for UNREP rigs, primarily as fairleads for various wire lines which make up the rig.

Commercial cargo hoister blocks sized for 3/4-inch wire rope and marked for 10 ton safe working load or more are suitable for Burton rigs and require 100,000 lb test as shown in NAVSHIP Dwg. No. 805-2549932.

DIMENSIONS

Varies according to application.

NATIONAL STOCK NUMBER

See Afloat Shopping Guide, Class 3940
Commercial Source Cargo Hoister Blocks
Brewer Titchener Corp.
The Crosby Group.

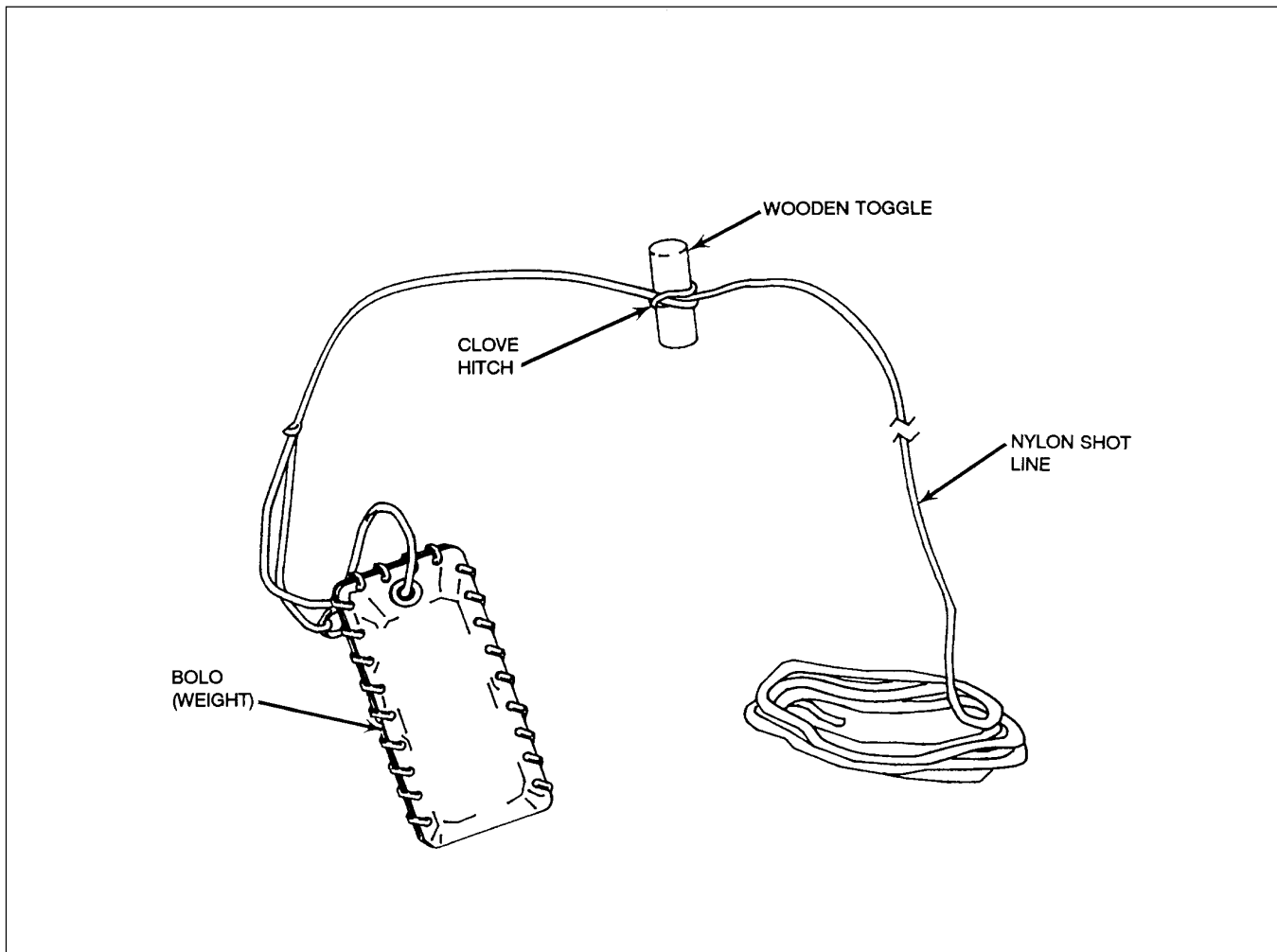
DRAWING NUMBER

None

REFERENCE

Block, Tackle, Wire Rope
Specification MIL-B-24141
Applicable Ship's Rigging Drawings
Boatswain's Mate 3 and 2 Training Course Manual
NAVEDTRA 12100

BOLO, LINE THROWING

**DESCRIPTION**

The Line Throwing Bolo consists of about ten ounces of lead with rounded corners, well padded, and enclosed in rubber or leather. The bolo is attached to the end of a nylon shot line. A two-inch wooden toggle is secured to the line about four or five feet from the weight.

FUNCTION

The Line Throwing Bolo is used to pass a shot line between ships as the first step in passing a messenger to connect up alongside transfer rigs. The bolo is hand-heaved from one ship to another.

Hand heaving requires a person to grasp the toggle and twirl the bolo (weight) overhead several times to gain momentum. When the toggle is released, the bolo and shot line will, with proper aim and enough force, travel through the air to the other ship. The Line Throwing Bolo is an alternative to a gun-fired shot line.

REFERENCE

Underway Replenishment (NWP 4-01.4)

NATIONAL STOCK NUMBER

Not a stock item.

CLAMPS, WIRE ROPE, SADDLE

DESCRIPTION

The general purpose Wire Rope Saddle Clamp is available in Type 1, single saddle, and is constructed of galvanized steel.

FUNCTION

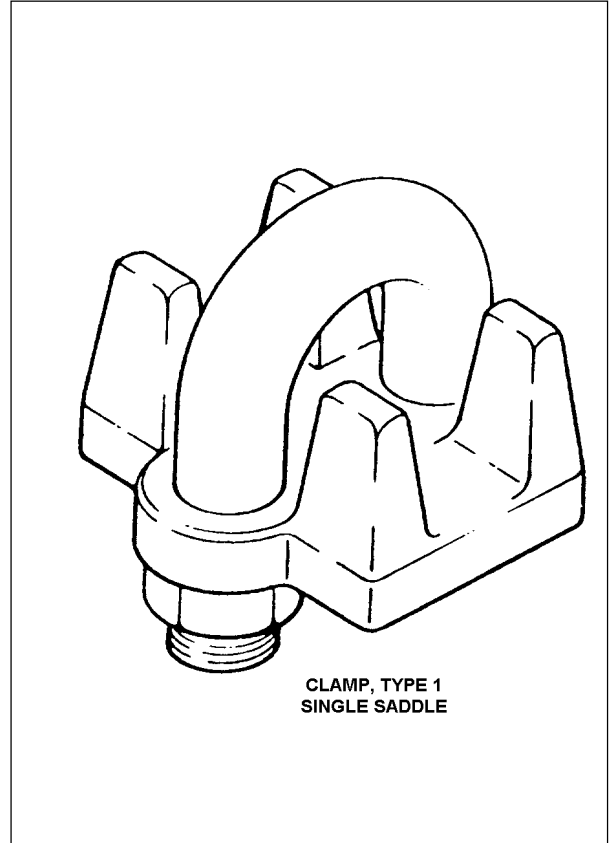
Wire Rope Saddle Clamps are used as the securing mechanism when installing thimbles in wire rope to form an eye where a nonpermanent or temporary joint is required.

NATIONAL STOCK NUMBER

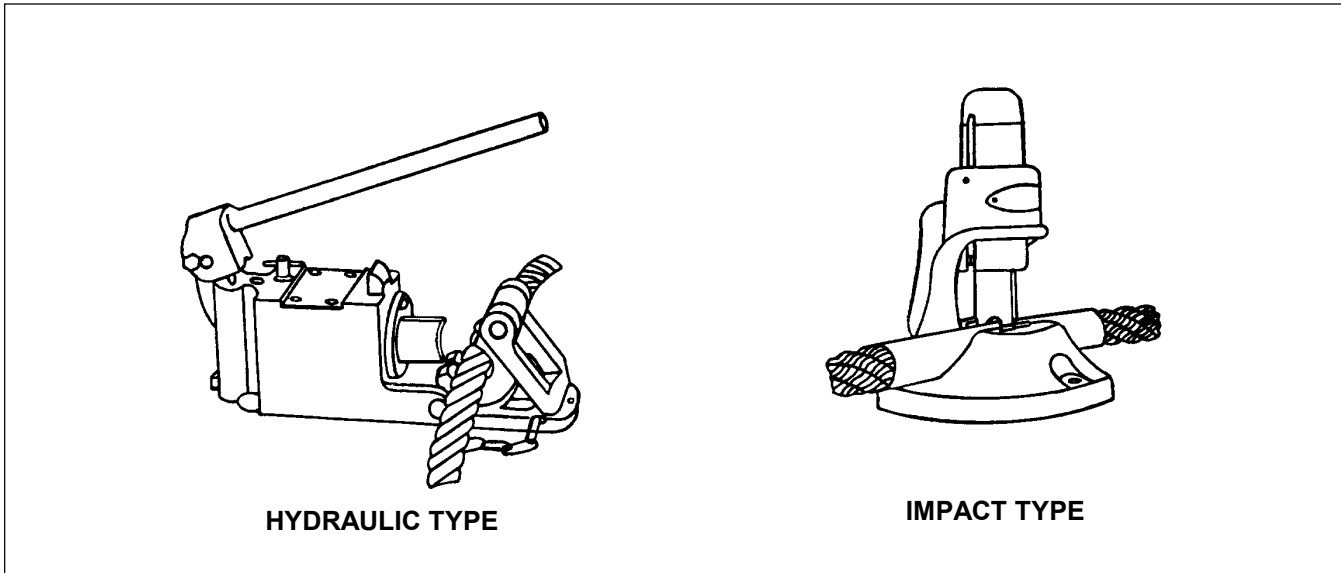
<u>Single Saddle, Type</u>	<u>NSN</u>
<u>1</u>	
1/2-inch	4030-00-243-4440
3/4-inch	4030-00-988-5637
7/8-inch	4030-00-243-4443
1-inch	4030-00-243-4444

REFERENCE

Wire and Fiber Rope and Rigging
S9086-UU-STM-010 Chapter 613.
Clamps, Wire Rope, Fed Spec. FF-C-450.



CUTTER, WIRE ROPE (HAND OPERATED)

**DESCRIPTION**

The Hydraulic Type Wire Rope Cutter is Type I, Class 1, Size 2 per Fed. Spec. AA-3029, and consists essentially of a self-contained hydraulic unit, cutting blade, rope holder and blade guides, and main body.

The Impact Type Wire Rope Cutter is Type III, Size 1 per Fed. Spec. AA-3029 and is suitable for cutting wire rope by striking with a sledge or heavy hand hammer. It consists essentially of a body and base, plunger, cutting blade, and die.

FUNCTION

These Wire Rope Cutters are used for general purpose, non-emergency cutting of wire rope. Either cutter will perform the same function.

CAPACITY**MAX WIRE ROPE DIA**

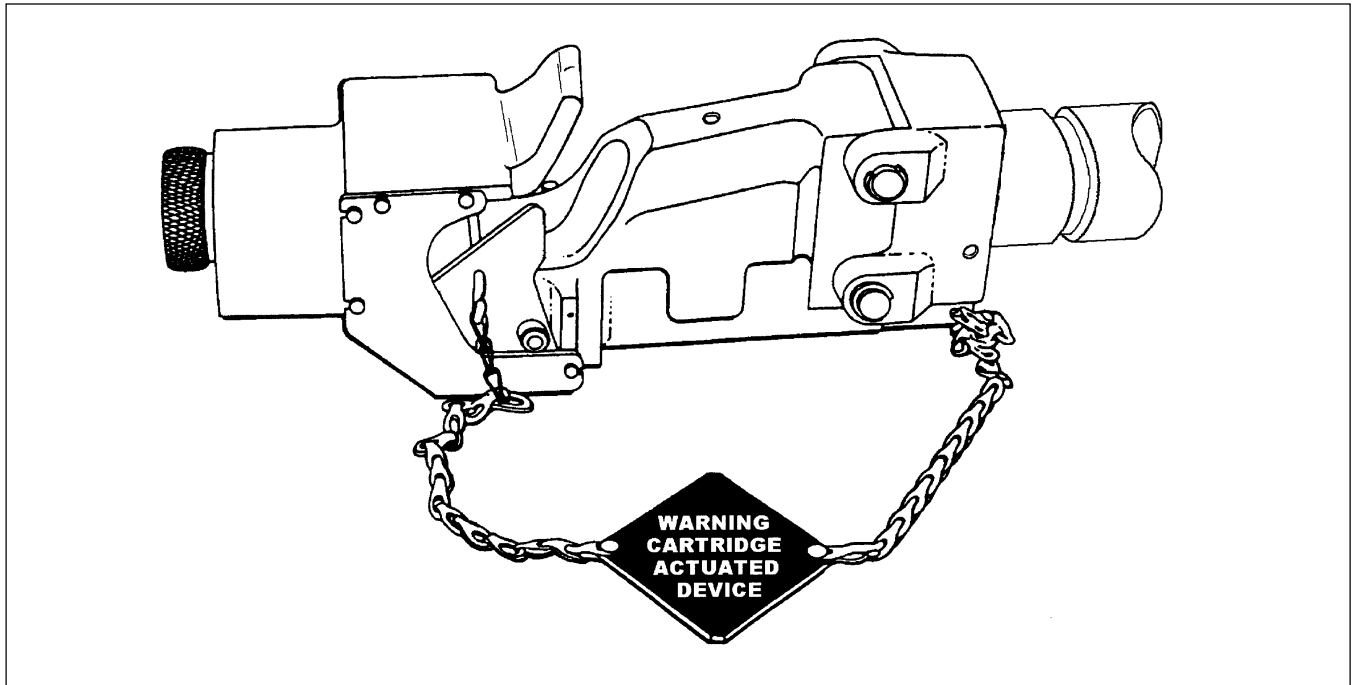
	<u>Inches</u>	<u>Wt. Lbs</u>
Hydraulic	1-1/8	32
Impact	1	10

NATIONAL STOCK NUMBER

Hydraulic Type	5110-00-224-7058
Impact Type	5110-00-242-8807

REFERENCE

Cutter, Wire Rope, Hand-Operated, Hydraulic, Horizontal Cutting Fed Spec. AA-3029

CUTTER, WIRE ROPE (VELOCITY POLE TYPE)**DESCRIPTION**

The Velocity Pole Type Wire Rope Cutter consists of a cutter body, cutter punch, anvil, anvil retaining screw, cartridge, firing mechanism and a handle assembly. It is a manually-actuated, explosive operated device capable of cutting improved or extra improved plow steel wire ropes from 1/2 to 1 inch in diameter instantaneously without danger to the operator. This cutter has improved safety features and is replacing the cutter manufactured by Mine Safety Appliance Co.

FUNCTION

It is used to cut wire ropes rigged between ships during an emergency breakaway.

NATIONAL STOCK NUMBER

Wire Rope Cutter
5130-01-028-3173
Box, Expendable Parts, Tools
0000-LL-CJ6-9706 (P-NICN)
Cartridge, Impulse MK 97 MOD 0
1377-00-938-1942

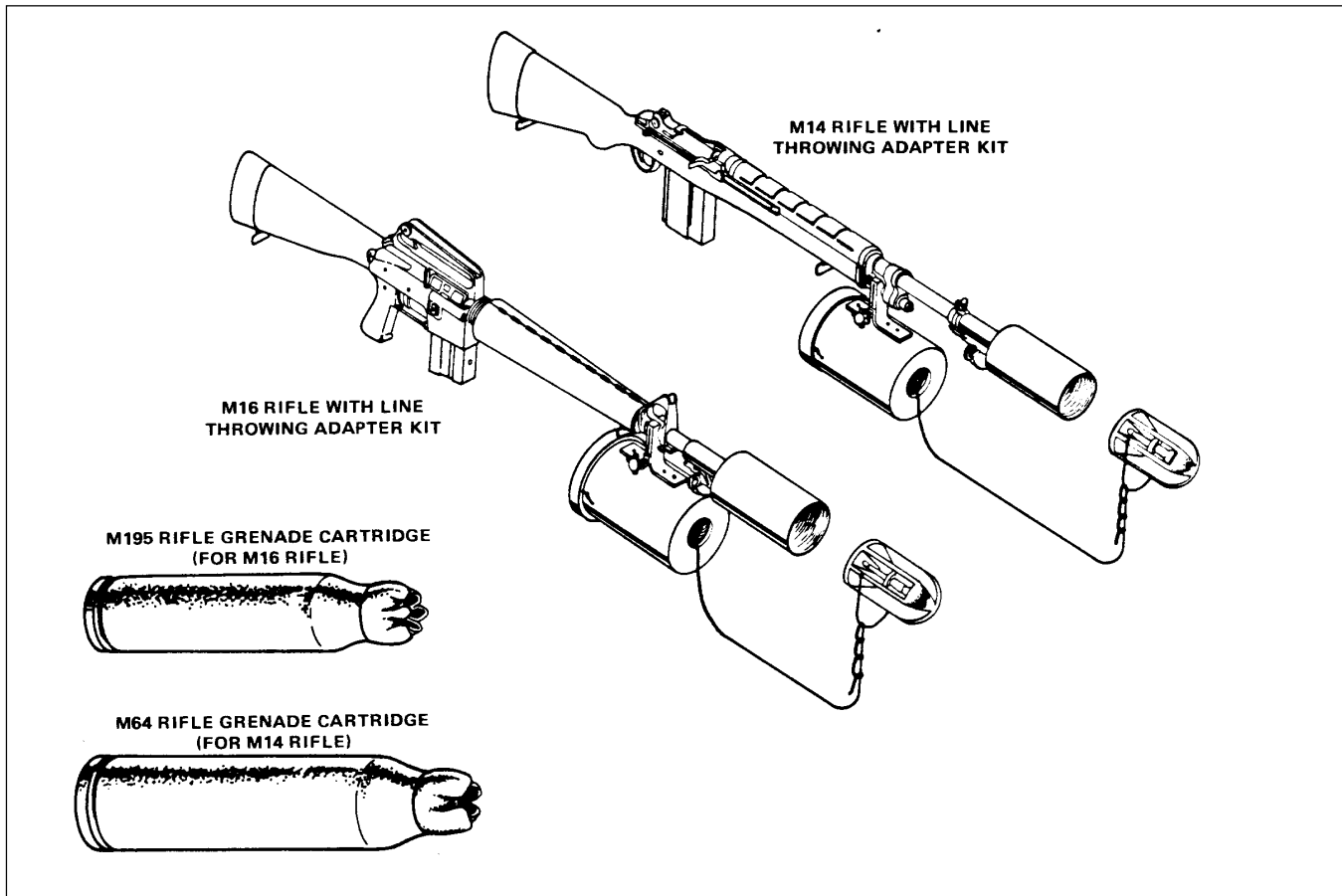
DRAWING NUMBER

To be assigned

REFERENCE

Wire Rope Cutter, Underway Replenishment
NAVSEA 0920-LP-106-3010
Underway Replenishment (NWP 4-01.4)

GUN KIT, LINE THROWING RIFLE ADAPTER

**DESCRIPTION**

The MK 87 MOD 1 Line Throwing Rifle Adapter Gun Kit consists of six projectiles, one launcher adapter, and 18 chemical light wands. The kit is used on the M14, M16, or M16A1 rifle. The launcher adapter is used when firing the projectile from the M14 rifle. The M16 and M16A1 rifles do not require the launcher adapter because the launcher fits over the integral flash suppressor on these rifles. The projectile is inserted into the launcher for firing. The projectile is made of Butyl

rubber, is reusable and has three holes and grooves for insertion of the chemical light wands. The shot line is secured to the nylon loop on the projectile. This kit has improved safety features and is replacing the MK 1 MOD 1 line throwing gun.

FUNCTION

The adapter kit, when assembled on the M14, M16 or M16A1 rifle, is used to pass a line between ships when rigging for alongside underway connected replenishment.

NATIONAL STOCK NUMBER

Canister Assembly	1095-01-027-7173
Chemical Light Wand	6260-00-106-7478
Shot Line	1095-00-334-2409
Rewinding Machine	1095-00-380-8786
M64 Rifle Grenade Cartridge	1330-00-892-4106
M195 Rifle Grenade Cartridge	1330-00-926-4011
Line Throwing Kit	1095-01-079-0140
Projectile	1095-01-079-0249
Launcher, Rifle Line	1095-01-079-0141
Pad, Recoil	1005-01-095-8950

DRAWING NUMBER

53711-5262286

REFERENCE

Rifle Adapter Kit MK 87 MOD 1 Line Throwing
Description, Operation and Maintenance
SW350-A1-MMO-010

Underway Replenishment (NWP 4-01.4),
Operators Manual for Rifle 7.62mm, M14
NAVSEA 0565-LP-028-1150

Operators Manual for Rifle 5.56mm, M16 and
M16A1

MK87 MOD 1, Kit, Adapter, Rifle, Line Throwing
AEL 0-006400254

HOOK, SNAP**DESCRIPTION**

Snap Hooks are narrow safety hooks consisting of a body with an eye at one end, a hook at the other end, and a spring loaded safety latch.

FUNCTION

The Snap Hook is used on various non-load bearing lines such as phone lines, messengers, steadying lines or temporary life lines where fast connect and disconnect is required.

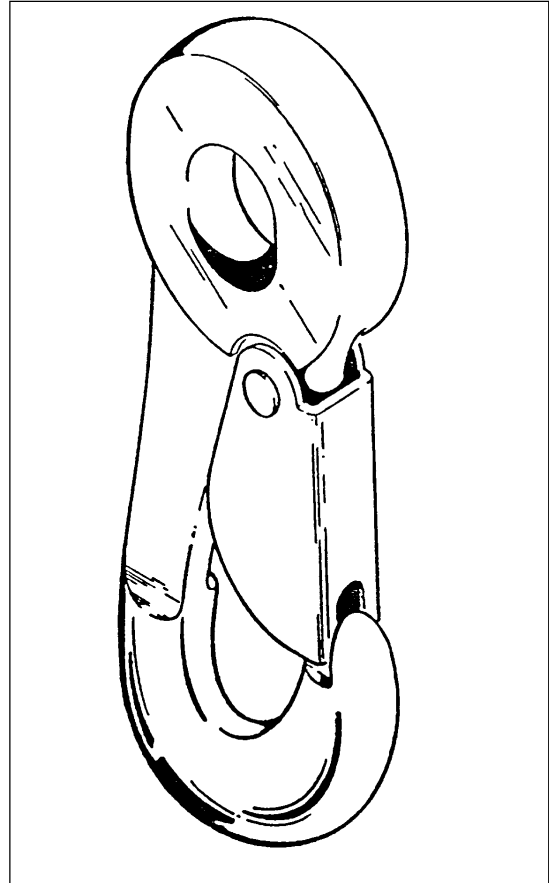
NATIONAL STOCK NUMBER

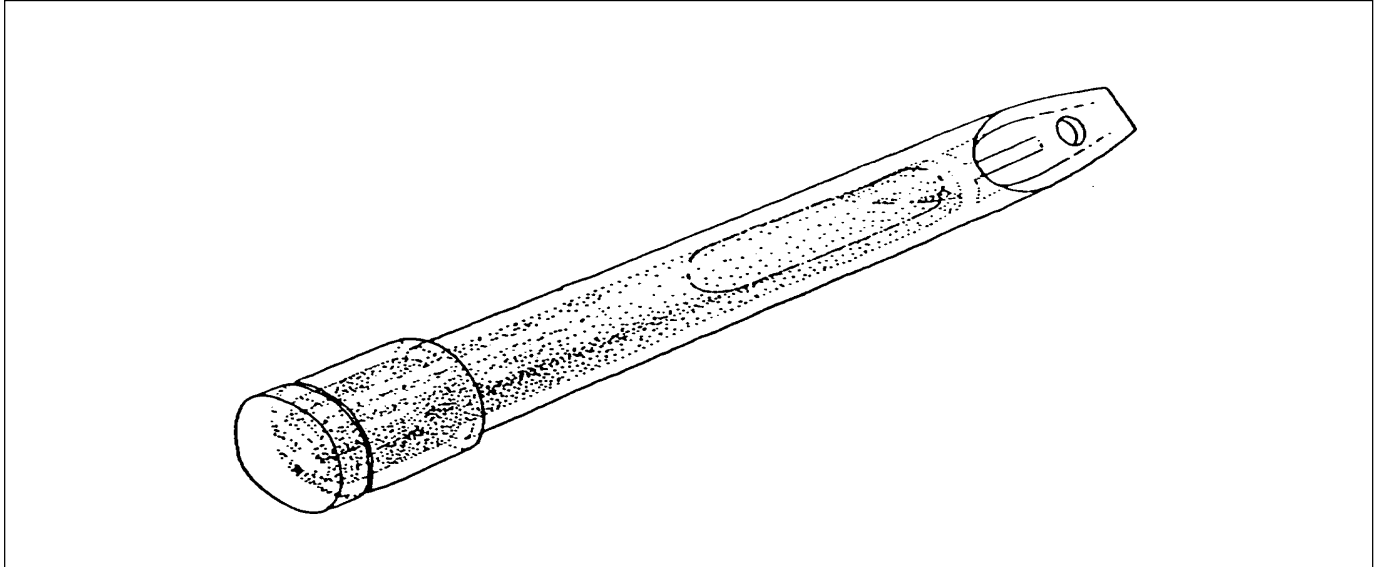
Large 5340-00-682-1686

Medium 5340-00-291-3543

DRAWING

None. Available from various commercial sources.



LIGHT, CHEMICAL**DESCRIPTION**

The Chemical Light wand is a two-component chemiluminescent system contained in a sealed plastic tube. Two components, which are physically separated, are stored in the same container. The chemical light is activated by flexing the plastic tube enough to break the inner glass tube and shaking to combine the two components. The mixing of the two components immediately produces a bright light which does not require oxygen or give off heat. If the tube is not punctured or otherwise opened, the light will be visible from 3 to 12 hours depending on the ambient temperature. Chemical Light wands are packaged in a plastic coated aluminum foil to protect them from being degraded by either moisture or light.

FUNCTION

The primary use for Chemical Light wand is to

replace the one-cell flashlight previously used for night underway replenishment operations. The red and blue wands may be attached to objects or obstructions which require illumination for an extended period of time such as deck edges, limits of obstruction, cargo hooks, trolleys, fueling probes or other fueling hose terminal end fittings, and extremities of cargo loads. The green light wand is used on kapok life jackets. The orange light wand is used on shot line projectiles.

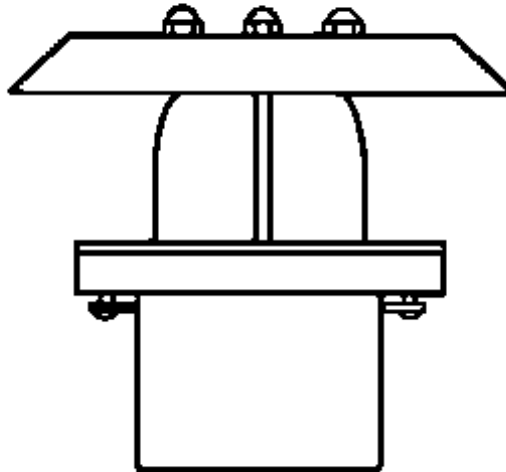
NATIONAL STOCK NUMBER

6-inch Red	6260-01-178-5559
6-inch Blue	6260-01-178-5560
6-inch Green	6260-00-106-7478
4-inch Orange	6260-01-282-7630

REFERENCE

Underway Replenishment (NWP 4-01.4)

LIGHT, CONTOUR, HULL



LIGHTING SYMBOL NO. 164.3

DESCRIPTION

Hull contour lights are circular and contain two blue 25-watt lights. The fore and aft lights are horizontally shaded to provide a 135-degree arc of visibility from directly astern to 45 degrees forward of the beam, and they are vertically shaded from 40 degrees above to 40 degrees below horizontal. For ships longer than 600 feet, a third light is located midway between the fore and aft lights.

FUNCTION

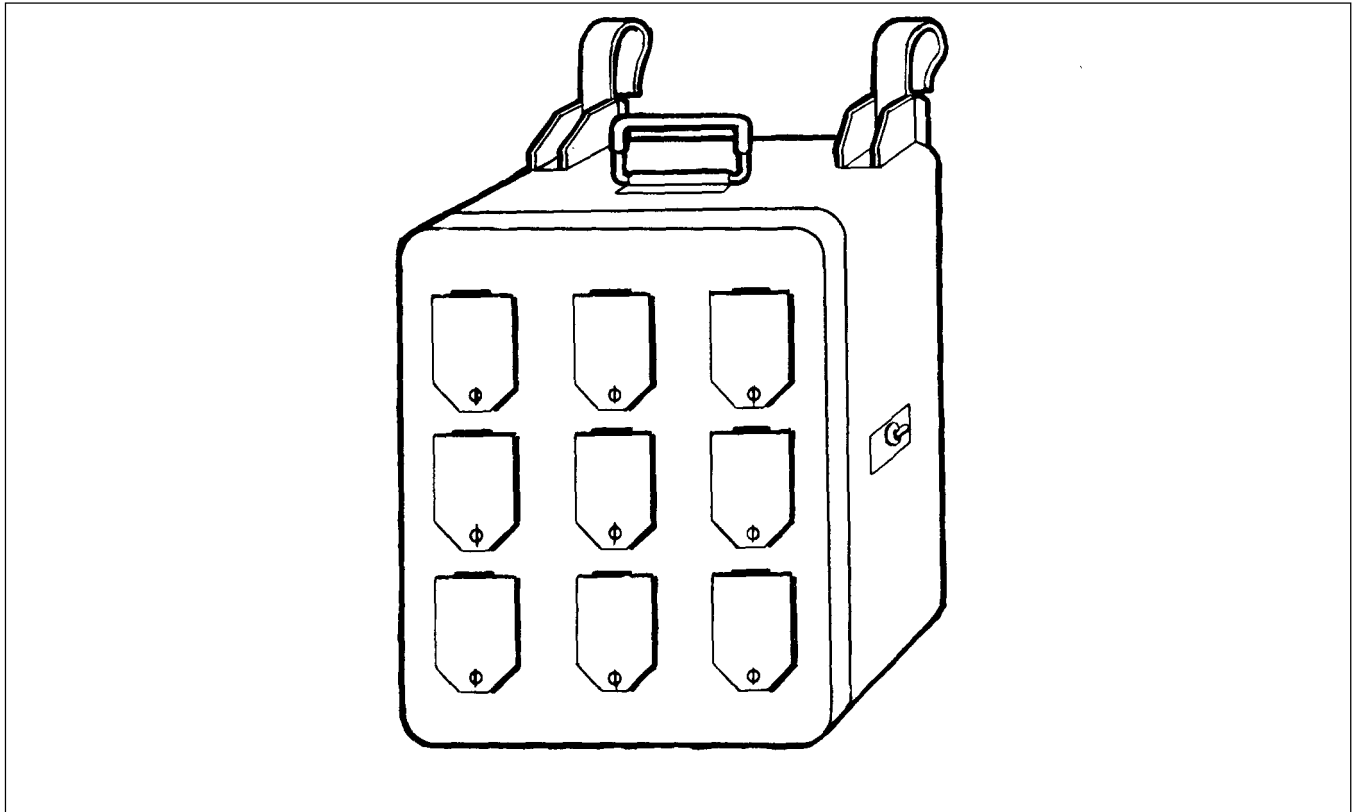
The lights are shown by the control ship during the approach and while the receiving ship is alongside.

NATIONAL STOCK NUMBER

Complete Hull	
Contour Assy	6220-00-723-5326
Replacement Blue	
Lens Assy	6220-01-082-5396

REFERENCE

Underway Replenishment (NWP 4-01.4)
 Light, Approach (Hull Contour), Blue, 120 Volts, 25
 Watts, One Lamp, Symbol 164.3
 (MIL-L-24560/3)

LIGHT, STATION MARKER BOX**DESCRIPTION**

The Station Marker Light Box consists of a box with nine 2-inch holes, each fitted with a red lens and a hand operated shutter that hinges upward. Two light fixtures, with 25-watt bulbs, mounted inside the box are wired to individual switches to permit illuminating one bulb at a time. Brackets are provided for hanging on the ship's rail and a handle for carrying.

FUNCTION

The Station Marker Light Box is used at each delivery and receiving station in use during night

alongside underway connected replenishment operations to indicate by code the commodity being transferred. The code is set up by opening various combinations of shutters to allow light to show.

NATIONAL STOCK NUMBER

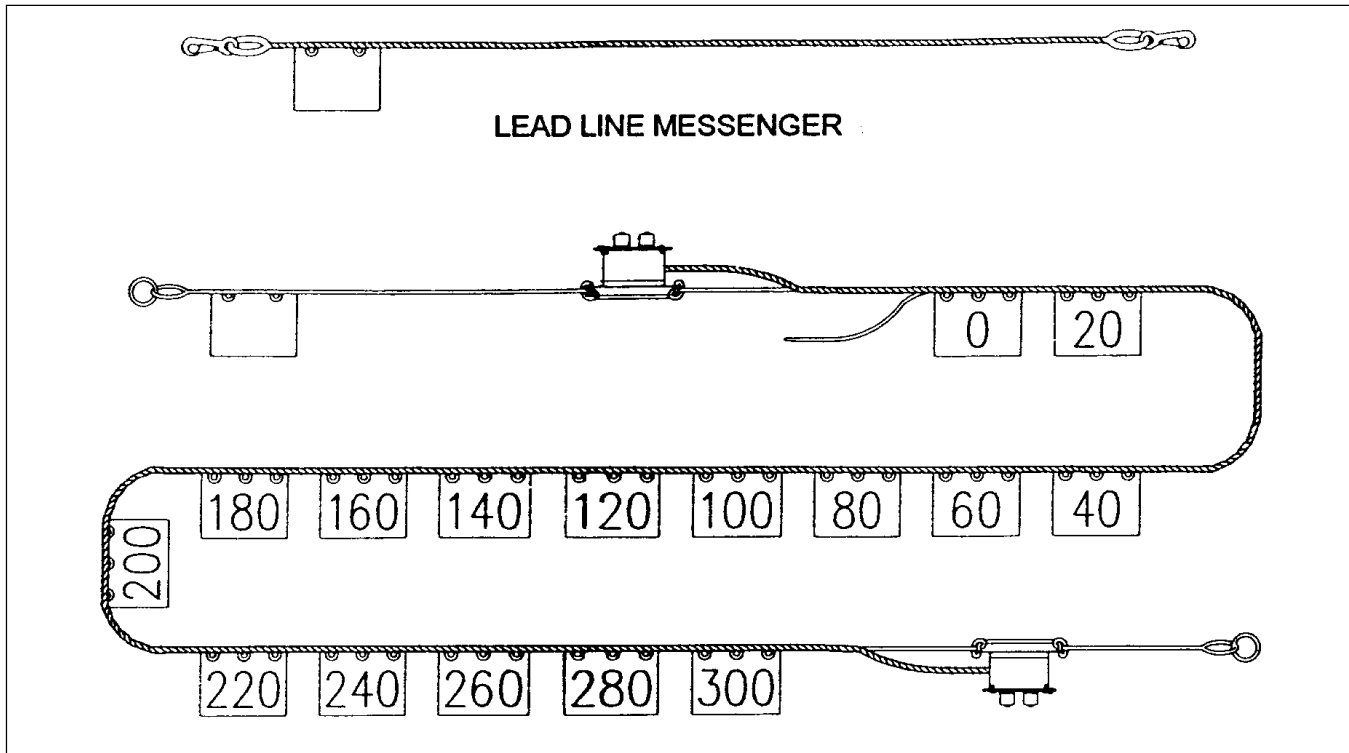
6230-00-658-3045

REFERENCE

Underway Replenishment (NWP 4-01.4)

Light, Station Marking Box SP SYM No 285 for Night Replenishment Operations (MS-17287)

LINE, BRIDGE-TO-BRIDGE PHONE/DISTANCE

**DESCRIPTION**

The Bridge-to-Bridge Phone/Distance Line consists of 350 feet of telephone cable manufactured from 3-strand, lightweight polypropylene rope with each strand containing a conductor. A waterproof sound-powered telephone jack box is connected to each end of the telephone cable.

Sixteen 8 x 10 inch, colored Herculite cloth markers are secured to the line at 20-foot intervals. The markers start with the "0" (zero) -foot marker about twelve feet from one jack box and end with the "300" foot marker about 37 feet from the other jack box. The cloth markers display 5-inch-high numerals to show the distance (0 to 300 feet) from the "0"-foot marker.

Each marker has one or two clear vinyl pockets designed to hold chemical lights for night operations.

Nylon lines are spliced into the Bridge-to-Bridge Phone/Distance Line between the two end markers (0 and 300) and their respective jack boxes. The lines are secured to the jack boxes so that no strain is taken by the telephone cable connections in the

jack boxes. On the zero marker end, the nylon line is about 200 feet long with a stainless steel ring in the bitter end. The nylon line serves as a lead line for passing the zero end of the phone/distance line to the delivery ship. A separate 200-foot-long nylon line, with snap hooks at both ends, is provided as a lead line messenger.

FUNCTION

The Bridge-to-Bridge Phone/Distance Line is used for all alongside underway connected replenishment operations. It provides a direct sound-powered telephone circuit between the delivery and receiving ships' bridges for use by the ships' captains or conning officers. It also provides a visual indicator of ship separation to the approach ships' conning officers. The Bridge-to-Bridge Phone/Distance Line is provided by the approach ship (normally the receiving ship). The zero end of the line is sent to the control ship (normally the delivery ship) and is secured on the control ship so that the "0" - foot marker is at the bulwark. The approach ship personnel hand tend the opposite end of the line,

keeping it taut, so that the marker at deck edge indicates the ship-to-ship distance.

During night operations, chemical lights are attached to each marker as required by NWP 4-01.4.

DRAWING NUMBER

NAVSEA 6695843 & 6695861

NATIONAL STOCK NUMBER

5995-01-394-7038

DIMENSIONS

	Length (<u>feet</u>)
Telephone cable	350
3/4-inch circumference nylon line	*424

*Length is approximate and includes lead line messenger.

REFERENCE

Underway Replenishment (NWP 4-01.4)

NATIONAL STOCK NUMBER

Assembly

5995-01-394-7038

Telephone Cable

6145-00-923-5787

Rope, Nylon, 3/4-inch circumference, 3-strand, nylon

4020-00-618-0261

Hook, Snap, Medium

5340-00-291-3543

Box, Sound Powered Telephone Jack

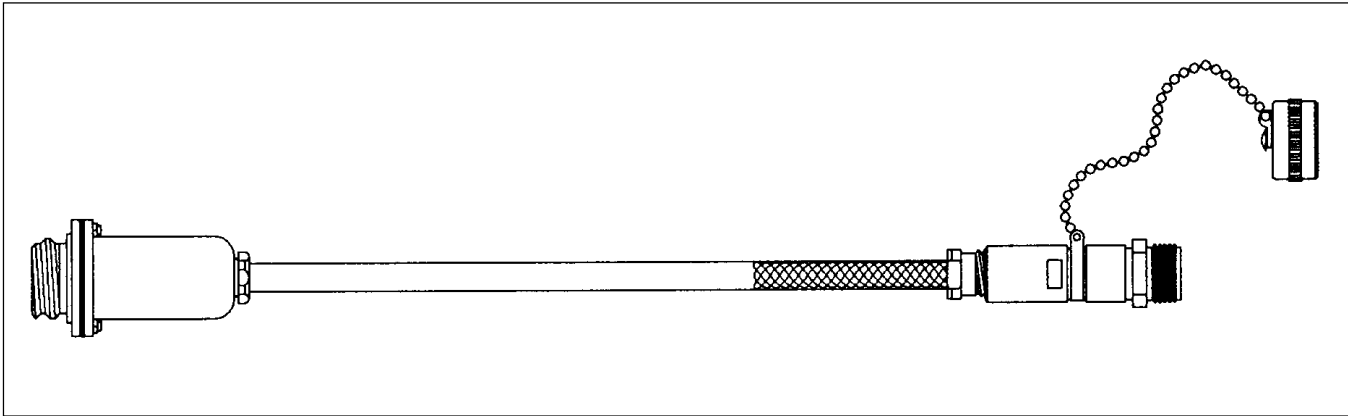
5935-00-552-6790

MANUFACTURER AND PART NUMBER

Ring, Galv Stl

Acco Babner, American Chain Division
(Cage 72671)

Part Number 4921-40814

LINE, FEMALE NATO PHONE CONNECTOR**DESCRIPTION**

The USN/NATO communications sound powered telephone Female Connector assembly consists of 18 inches of insulated electrical cable with two conductors. A NATO standard 4-pin straight plug female receptacle is connected to one end and a USN male portable telephone jack connector on the other end.

FUNCTION

The Female Phone Connector assembly is used when receiving a station-to-station phone line or a bridge-to-bridge phone/distance line from a NATO ship. It provides an interface between the standard

male NATO connector from the NATO ship and the female connection on the U.S. Navy sound powered phones. It completes the direct sound-powered telephone circuit between the delivery and receiving ships.

DRAWING NUMBER

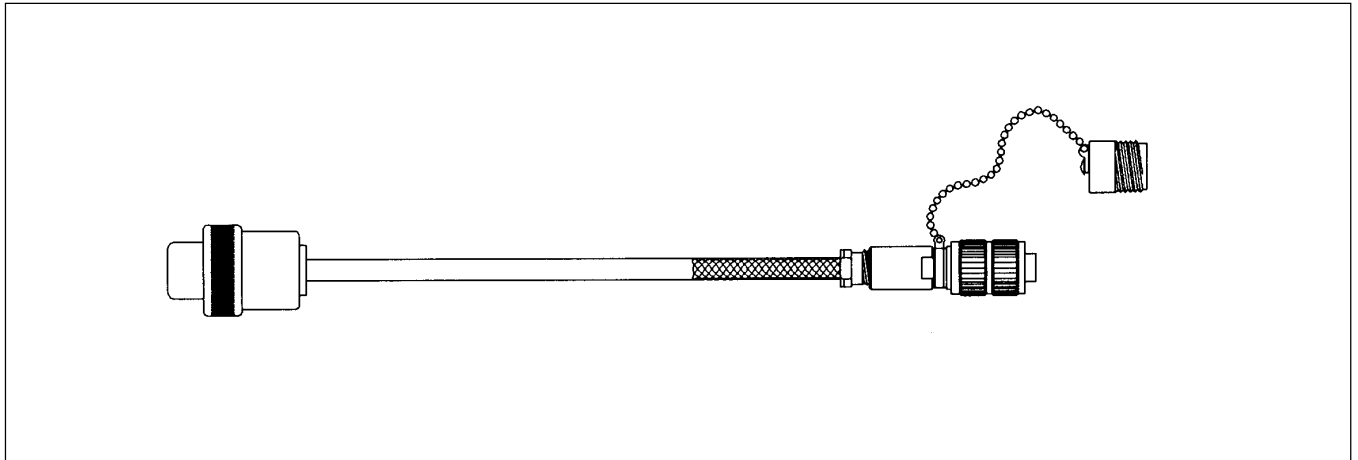
NAVSEA 805-6937098

NATIONAL STOCK NUMBER

5935-01-407-8657

REFERENCE

Underway Replenishment (NWP 4-01.4)

LINE, MALE NATO PHONE CONNECTOR**DESCRIPTION**

The USN/NATO communications sound powered telephone Male Connector assembly consists of 18 inches of insulated electrical cable with two conductors. A NATO standard 4-pin straight plug Male Connector is connected to one end and a USN female telephone jack connector on the other end.

FUNCTION

The Male NATO Phone Connector assembly is plugged into the outboard jack box when sending station-to-station phone line or a bridge-to-bridge

phone/distance line to a NATO ship. It provides a NATO male connection for a direct sound-powered telephone circuit between the delivery and receiving ships' UNREP stations or bridges.

DRAWING NUMBER

NAVSEA 805-6937099

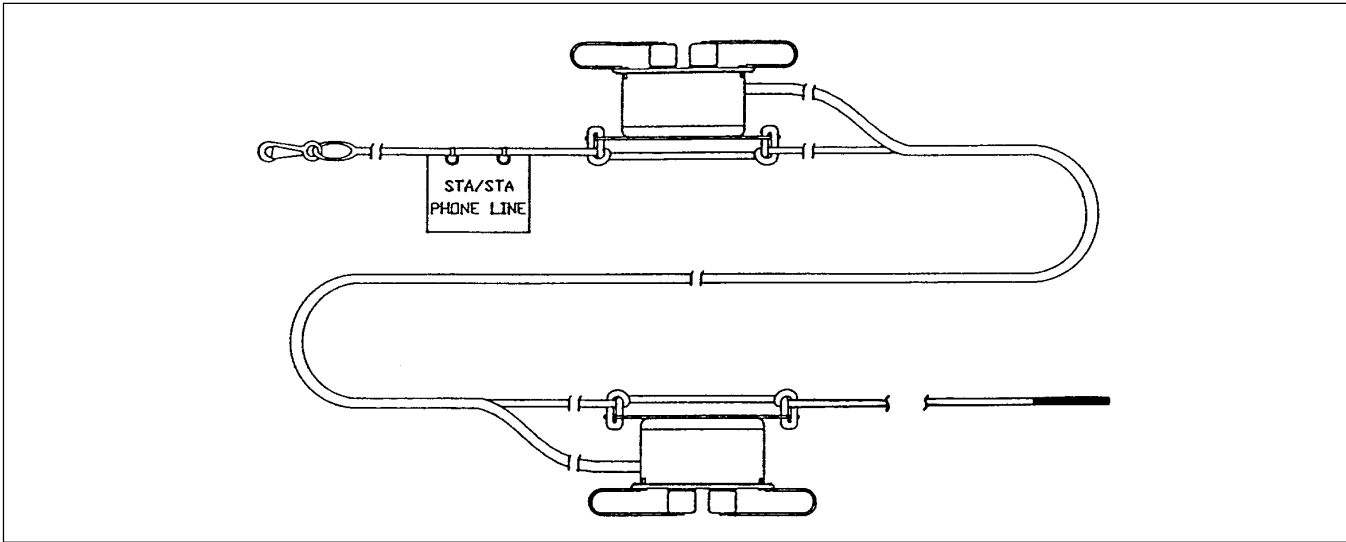
NATIONAL STOCK NUMBER

5935-01-407-8658

REFERENCE

Underway Replenishment (NWP 4-01.4)

LINE, STATION-TO-STATION PHONE

**DESCRIPTION**

The Station-to-Station Phone Line consists of 350 feet of telephone cable manufactured from 3-strand, lightweight polypropylene rope with each strand containing a conductor. A waterproof, sound-powered telephone jack box is connected to each end of the telephone cable.

Nylon lines are spliced into the Station-to-Station Phone Line approximately two feet from the jack boxes. The lines are secured to the jack boxes so that no strain is taken by the telephone cable connections in the jack boxes. On one end the nylon line is about 200 feet long and is designated the "lead line." The lead line has a snap hook installed in an eye splice at the bitter end. The nylon line at the opposite end of the Station-to-Station Phone Line is about eight feet long and is designated the "tail line."

FUNCTION

The Station-to-Station Phone Line is used with each alongside connected replenishment rig. It provides a direct sound-powered telephone circuit between the delivery station and the receiving station. The lead

line is connected to the rig messenger and passed from the delivery ship to the receiving ship when the rig is passed. The lead line is also used to tend the jack box, keeping it clear of the water, when the rig and phone line is retrieved.

DRAWING NUMBER

NAVSEA 6695844

REFERENCE

Underway Replenishment (NWP 4-01.4)

NATIONAL STOCK NUMBER

Assembly

5995-01-394-8641

Telephone Cable

6145-00-923-5787

Rope, Nylon, 3/4-inch circumference, 3-strand

4020-00-618-0261

Hook, Snap, Medium

5340-00-291-3543

Box, Sound-Powered, Telephone Jack

5935-00-552-6790

LINKS, END

DESCRIPTION

End Links are made up of forged heat treated steel. The inside length (L) and the width (W) are measured in inches. The diameter (D) of the stock is also measured in inches and indicates the size of the link.

FUNCTION

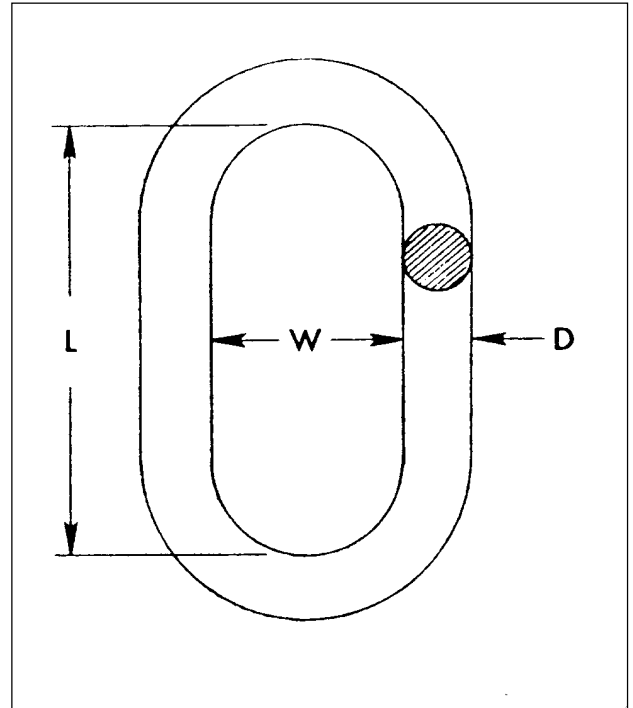
End Links are used to increase the distance between two fittings such as in the suspension of the hose from the trolley.

REFERENCE

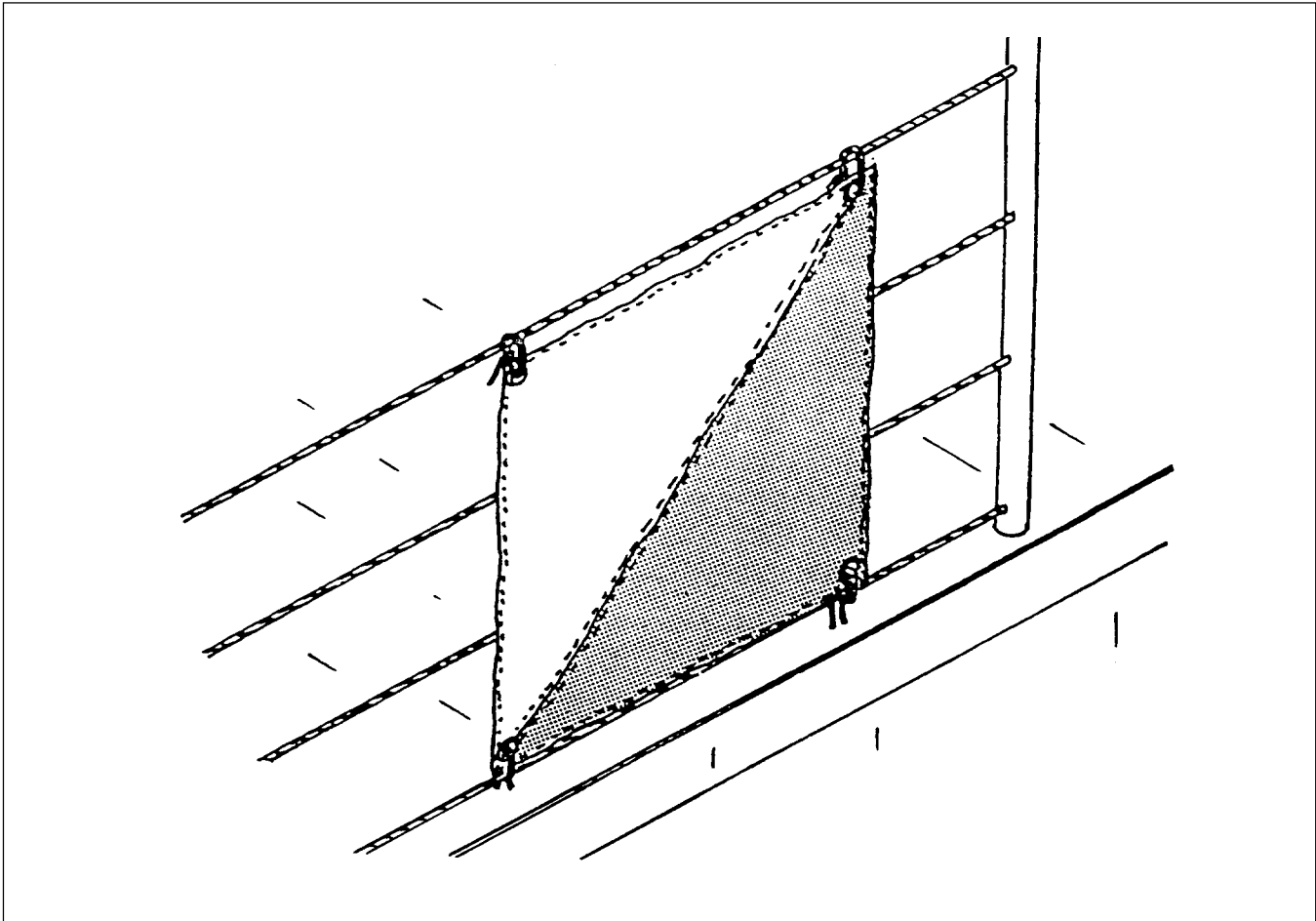
Chain and Attachments, Welded and Weldless
RR-C-271D

NATIONAL STOCK NUMBER

<u>Bar Size (Inches)</u>	<u>NSN</u>
5/8	4010-00-834-8546
3/4	4010-01-346-3954
7/8	4010-01-295-9406
1	4010-01-346-3953



MARKER, STATION, DAY

**DESCRIPTION**

The Day Station Marker consists of color coded bunting, wood, metal or a painted area mounted or installed at each replenishment station. Day Station Markers on UNREP ships and aircraft carriers also display the station number in addition to the color coding. NWP 4-01.4, chapter 2 contains Day Station Marker color code and pattern descriptions for all commodities normally transferred.

FUNCTION

The Day Station Marker is used at all alongside connected replenishment delivery and receiving stations to indicate the commodity being transferred.

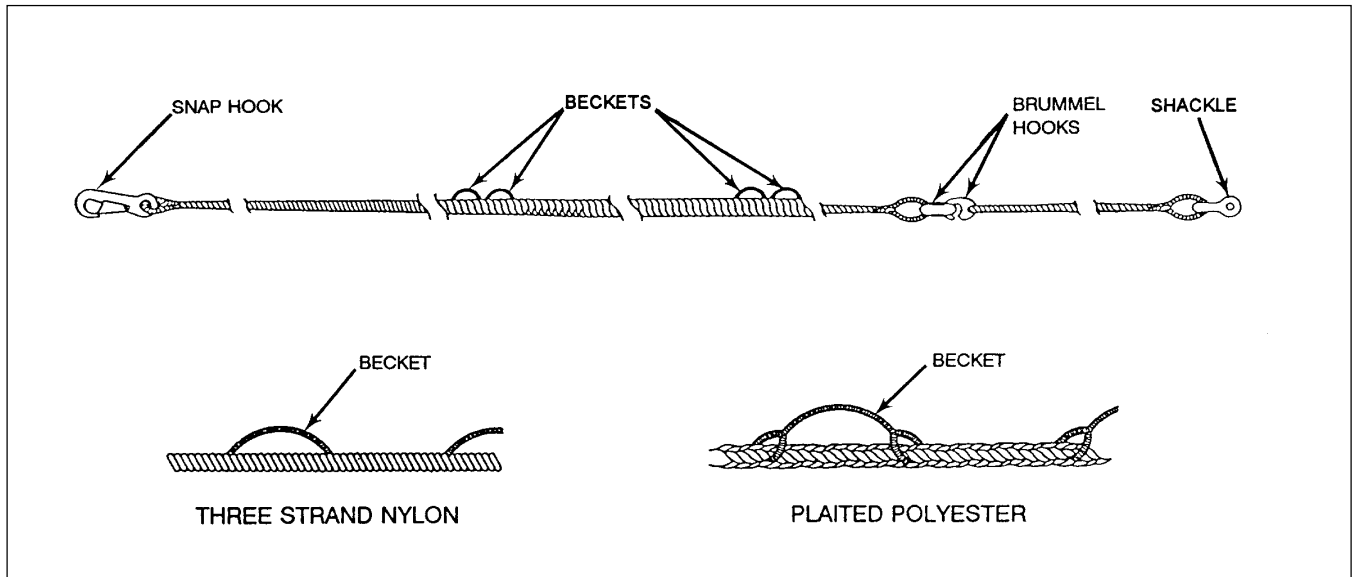
REFERENCE

Underway Replenishment (NWP 4-01.4)

NATIONAL STOCK NUMBER

Not a stock item. The Day Station Marker may be fabricated by ship's force.

MESSENGER ASSEMBLY, STAR (SURF, TRAVELING ACTUATED REMOTELY)



DESCRIPTION

The STAR Messenger Assembly is an 800-foot long, graduated three strand nylon or plaited polyester line. The main portion of the three strand nylon messenger consists of a snap hook attached to 200-feet of 1-1/2-inch circumference line spliced to 534-feet of 3-inch circumference line spliced to 64-feet of 2-1/4-inch circumference line attached to a brummel hook. The releasing line portion of the 3 strand nylon messenger consists of a second brummel hook attached to 60-feet of 2-1/4-inch circumference line with a soft spliced eye for dipping a shackle. The main portion also has four 1-1/8-inch circumference 3 strand nylon beckets attached to it. The plaited polyester messenger is configured the same as the 3 strand nylon except the nylon sections are replaced with the same sizes and lengths of plaited polyester line.

FUNCTION

The STAR Messenger Assembly is used on all cargo and fuel STREAM rigs to haul the station-to-

station phone line, the highline or spanwire, and the traveling SURF/STAR or fueling hose from the delivery ship to the receiving ship. The releasing line is used to release the STAR (as originally designed), provide slack to release the traveling SURF, or as a re-mating line for single probe fueling.

DRAWING NUMBER

NAVSEA 4629255

REFERENCE

Underway Replenishment (NWP 4-01.4)

NATIONAL STOCK NUMBER

STAR Messenger Assembly
4010-01-225-9838

Brummel Hook (Fast Eye No.2)
4030-01-176-8032

Snap Hook
5340-00-291-3543

PADDLES, SIGNAL

DESCRIPTION

UNREP Signal Paddles consist of two similar paddles with a square plastic surface and a polypropelene handle. One paddle has a red colored surface on one side and a green colored surface on the opposite side. The other paddle has a green colored surface on one side and an amber colored surface on the opposite side. A 1-inch wide diagonal white stripe runs from the upper left to the bottom right corner on the side of each paddle colored green. Operating signals are provided on surfaces of paddles.

FUNCTION

The Signal Paddles are used to visually signal and direct operations during underway replenishment.

NATIONAL STOCK NUMBER

red/green 6350-01-036-1989

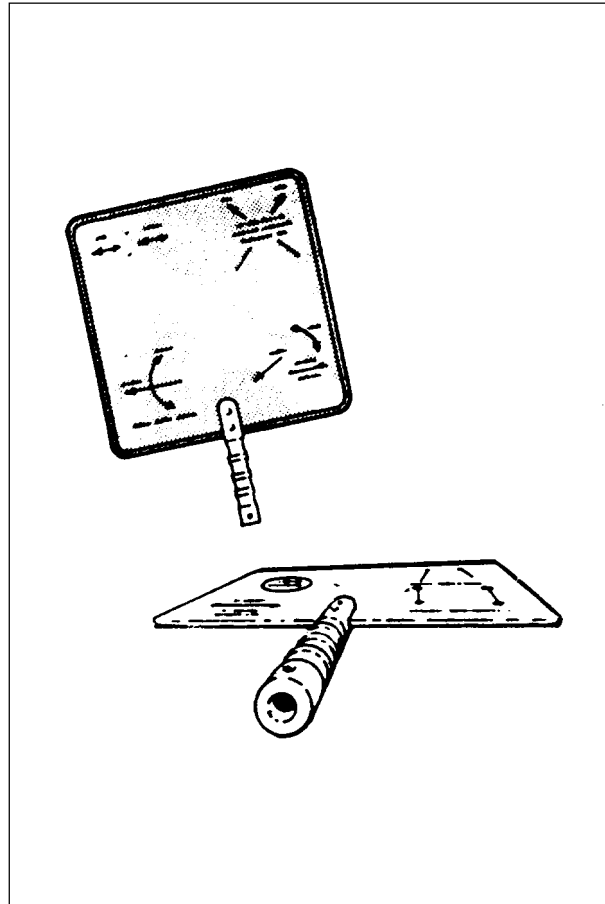
amber/green 6350-01-033-7519

DRAWING NUMBER

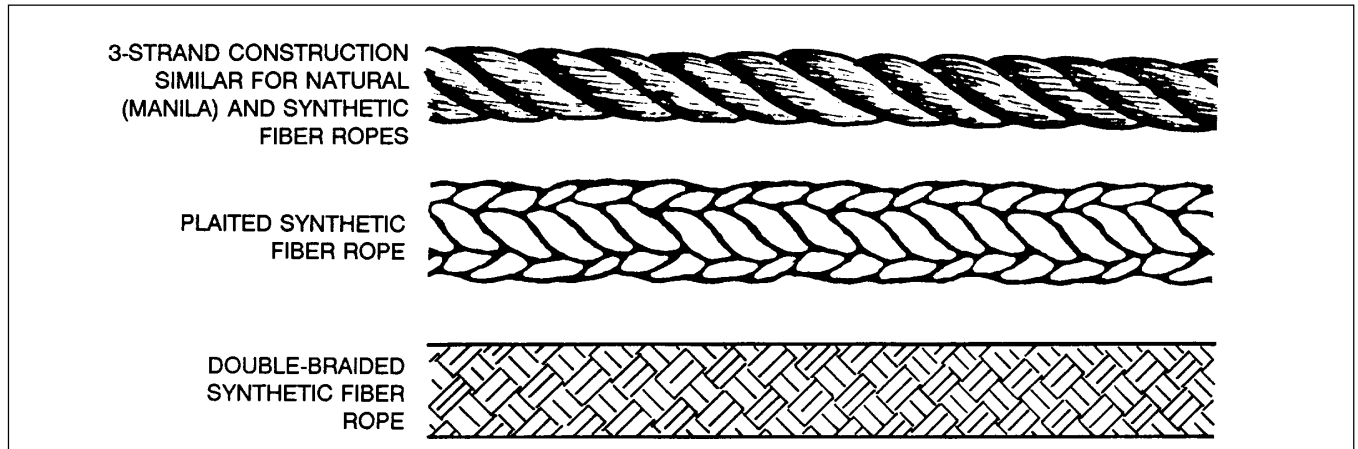
NAVSHIPS 805-2580255

REFERENCE

Underway Replenishment (NWP 4-01.4)



ROPE, FIBER (SYNTHETIC & NATURAL)



DESCRIPTION

Fiber Ropes used by the Navy for underway replenishment includes natural fiber (manila) and synthetic fiber (nylon, polyester or dacron, and polypropylene). Manila rope can be readily distinguished from the synthetic ropes by its dry, harsh feel. Manila rope is available in 3-strand construction only.

Synthetic Fiber Ropes come in several different constructions. Those commonly used in underway replenishment are 3-strand; double braided; plaited; and double braided with a staple wrap. The double braided with staple wrap rope can be distinguished from the others by its dull, soft, fuzzy appearance and feel as compared to the shiny, smooth appearance and feel of non-staple wrap constructions.

Sizes of both Natural and Synthetic Fiber Ropes are identified by their circumference, as opposed to diameter used for wire rope. Small 3-strand nylon and manila rope sizes are commonly referred to by number of threads. Refer to tables on following pages.

FUNCTION

Manila is the only rope authorized for use as riding lines on fueling-at-sea rigs. Standard riding lines are 4-inch manila rope used with two-folds made up of 2 1/2-inch manila rope.

Easing out lines are made up of 12 to 21-thread manila. Manila may also be used as lizard lines. Synthetic lines of various sizes and constructions are

used in numerous underway replenishment applications. However, the only synthetic highline authorized for transfer of personnel is 350 feet, or more, of 4-inch double-braided, spun polyester with staple wrap (in accordance with MIL-R-24536).

Other typical applications of synthetic ropes in underway replenishment include: 3-inch plaited, spun polyester (MIL-R-24537) for the synthetic highline rig inhaul line; and various sizes of either plaited polyester or 3-strand nylon for the STAR messenger.

DIMENSIONS, WEIGHT AND CAPACITY

See tables on following pages.

REFERENCE

Wire and Fiber Rope and Rigging
 NSTM S9086-UU-STM-010/CH-613
 Underway Replenishment (NWP 4-01.4)
 Rope, Manila and Sisal (Fed Spec. T-R-605)
 Rope, Nylon, 3-strand (MIL-R-17343)
 Rope, Nylon, Fibrous, Double-Braided
 (MIL-R-24050)
 Rope, Polyester, 3-strand (MIL-R-30500)
 Rope, Polypropylene (MIL-R-24049)
 Rope, Fibrous Plaited, Continuous Polyester
 Filament with a Staple Wrap (MIL-R-24537)
 Rope, Fibrous, Double Braided, Continuous
 Polyester Staple Wrap (MIL-R-24536)

NATIONAL STOCK NUMBER

See tables on following pages.

DIMENSIONS, WEIGHT, CAPACITY AND NATIONAL STOCK NUMBER

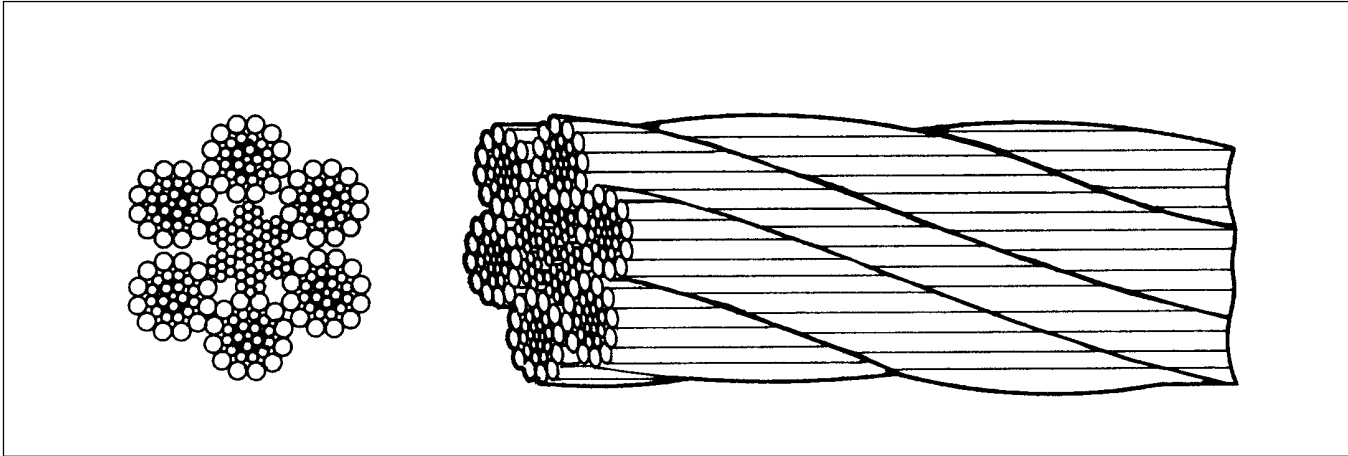
SIZE (Circumference) Inches	DIAMETE R (Approx.) Inches	LENGTH (Max.) Feet	WEIGHT (Approx.) Pounds	BREAKING STRENGTH (Minimum) Pounds	NATIONAL STOCK NUMBER
THREE STRAND NYLON					
3/4 (6-Thread)*	1/4	1980	35	1,500	4020-00-618-0261
1 (9-Thread)*	5/16	2250	54	2,600	4020-00-641-8898
1-1/8 (12-Thread)*	3/8	1620	59	3,300	4020-00-641-8899
1-1/4 (15-Thread)*	7/16	1200	61	4,800	4020-00-753-2886
1-1/2 (21-Thread)*	1/2	1200	75	5,800	4020-00-641-8900
1-3/4	9/16	1200	99	7,600	4020-00-560-7732
2	5/8	1200	127	9,800	4020-00-753-2887
2-1/4	3/4	1200	172	13,200	4020-00-141-7152
2-1/2	13/16	1200	203	15,300	4020-00-753-2888
2-3/4	7/8	1200	248	19,000	4020-00-174-1231
3	1	1200	303	23,200	4020-00-752-8878
3-1/2	1-1/8	1200	416	32,000	4020-00-174-1232
DOUBLE BRAIDED NYLON					
3/4*	1/4	600	10	1,700	4020-00-106-9342
1*	5/16	600	16	2,700	4020-00-106-9341
1-1/8*	3/8	600	23	3,900	4020-00-946-0436
1-1/2*	1/2	600	40	6,900	4020-00-106-9361
2	5/8	600	70	12,000	4020-00-106-9402
2-1/4	3/4	600	89	15,000	4020-00-106-9403
2-1/2	13/16	600	110	18,400	4020-00-106-9404
3	1	600	158	26,500	4020-00-471-9336
3-1/2	1-1/8	600	-	36,000	4020-00-519-7916
4	15/16	600	-	48,000	4020-00-106-9407
4-1/2	1-1/2	600	-	60,000	4020-00-106-9408
5	1-5/8	600	-	73,000	4020-00-106-9409

DIMENSIONS, WEIGHT, CAPACITY AND NATIONAL STOCK NUMBER (CONT.)

SIZE (Circumference) Inches	DIAMETER (Approx.) Inches	LENGTH (Max.) Feet	WEIGHT (Approx.) Pounds	BREAKING STRENGTH (Minimum) Pounds	NATIONAL STOCK NUMBER
MANILA					
3/4 (6-Thread) *	1/4		50	540	4020-00-231-9021
1 (9-Thread) *	5/16	1725	50	900	4020-00-231-9005
1-1/8 (12-Thread) *	3/8	1220	50	1,215	4020-00-231-2581
1-1/4 (15-Thread) *	7/16	1200	63	1,575	4020-00-231-9007
1-1/2 (21-Thread)*	1/2	1200	90	2,385	4020-00-231-2572
2-1/4	3/4	1200	200	4,860	4020-00-238-7734
2-1/2	13/16	1200	234	5,850	4020-00-231-9012
3	1	1200	324	8,100	4020-00-231-9014
4	1-1/4	1200	571	14,400	4020-00-184-9807
SPUN POLYESTER - PLAITED WITH A STAPLE WRAP					
1-1/2	1/2	400			4020-01-028-3826
3	1	1200			4020-01-028-3841
SPUN POLYESTER - DOUBLE BRAIDED WITH A STAPLE WRAP					
1	5/16	1200			4020-01-028-4528

NOTES * Length, weight and stock number shown is for the longest unit of issue (coil or reel). Consult stock catalog for shorter length coil or reel.

ROPE, WIRE



DESCRIPTION

Wire Rope used for underway replenishment is Type I, general purpose, Class 3, construction 6, 6 by 37, independent wire rope core, extra improved plow steel, preformed right regular lay in accordance with Fed Spec. RR-W-410. Wire Rope sizes are expressed as the diameter of the rope.

FUNCTION

Wire Rope is used in numerous applications during underway replenishment operations. Ships use wire rope to make up the wires and whips used in the rigging of all connected replenishment fueling and cargo rigs.

DIMENSIONS, WEIGHTS AND STRENGTHS

See table on following page.

REFERENCE

Wire Rope and Strand Fed Spec. RR-W-410.

NATIONAL STOCK NUMBER

1/2-inch 1200-Foot Reel	4010-00-142-6486
3/4-inch 900-Foot Reel	4010-00-142-6341
7/8-inch 900-Foot Reel	4010-00-142-6342

NOTE: Stock numbers shown are for standard unit of issue. If a different unit is desired consult Afloat Shopping Guide.

**PHYSICAL PROPERTIES OF TYPE I
GENERAL PURPOSE, CLASS 3, 6 BY 37**

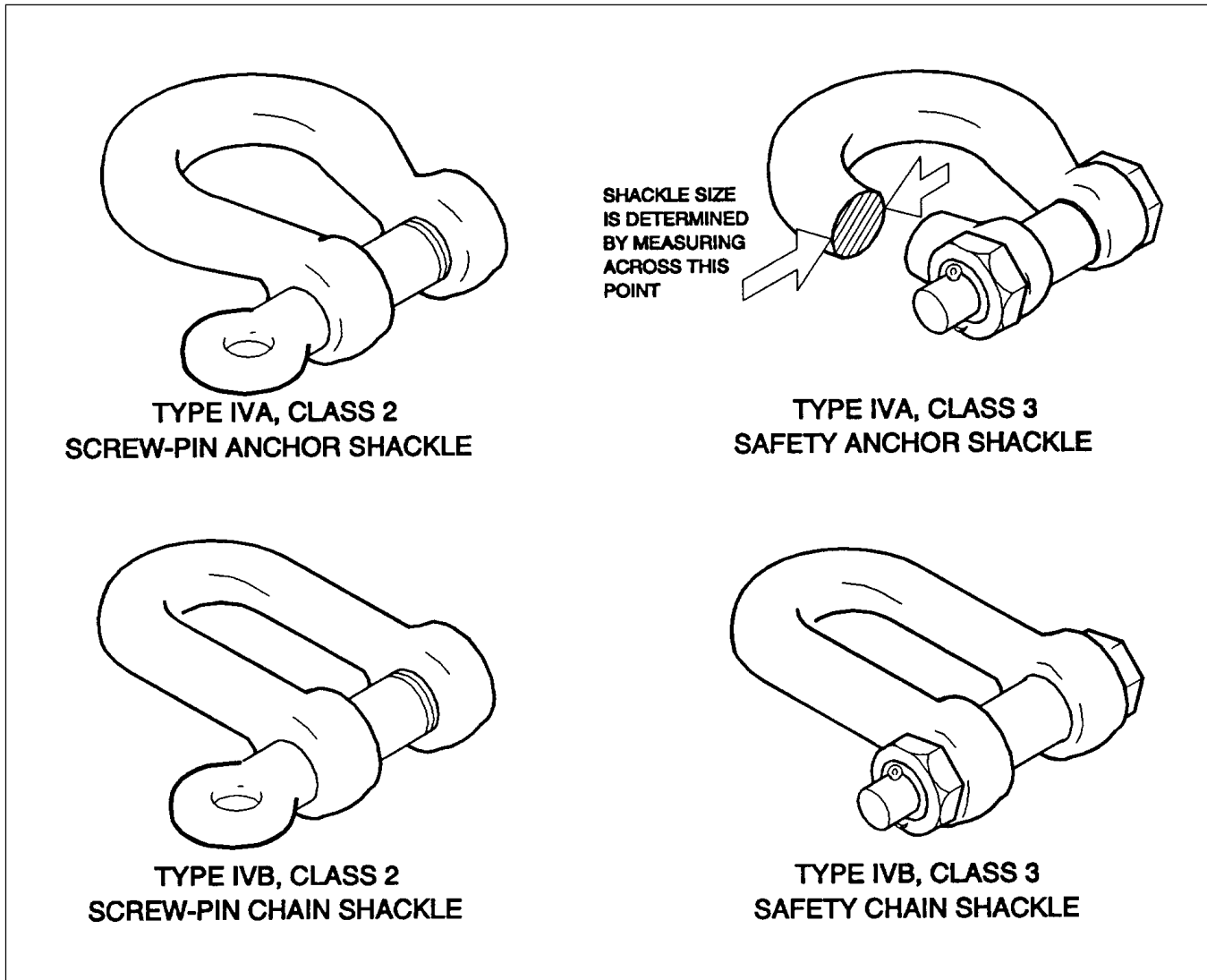
EXTRA IMPROVED PLOW STEEL, WIRE STRAND OR IWRC*

WIRE ROPE

SIZE (Diameter)		WEIGHT (Approx. per foot)	BREAKING STRENGTH (Pounds)
Normal (ordered) (Minimum)	(Maximum)		
1/2	17/32	.46	26,000
3/4	25/32	1.04	57,400
7/8	59/64	1.42	77,600

*Independent Wire Rope Core

SHACKLES, STEEL

**DESCRIPTION**

There are two types and two classes of Steel Shackles commonly used in underway replenishment rigs.

Type IVA shackles have curved body sides and are narrower at the throat (the gap spanned by the screw-pin or bolt) than at the widest part of the inside dimension of the curved body. This type of shackle is termed "anchor" shackles.

Type IVB shackles have straight sides with the throat width dimension the same as the maximum inside dimension of the body. This type of shackle is termed "chain" shackles. Class 2 shackles have a

pin, which passes through one eye and screws into the other (threaded) eye. These are termed "screw-pin" shackles.

Class 3 shackles have a bolt, which passes through both (unthreaded) eyes and is secured by a threaded nut and a cotter pin. These are termed "safety" shackles.

Shackle sizes are determined by the diameter of the steel body rod (refer to illustration). All shackles used in underway replenishment are grade B, which is high strength. Shackle bodies are permanently marked in raised or stamped letters on the side with the manufacturer's name or trademark, shackle size,

and safe working load. Grade B shackle pins or bolts are marked by raised or stamped letters "HS" on the head.

FUNCTION

Shackles are used in many applications in underway replenishment systems where a nonpermanent connection is required. Typical applications include hanging blocks and connecting ends of wire ropes, chains, natural and synthetic lines to hooks, eyes or other hardware or load-bearing equipment.

Safety shackles should be used wherever possible, especially when safety is critical for personnel or

equipment, or where loading of the rig is variable and quick removal is not required. Screw-pin shackles may be used in place of safety shackles but the screw-pin must be seized to prevent it working loose.

DIMENSIONS

See tables on following pages.

REFERENCE

Chain and Attachments, Welded and Weldless
RR-C-271D

NATIONAL STOCK NUMBER

See tables on following pages.

**SAFETY CHAIN SHACKLE
(GRADE B)**

SIZE (INCHES)	SAFE WORKING LOAD (POUNDS)	MINIMUM BREAKING LOAD (POUNDS)	NATIONAL STOCK NUMBER
1/2	6,600	33,000	4030-00-369-4033
5/8	10,000	50,000	4030-00-279-4477
3/4	14,000	70,000	No NSN Assigned
7/8	19,000	95,000	4030-00-278-0698
1	25,000	125,000	4030-00-373-1404
1-1/8	30,000	150,000	4030-00-373-1405
1-1/4	36,000	180,000	4030-00-278-0717
1-3/8	42,000	210,000	No NSN Assigned
1-1/2	60,000	300,000	4030-00-369-4038
1-5/8	70,000	350,000	No NSN Assigned
1-3/4	80,000	400,000	4030-00-377-1406
2	100,000	500,000	4030-00-369-4039

**SAFETY ANCHOR SHACKLE
(GRADE B)**

SIZE (INCHES)	SAFE WORKING LOAD (POUNDS)	MINIMUM BREAKING LOAD (POUNDS)	NATIONAL STOCK NUMBER
1/2	6,600	33,000	4030-00-280-3453
5/8	10,000	50,000	4030-00-278-0700
3/4	14,000	70,000	4030-00-278-0699
7/8	19,000	95,000	4030-00-278-0701
1	25,000	125,000	4030-00-279-4475
1-1/8	30,000	150,000	4030-00-278-0703
1-1/4	36,000	180,000	4030-00-279-4476
1-3/8	42,000	210,000	4030-00-278-0712
1-1/2	60,000	300,000	4030-00-278-0714
1-5/8	70,000	350,000	4030-00-278-0715
1-3/4	80,000	400,000	4030-00-369-2955
2	100,000	500,000	4030-00-373-0939

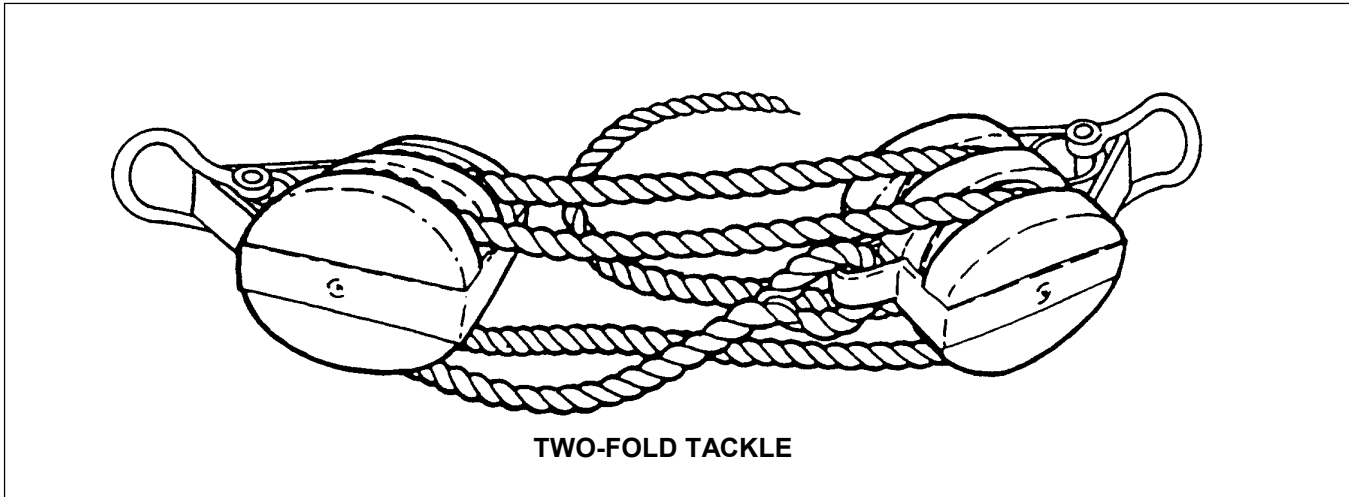
**SCREW PIN ANCHOR SHACKLE
(GRADE B)**

SIZE (INCHES)	SAFE WORKING LOAD (POUNDS)	MINIMUM BREAKING LOAD (POUNDS)	NATIONAL STOCK NUMBER
1/2	6,600	33,000	4030-00-369-3962
5/8	10,000	50,000	4030-00-369-3963
3/4	14,000	70,000	4030-00-369-3973
7/8	19,000	95,000	4030-00-369-3988
1	25,000	125,000	No NSN Assigned
1-1/8	30,000	150,000	4030-00-373-1316
1-1/4	36,000	180,000	4030-00-373-1317
1-3/8	42,000	210,000	4030-00-390-0740
1-1/2	60,000	300,000	4030-00-373-1327
1-5/8	70,000	350,000	4030-00-369-3992
1-3/4	80,000	400,000	4030-00-369-3993
2	100,000	500,000	4030-00-367-6888

**SCREW PIN CHAIN SHACKLE
(GRADE B)**

SIZE (INCHES)	SAFE WORKING LOAD (POUNDS)	MINIMUM BREAKING LOAD (POUNDS)	NATIONAL STOCK NUMBER
1/2	6,600	33,000	4030-00-369-3894
5/8	10,000	50,000	4030-00-369-3905
3/4	14,000	70,000	4030-00-373-0997
7/8	19,000	95,000	4030-00-369-3909
1	25,000	125,000	4030-00-373-0998
1-1/8	30,000	150,000	4030-00-373-1015
1-1/4	36,000	180,000	4030-00-369-3911
1-3/8	42,000	210,000	4030-00-369-3913
1-1/2	60,000	300,000	4030-00-373-1017
1-5/8	70,000	350,000	4030-00-373-1020
1-3/4	80,000	400,000	4030-00-373-1021
2	100,000	500,000	4030-00-373-1063

TACKLE

**DESCRIPTION**

A Tackle consists of a single and double block (luff tackle) or two double blocks (two fold) and up to 250-feet of 2-1/2-inch circumference manila line. The blocks are fitted with an oblong swivel eye and upset anchor screw pin shackle. One block is fitted with a becket.

FUNCTION

A Tackle is used during rigging operations to provide a mechanical advantage. The Tackle is used to adjust riding lines at alongside fuel receiving

stations when the probe connection is not used. At solid cargo pendant receiving stations it is used to haul the pendant to the operating position.

DRAWING NUMBER

NAVSHIPS 805-2227936

REFERENCE

Underway Replenishment (NWP 4-01.4)

NATIONAL STOCK NUMBER (P-NICN)

Jigger, Tackle 1H 0000-LL-CJ6-9908

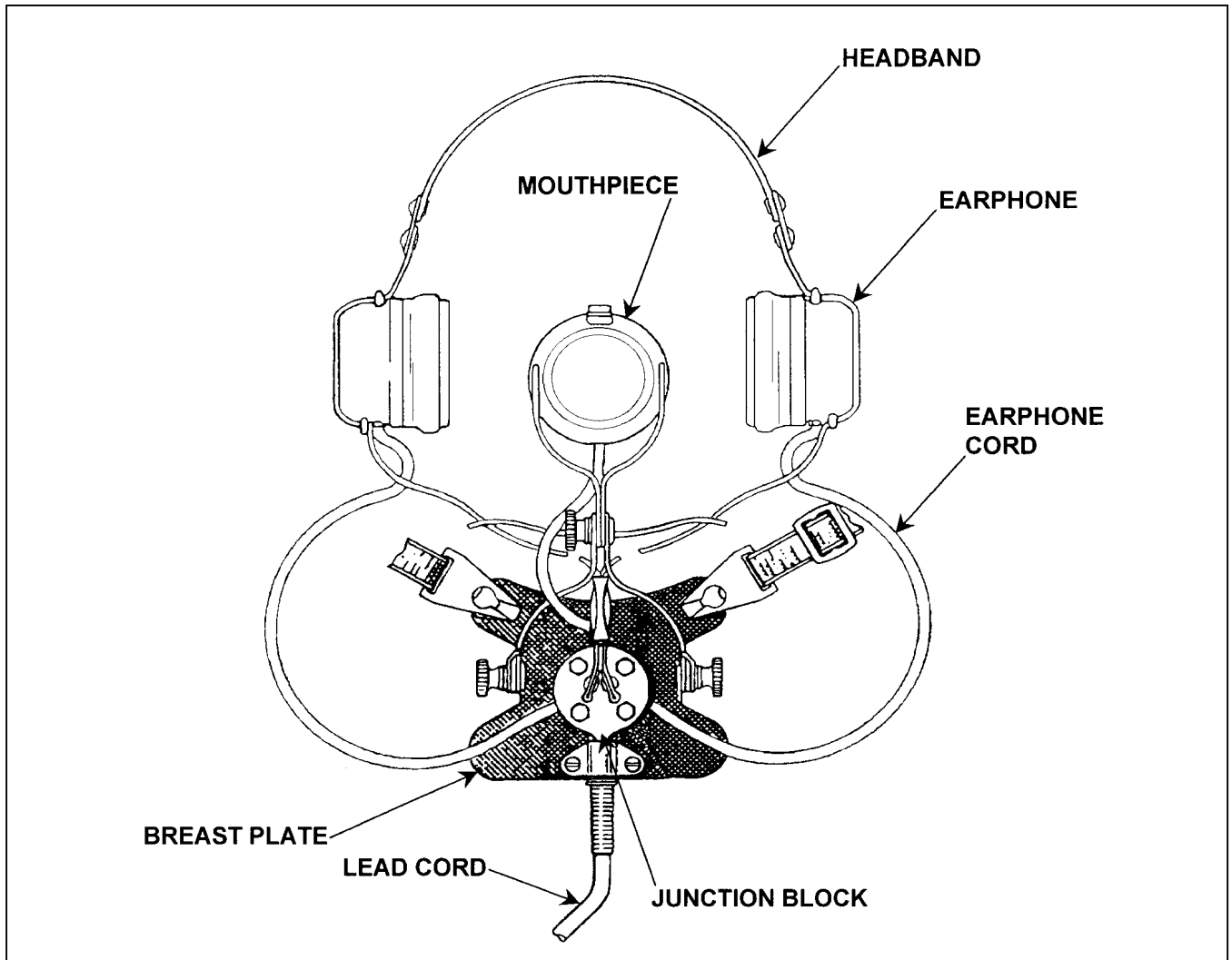
7 or 8 inch block without becket

7 or 8 inch block with becket

2-1/2" Circ. Manila line

4020-00-231-9012

TELEPHONE, SOUND-POWERED

**DESCRIPTION**

A Sound-Powered Telephone system is one in which the power is created from the sound vibrations of speech against a plate in the mouthpiece. No external electric power or batteries are required. The headset consists of a breastplate supported on the chest of the user by cloth neckstraps and a yoke that is mounted to the mouthpiece. The earphones are supported by a metal or fiber headband. The mouthpiece and the earphones are connected by cords (rubber wound around wire) to the junction block on the breastplate. From the bottom of the junction block

runs the lead ("leed") cord. This cord may vary in length, depending on the needs of the station. It ends in a metal plug called a jack.

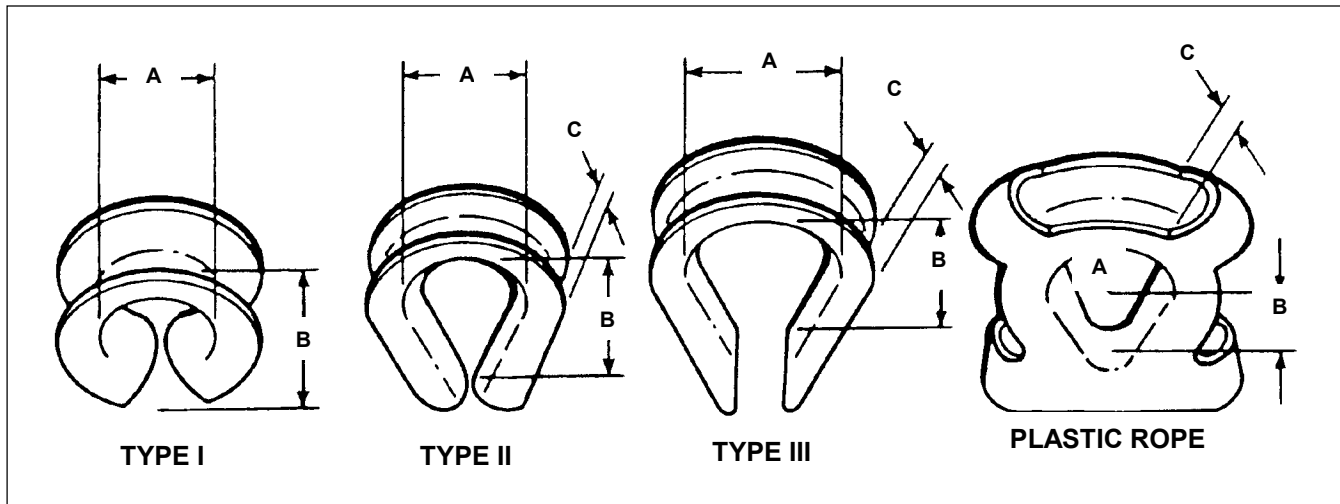
FUNCTION

During UNREP, Sound-Powered Telephones are used to transmit orders and information to various stations within the delivery and receiving ships, between the bridges of each ship and between the delivery and receiving stations on each ship.

NATIONAL STOCK NUMBER

Headset; Chestset 5695-00-900-6401

THIMBLES



DESCRIPTION

Thimbles are made of rolled steel and are hot-dip galvanized. There are four basic types of thimbles. Type I thimbles for natural fiber and nylon small stuff are round. Type II light thimbles for natural fiber and wire rope are semicircular at the closed ends, with the sides tapering together at the free ends. Type III heavy thimbles for wire rope are semicircular at the closed ends with the sides tapering together at the free ends with a slightly longer taper than for Type II Thimbles.

Thimbles for plastic rope (such as nylon small stuff) are made of a one-piece aluminum bronze casting. Each thimble is marked for identification by giving the rope size circumference and the wording "For Plastic Rope" depressed in the casting.

FUNCTION

Thimbles are used to form an eye in the end of a piece of line or wire. They provide a smooth bend in the line and prevent fittings or shackles, etc. from wearing through the line.

DIMENSIONS

See Following Table

NATIONAL STOCK NUMBER

TYPE I

Circumference Rope (inches)	NSN
3/4 to 1	No NSN Assigned
1-1/8	4030-00-262-2045
1-1/2	4030-00-282-2509
2	4030-00-262-2048
2-1/4	4030-00-262-1597
2-1/2	4030-00-262-2049
3	4030-00-270-8695
3-1/2	4030-00-270-8698
4	4030-00-262-2051
5	4030-00-262-1599

TYPE II			PLASTIC ROPE	
Wire Diameter	Fiber Circumference	NSN	Plastic Rope Circumference	NSN
3/16	9/16	4030-00-202-3339	1-1/8 to 1-1/4	4030-00-814-5781
3/8	1 to 1-1/8	4030-00-266-0085	1-1/2 to 1-3/4	4030-00-814-5790
1/2	1-1/2	4030-00-282-2513	2 to 2-1/4	4030-00-814-5794
5/8	2	4030-00-262-1791	2-1/2 to 2-3/4	4030-00-814-5825
7/8	2-1/2 to 2-3/4	4030-00-286-5430	3	4030-00-814-5827
1	3	4030-00-266-0086	4	4030-00-814-5947
1-1/2	4-1/2	4030-00-266-7094	5	4030-00-814-5851

TYPE III	
Wire Diameter	NSN
1/2	4030-00-266-0066
3/4	4030-00-270-8709
7/8	4030-00-266-0070
1	4030-00-266-0071

DRAWING NUMBER

Hull S1801-860292

REFERENCE

Thimbles, Rope, Fed Spec. FF-T-276
 Thimble, Synthetic Rope, MIL-T-23326

DIMENSIONS

Circumference of rope (inches)	Thimble Size (inches)	*A min (inches)	*B min (inches)	*C min (inches)	Approx. weight per 100 (pounds)
TYPE I					
3/4 to 1	5/16	3/8	3/4	NA	1.5
1-1/8	3/8	1/2	7/8	NA	2.2
1-1/2	1/2	3/4	1-1/4	NA	5.8
2	11/16	15/16	1-1/2	NA	11.0
2-1/4	3/4	1-1/8	1-3/4	NA	16.0
2-1/2	7/8	1-3/16	2	NA	20.0
3	1	1-1/4	2-1/4	NA	30.0
3-1/2	1-1/8	1-3/8	2-1/2	NA	35.0
4	1-3/8	1-3/4	3	NA	60.0
5	1-3/4	2-3/8	4	NA	150.0

* Refer to illustration for A, B and C dimension locations.

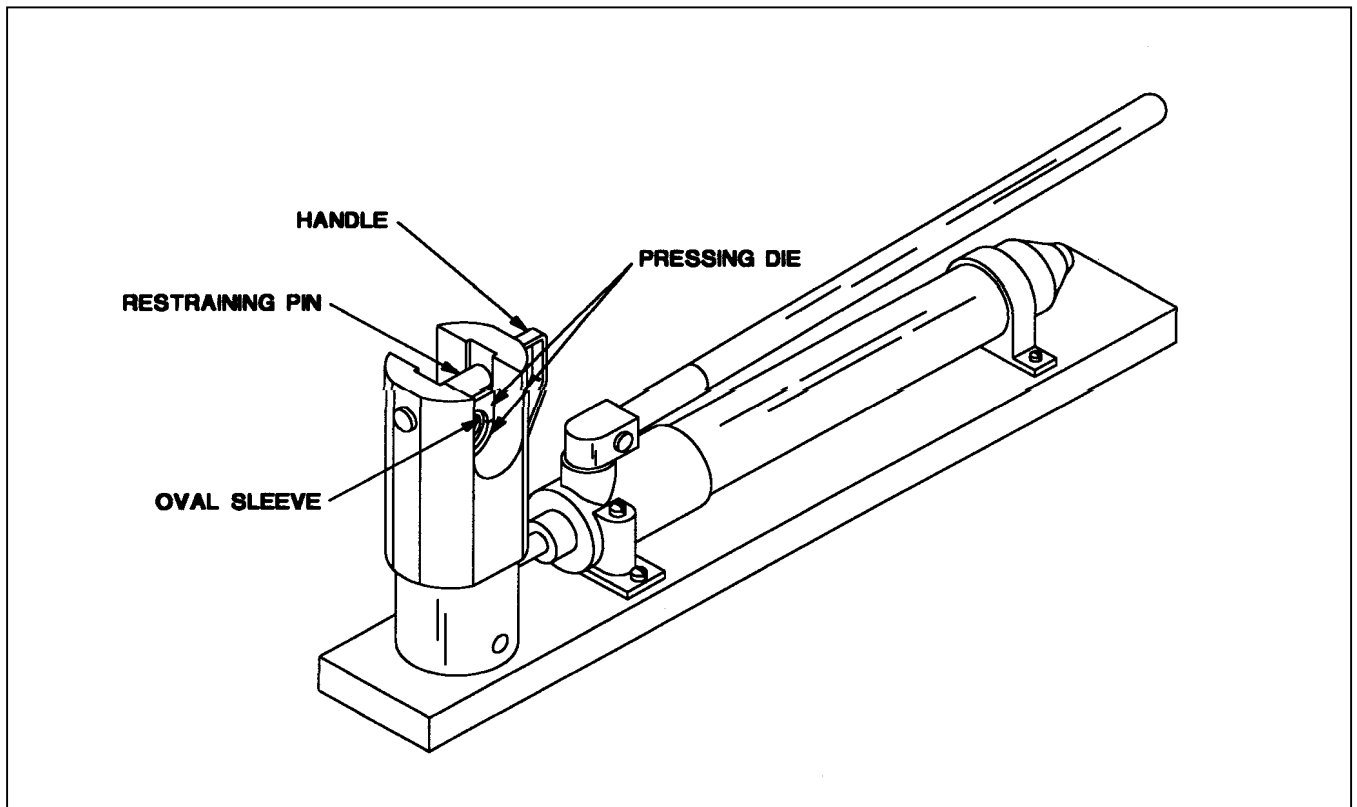
TOOLS

S9570-AD-CAT-010

DIMENSIONS (CONT.)					
Circumference of rope (inches)	Thimble Size (inches)	*A min (inches)	*B min (inches)	*C min (inches)	Approx. weight per 100 (pounds)
TYPE II					
3/4	1/4	11/16	1-5/16	9/32	3.25
1 to 1-1/8	3/8	15/16	1-9/16	13/32	7.40
1-1/2	1/2	1-1/8	1-7/8	17/32	13.75
2	5/8	1-3/8	2-1/4	21/32	34.0
2-1/4	3/4	1-1/2	2-1/2	25/32	50.6
2-1/2	7/8	1-7/8	3	15/16	90.0
3	1	2-1/8	3-5/16	1-1/16	105.0
3-1/2	1-1/8	2-3/8	3-5/8	1-3/16	190.0
4	1-3/8	2-3/4	4-5/16	1-7/16	-
5	1-3/4	3-1/2	5-5/16	1-7/8	594.0
TYPE III					
Wire Diameter					
1/2	1/2	1-1/2	2-5/8	17/32	51
3/4	3/4	2	3-3/4	25/32	147
7/8	7/8	2-1/4	4-1/4	15/16	185
1	1	2-1/2	4-1/2	1-1/16	300
PLASTIC ROPE					
Circumference					
1-1/8 to 1-1/4	3/8 to 7/16	7/16	13/16	9/16	30
1-1/2 to 1-3/4	1/2 to 9/16	1/2	1	11/16	50
2 to 2-1/4	5/8 to 3/4	9/16	1-3/16	7/8	60
2-1/2 to 2-3/4	13/16 to 15/16	5/8	1-7/16	1-1/16	90
3	1	13/16	1-9/16	1-3/16	160
4	1-5/16	1-1/16	2	1-1/2	260
5	1-5/8	1-5/16	2-7/16	1-13/16	480

* Refer to illustration for A, B and C dimension locations.

TOOL, SWAGING

**DESCRIPTION**

The Swaging Tool (Nicopress) is a 35-ton capacity, manually operated, hydraulic jack. Included is a restraining pin with handle. Pressing dies are installed to swage an oval sleeve to form an eye (i.e., a loop) at the end of a wire rope.

FUNCTION

With a set of 1/2-inch dies, the swaging tool is used to press oval sleeves to make-up 1/2-inch wire rope preventers and pendants, etc.

NATIONAL STOCK NUMBER

<u>Item</u>	<u>NSN</u>
Swaging Tool, P/N 635	5100-00-818-4468
Pressing Die Set P/N OVAL K8	5120-01-051-5832
Oval Sleeve, Zinc-Plated Copper, MS51844-32	4030-01-387-9835
Oval Sleeve, Plain Copper P/N 18-25-K8	4030-00-612-7487

REFERENCE

Underway Replenishment (NWP 4-01.4)

TOOLS

DESCRIPTION

All underway replenishment stations are provided with tools which are stowed in a tool box readily

accessible to each station. The tools are considered an integral part of the transfer station equipment and shall not be used for any other purpose.

LIST OF ACCEPTABLE TOOLS			
Item	NSN	KEY	QTY
Allen Wrenches	5120-00-729-6392	B	2 EA SIZE
Axe	5110-00-720-0711	B	1
Chain Stopper, 1/4-inch x 6 feet long	No NSN Assigned	B	1
Cotter Pins (CRES)			
1/16 x 3 inches	5315-00-182-4173	B	12
3/32 x 3 inches	5315-00-543-3696	B	12
1/8 x 3 inches	5315-00-236-8365	B	12
5/32 x 3 inches	5315-00-239-8031	B	12
3/16 x 3 inches	5315-00-899-4116	B	12
1/4 x 3 inches	5315-00-243-1167	B	12
Hammer, 2 to 4 lb			
Machinist, Ball Peen, 2 lb	5120-00-061-8546	B	1
Machinist, Ball Peen, 4 lb	No NSN Assigned	B	1
Hammer, Sledge, 10 lb	5120-00-243-2957	B	1
Hose Spanner Wrench			
1-1/4 to 3-inch adjustable	5120-00-293-0406	C	1
2 to 4-3/4-inch adjustable	5120-00-277-9076	C	1
Marlinespike, 16-inch	5120-00-224-9440	B	2
Pliers			
Side Cutting, 8-inch	5120-00-224-1540	B	1
Slip-Joint, appropriate size	No NSN Assigned	B	1
Screwdriver, Flat Tip, 8-inch	5120-00-237-6985	B	1
Segmented Hose Coupling Tool Kit			
2-1/2 and 4-inch Kit	5180-01-296-0744	C	1
6 and 7-inch Kit	5120-00-940-8459	C	1
Seizing Wire	No NSN Assigned	B	6 feet
Shackles, Safety Anchor, Grade B			

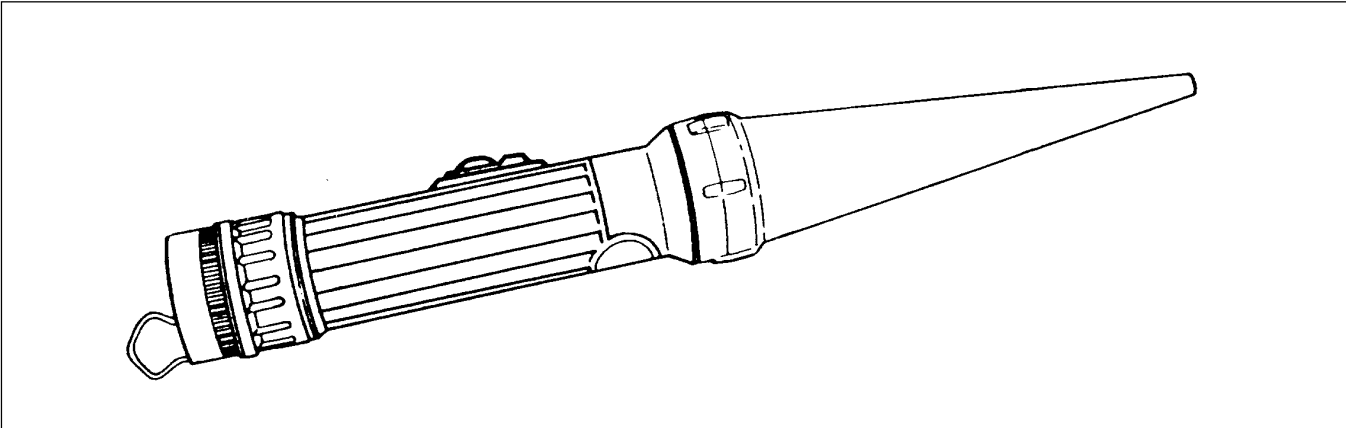
LIST OF ACCEPTABLE TOOLS			
Item	NSN	KEY	QTY
5/8-inch	4030-00-278-0700	B	1
3/4-inch	4030-00-278-0699	B	1
7/8-inch	4030-00-278-0701	B	1
1-inch	4030-00-279-4475	B	1
1-1/8-inch	4030-00-278-0703	B	1
Shackle, Screw-Pin Anchor, Grade B			
5/8-inch	4030-00-369-3963	B	1
3/4-inch	4030-00-369-3973	B	1
7/8-inch	4030-00-369-3988	B	1
1-inch	No NSN Assigned	B	1
1-1/8-inch	4030-00-373-1316	B	1
Wire Rope Cutter			
Hydraulic	5110-00-224-7058	A	2
or			
Impact	5110-00-242-8807	A	2
Wrench			
Open End, Adjustable, 10-inch	5120-00-449-8083	B	1 minimum
Open End, Adjustable, 12-inch	5120-00-264-3796	B	1 minimum
Open End, Adjustable, 15-inch	5120-00-423-6728	B	1 minimum

Key: A – Per ship with wire rope delivery capability (not carried in station tool box)

B – All Delivery and Receiving Stations

C – Fuel Delivery Stations

WAND, SIGNAL

**DESCRIPTION**

The Signal Wand is composed of a standard flashlight with an illuminator wand threaded to fit the flashlight.

FUNCTION

Signal Wands (red, green and amber) are used during night alongside connected replenishment to visually signal between transfer stations on the delivery and receiving ship. During VERTREP operations Signal Wands (Amber) are used by the Landing Signalman, Enlisted (LSE) to signal the helicopter pilot.

NATIONAL STOCK NUMBER

<u>Item</u>	<u>NSN</u>
Flashlight Type IV, Style 1, 2-cell	6230-00-926-4331
Baton, traffic directing Filters	6230-00-691-1407
Red	6230-00-111-0190
Amber	6230-00-504-8342
Green	6230-00-504-8341

REFERENCE

Underway Replenishment (NWP 4-01.4)
Shipboard Helicopter Procedures for Air Capable
Ships (NWP 3-04.1M)

**PART 2 — UNDERWAY REPLENISHMENT — FUEL
SECTION A — INTRODUCTION**

DESCRIPTION OF PART 2

The information contained in Part 2 is directed toward the standardization of Underway Replenishment — Fuel Equipment and Rigging. It is designed to provide guidance to aid all activities concerned with underway refueling in the identification of the equipment and the installation of associated rigs.

In developing Part 2, every effort has been made to incorporate the most recently developed materials and equipment. It is intended to describe in general terms the equipment and rig of a typical fueling station, be it one with a delivery capability or a

receiving capability. The specifying of new or different materials and equipment does not constitute an alteration, installation or procurement directive, but rather tries to illustrate in a general way what is typical. References to other directives and publications imply their effective editions.

Part 2 is divided into two basic sections. Section A, the Introduction explains the purpose and describes the format of the manual. Section B, Equipment, contains illustrations of the standard equipment used for fueling with a description and the function of the item and various other data helpful in further identification of the item.

PART 2

UNDERWAY REPLENISHMENT — FUEL

SECTION B — EQUIPMENT

Some Items of UNREP equipment are common to both Fuel and Cargo Underway Replenishment and are listed below. Pertinent information concerning this equipment is located in Part 1, Section B of this document. Only that equipment which is peculiar to Underway Replenishment — Fuel are presented in this section.

ITEMS COMMON TO FUEL AND CARGO UNDERWAY REPLENISHMENT	PAGE
Apparel, Safety	1-3
Bag, Shot Line Return	1-4
Blocks, Fiber Rope	1-5
Blocks, Wire Rope	1-6
Bolo, Line Throwing	1-8
Clamps, Wire Rope, Saddle	1-9
Cutter, Wire Rope (Hand Operated)	1-10
Cutter, Wire Rope (Velocity Pole Type)	1-11
Gun Kit, Line Throwing Rifle Adapter	1-12
Hook, Snap	1-14
Light, Chemical	1-15
Light, Contour, Hull	1-16
Light, Station Marker Box	1-17
Line, Bridge-to-Bridge Phone/Distance	1-18
Line, Female NATO Phone Connector	1-20
Line, Male NATO Phone Connector	1-21
Line, Station-to-Station Phone	1-22
Links, End	1-23
Marker, Station, Day	1-24
Messenger Assembly, STAR (SURF Traveling Actuated Remotely)	1-25
Paddles, Signal	1-26
Rope, Fiber (Synthetic and Natural)	1-27
Rope, Wire	1-30
Shackles, Steel	1-32
Tackle	1-36
Telephone, Sound Powered	1-37
Thimbles	1-38
Tool, Swaging	1-41
Tools	1-42
Wand, Signal	1-44

ADAPTER, 90° ELBOW 2-1/2 INCH HOSE RIG**DESCRIPTION**

The 90° Elbow Adapter consists of an aluminum casting with a male split clamp coupling on one end and a female split clamp coupling on the other. The web on the top of the fitting contains two holes to suspend the fitting from the receiving ship.

FUNCTION

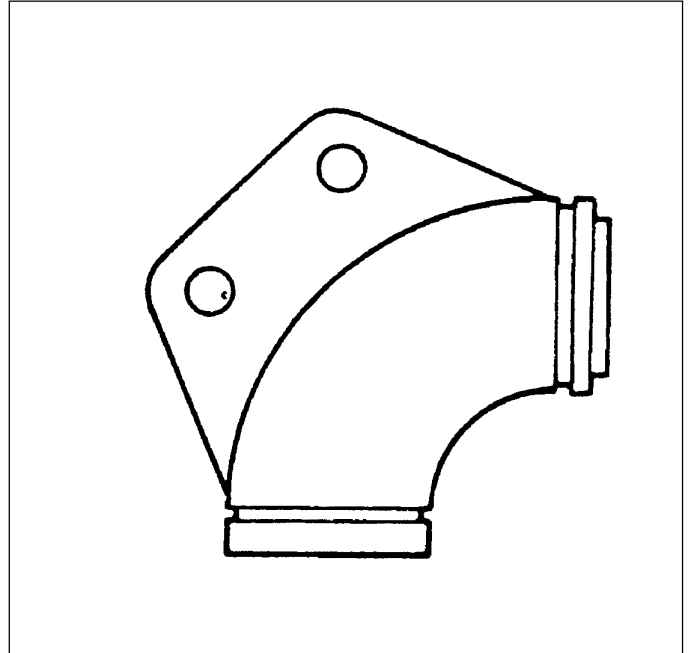
The 90° Elbow Adapter is a junction, which fits over the outlet of the breakaway coupling and is connected to it by a split clamp. The lug protruding from the top of the adapter accommodates a 1/2-inch shackle that secures the adapter to the receiving ship.

NATIONAL STOCK NUMBER

4730-01-106-0822

DRAWING NUMBER

NAVSHIPS 803-2260823



ADAPTER, HOSE, FEMALE SPLIT CLAMP TO MALE SPLIT CLAMP

DESCRIPTION

The Female Split Clamp to Male Split Clamp Adapter consists of an aluminum body with a 4-inch, 6-inch or 7-inch female split clamp fitting and 2-1/2-inch, 4-inch, 6-inch or 7-inch male split clamp fitting.

FUNCTION

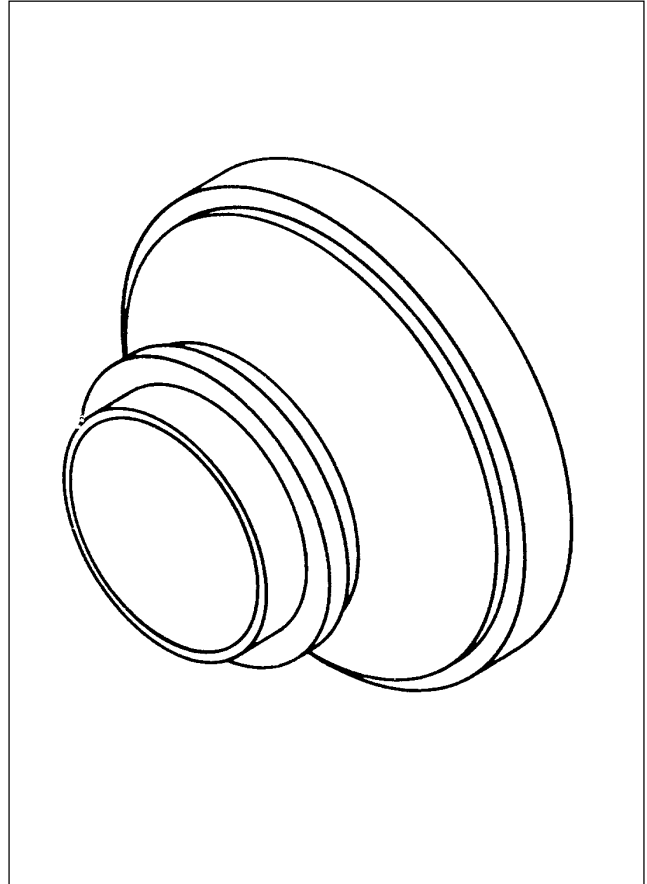
Female Split Clamp to Male Split Clamp Adapters are used to join the listed fitting sizes.

NATIONAL STOCK NUMBER

<u>Female</u>	<u>Male</u>	<u>NSN</u>
7	2-1/2	4730-01-313-7278
7	4	4730-00-793-9816
6	7	4730-01-120-1034
4	6	4730-01-291-6647

DRAWING NUMBER

NAVSHIPS 805-4472651



ADAPTER, HOSE, FLANGE TO FEMALE SPLIT CLAMP**DESCRIPTION**

The Flange to Female Split Clamp Adapter consists of an aluminum 2-1/2-inch inside diameter flange to a 2-1/2-inch female split clamp coupling; or a 6-inch inside diameter flange to 4-inch, 6-inch or 7-inch female split clamp coupling; or a 7-inch inside diameter flange to a 7-inch female split clamp coupling.

FUNCTION

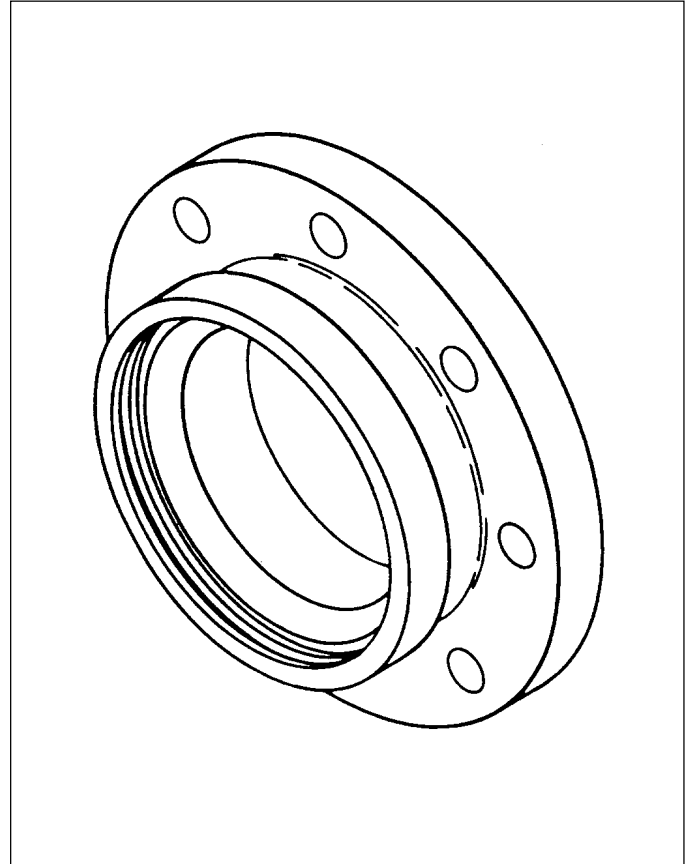
The Flange to Female Split Clamp Adapter is used to couple a male split clamp fitting to the B-end of the NATO flanged adapter assembly.

NATIONAL STOCK NUMBER

<u>Flange</u>	<u>Split Clamp</u>	<u>NSN</u>
2-1/2 —	2-1/2	No NSN Assigned
6 —	7	4730-01-022-5943
6 —	6	4730-00-817-7779
6 —	4	0000-LL-CJ6-8351 (P-NICN)
7 —	7	4730-00-453-9037

DRAWING NUMBER

NAVSHIPS 805-4472647



ADAPTER, HOSE, FLANGE TO MALE SPLIT CLAMP**DESCRIPTION**

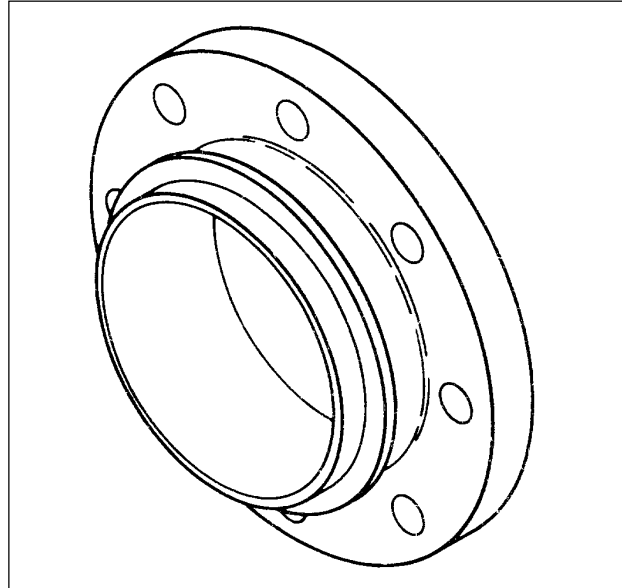
The Flange to Male Split Clamp Hose Adapter consists of an aluminum 8-inch, 7-inch, 6-inch, 5-inch, 4-inch or 2-1/2 inch inside diameter I.D. flange to a 7-inch, 6-inch, 4-inch or 2-1/2-inch male split clamp coupling.

FUNCTION

The Flange to Male Split Clamp Hose Adapter is used to couple a female split clamp fitting to a flange such as a fuel riser, or to the male end of the Robb coupling.

NATIONAL STOCK NUMBER

<u>Flange</u>	<u>Split Clamp</u>	<u>NSN</u>
8 — 7		4730-01-313-5409
7 — 7		4730-00-793-9815
7 — 6		No NSN Assigned
6 — 7		4730-01-022-6092
6 — 6		4730-00-817-7778
6 — 4		4730-00-007-9404
5 — 4		No NSN Assigned
4 — 4		4730-00-005-7370
2-1/2 — 2-1/2		No NSN Assigned

**DRAWING NUMBER**

NAVSHIPS 805-4472639

ADAPTER, HOSE, MALE HOSE THREAD TO FEMALE SPLIT CLAMP**DESCRIPTION**

The Male Hose Thread to Female Split Clamp Hose Adapter consists of an aluminum bronze body with a 4-inch male hose thread on one end and a 4-inch, 6-inch or 7-inch female split clamp coupling on the other. A slotted ring is provided for a spanner wrench to hold the adapter when tightening. The threads are National Hose (NH) as per Handbook H-28 Part II.

FUNCTION

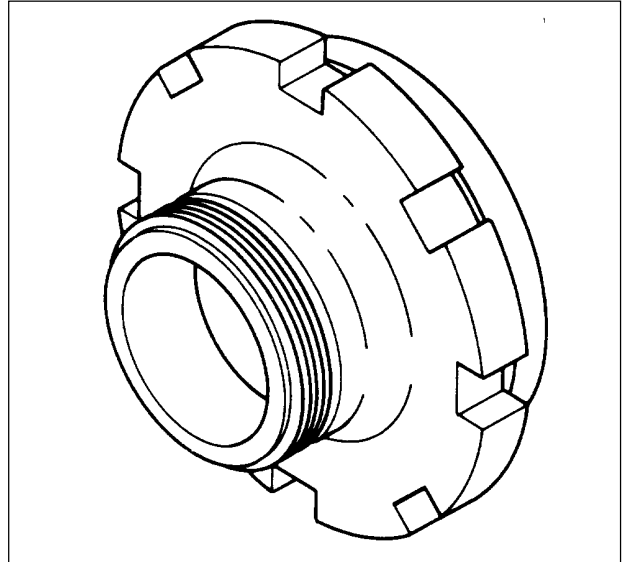
The Male Hose Thread (MHT) to Female Split Clamp Hose Adapter is used to couple a female hose thread fitting to a male split clamp fitting.

NATIONAL STOCK NUMBER

	<u>Split Clamp</u>	<u>NSN</u>
<u>MHT</u>		
4 — 4		4730-00-007-9406
4 — 6		4730-00-756-1469
4 — 7		4730-01-022-6088

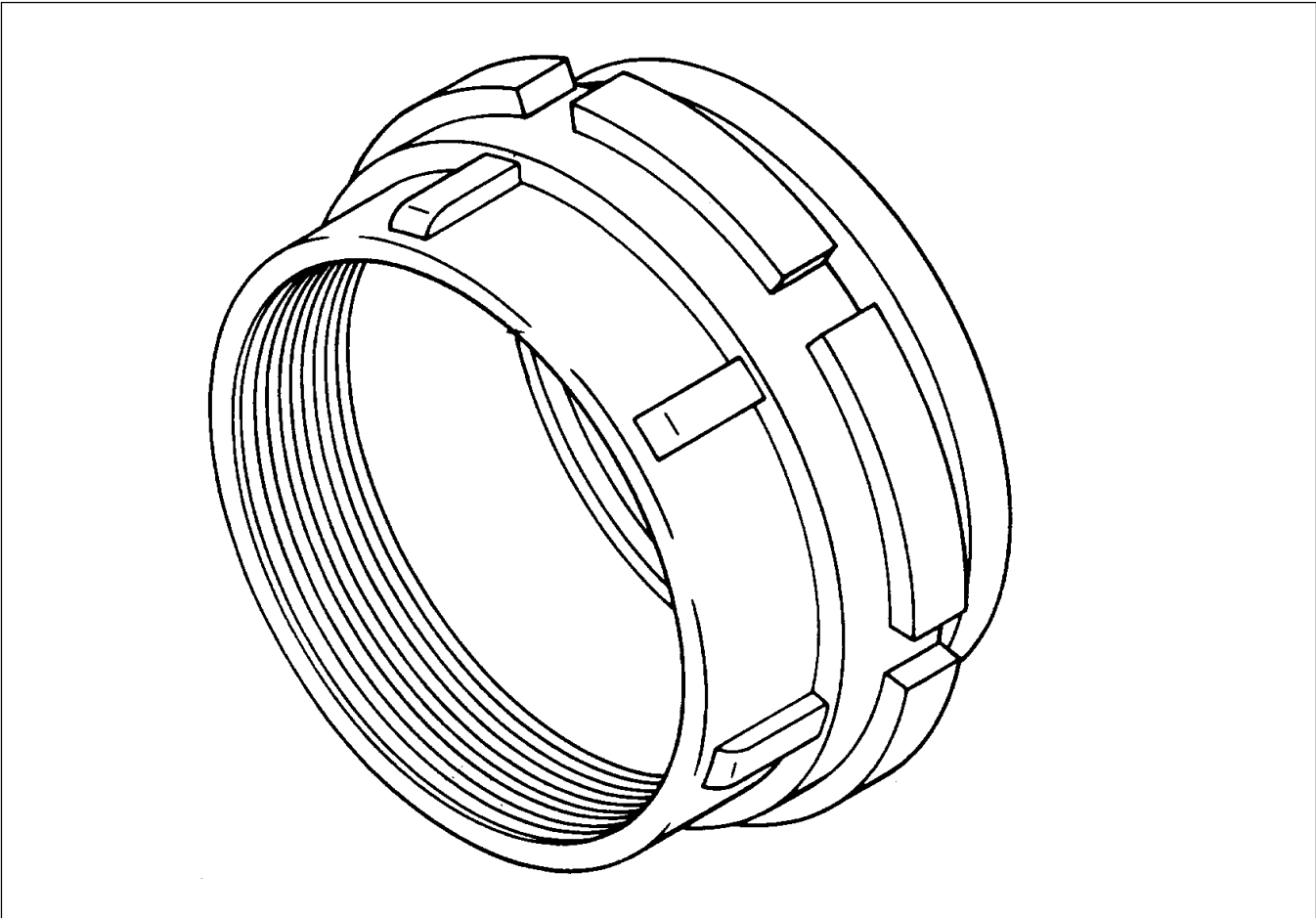
DRAWING NUMBER

<u>MH</u>	<u>Split Clamp</u>	
<u>I</u>		
4 — 7		NAVSHIPS 805-4472640
4 — 6		NAVSHIPS 805-4472641
4 — 4		NAVSHIPS 805-4472642

**REFERENCE**

Handbook H-28

ADAPTER, HOSE, FEMALE SPLIT CLAMP TO FEMALE HOSE THREAD SWIVEL

**DESCRIPTION**

The Female Split Clamp to Female Hose Thread Swivel Hose Adapter consists of an aluminum bronze 2-1/2-inch or 4-inch female split clamp body and a 2-1/2-inch or 4-inch female hose thread swivel. The threads are National Hose (NH) as per Handbook H-28, Part 11.

FUNCTION

The Female Split Clamp to Female Hose Thread Swivel is used to couple a male split clamp coupling to a male hose thread assembly.

NATIONAL STOCK NUMBER

<u>CLP</u>	<u>HSTH</u>	<u>NSN</u>
2-1/2 —	2-1/2	4730-01-310-1135
4 —	2-1/2	0000-LL-CJ6-8345 (P-NICN)

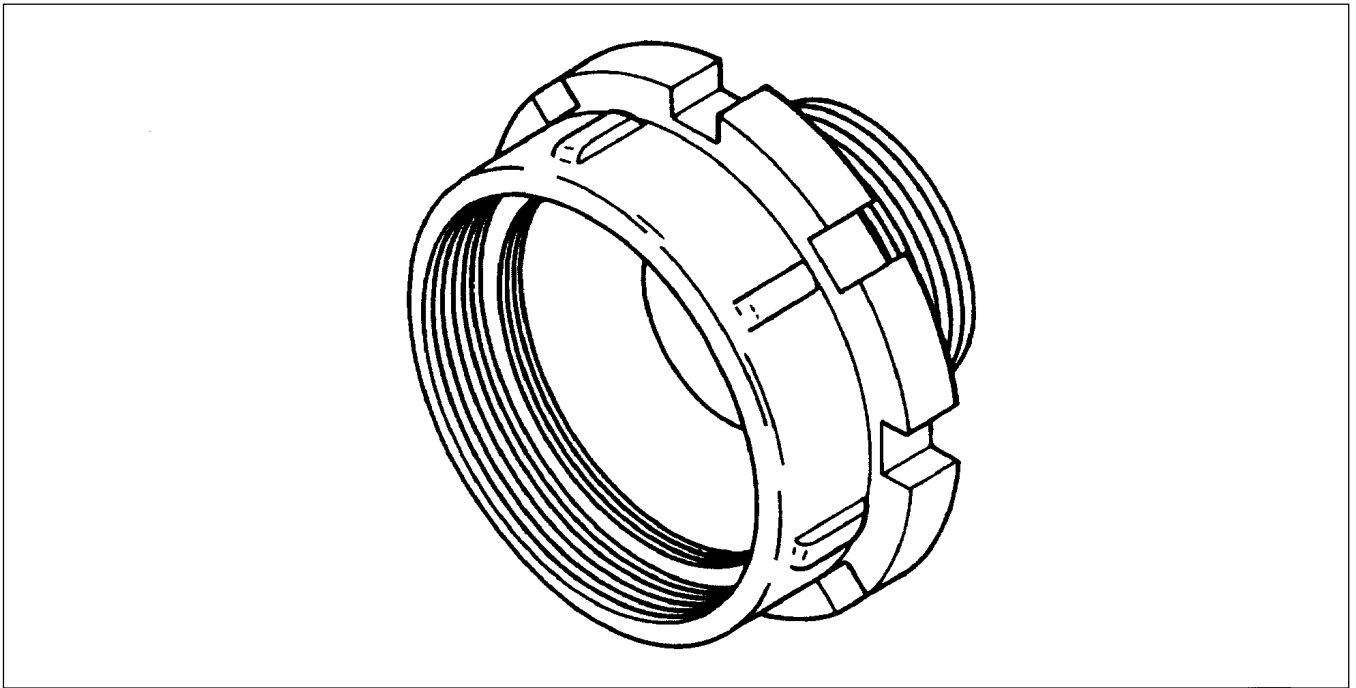
DRAWING NUMBER

<u>CLP</u>	<u>HSTH</u>	
4 —	4	805-4472644
4 —	2-1/2	805-4472645
2-1/2 —	2-1/2	805-2260822

REFERENCE

Handbook H-28

**ADAPTER, HOSE, REDUCER, 4-INCH FEMALE HOSE THREAD
TO 2-1/2 INCH MALE HOSE THREAD**



DESCRIPTION

The 4-inch Female Hose Thread to 2-1/2-inch Male Hose Thread Reducer Hose Adapter consists of an aluminum bronze body with female hose threads on one end and male hose threads on the other. The threads are National Hose (NH) as per Handbook H-28 Part II.

FUNCTION

The Female Hose Threaded end is attached to the outboard end of the 4-inch pigtail hose to permit

attaching the 2-1/2-inch Quick Hose Coupler to the male end of the reducer.

STOCK NUMBER

0000-LL-CJ6-8361

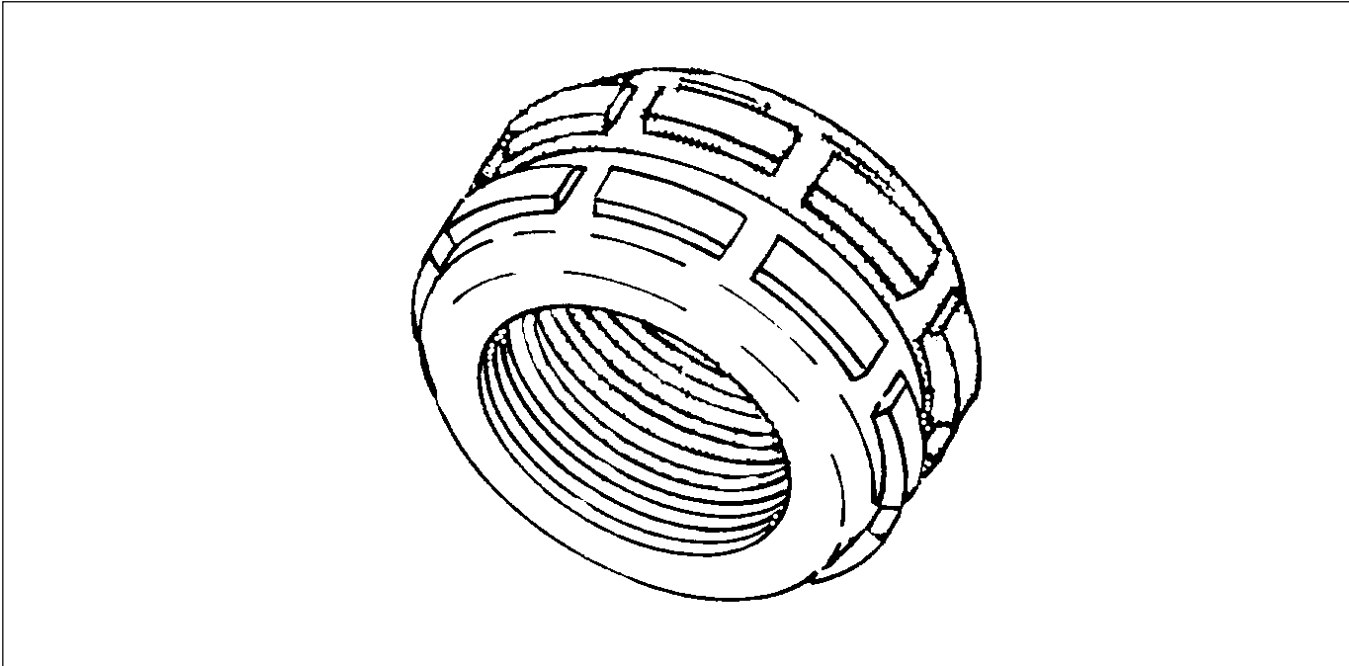
DRAWING NUMBER

NAVSHIPS 805-4472663

REFERENCE

Handbook H-28

ADAPTER, UNION, 4-INCH FEMALE HOSE THREAD



DESCRIPTION

The 4-inch Female Hose Thread Union Adapter consists of two bronze swivels with 4-inch female hose threads on one end and a female thread on the other. Slots around each swivel permit holding and tightening with a spanner wrench.

FUNCTION

The 4-inch Female Hose Thread Union Adapter is used to couple two 4-inch male hose thread fittings together.

NATIONAL STOCK NUMBER

Stock number not presently assigned.

DRAWING NUMBER

NAVSHIPS 805-4472662

AIDS, TRAINING, UNDERWAY REPLENISHMENT — FUEL

Two audiovisual training programs have been developed to support shipboard training on the Probe Fueling System. These programs are available on a loan basis from Type Commanders and/or Fleet Training Aid Libraries.

Number 12-7200038.1-SS: Single Probe Fueling-at-Sea System, Program I

Part 1 – Introduction 12 minutes/35 slides

Describes the equipment used with the single probe fueling-at-sea system.

Part 2 – Operation 21 minutes/73 slides

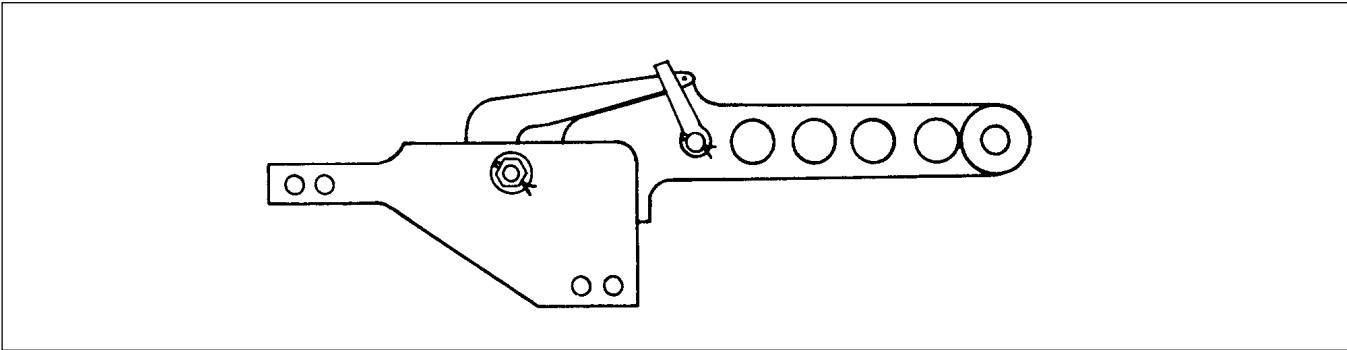
Covers the step-by-step procedures used by the Delivery ship and Receiving ship to prepare for fueling, pass the rig and recover the rig.

Number 12-7200038.2-SS: Single Probe Fueling-at-Sea System, Program II

Fueling Probe Maintenance 27 minutes/99 slides

Covers the procedures for conducting ship level maintenance on the probe and carrier assembly, including inspection, relatching, replacing nose seal, replacing parts in the latching mechanisms and replacing parts in the carrier assembly.

ARM, SWIVEL, SINGLE PROBE RECEIVER

**DESCRIPTION**

The Single Probe Receiver Swivel Arm is a welded high-strength steel assembly. It consists primarily of a main body or arm to which other components are attached. Attached to one end of the main arm are two side plates that provide the means of attaching the assembly to the Probe Receiver using through-bolts. The side plates provide the support for a pelican hook that is also through-bolted to the plates. A pin is permanently installed between the side plates and provides a positive stop to limit the open position of the pelican hook. A bale, or latch, for the pelican hook is through-bolted to the main arm. The pelican hook can be locked in the closed position by closing the bail over the end of the hook and inserting a 3/16-inch diameter by 3-inch long steel cotter pin through a hole in the free end of the pelican hook. The main arm is lightened by four holes. A hole, with bronze bushing, penetrates the other end of the arm and provides the means of connecting the assembly to the Probe Swivel joint again using a through-bolt. This

through-bolt is the pivot point for vertical swing of the assembly.

FUNCTION

The Single Probe Receiver Swivel Arm is required to provide the means of attaching the Probe Receiver to the Probe Swivel joint. The pelican hook of the assembly provides a quick-release means of attaching the end of the spanwire to the Probe Swivel joint.

NATIONAL STOCK NUMBER

2040-00-851-9467

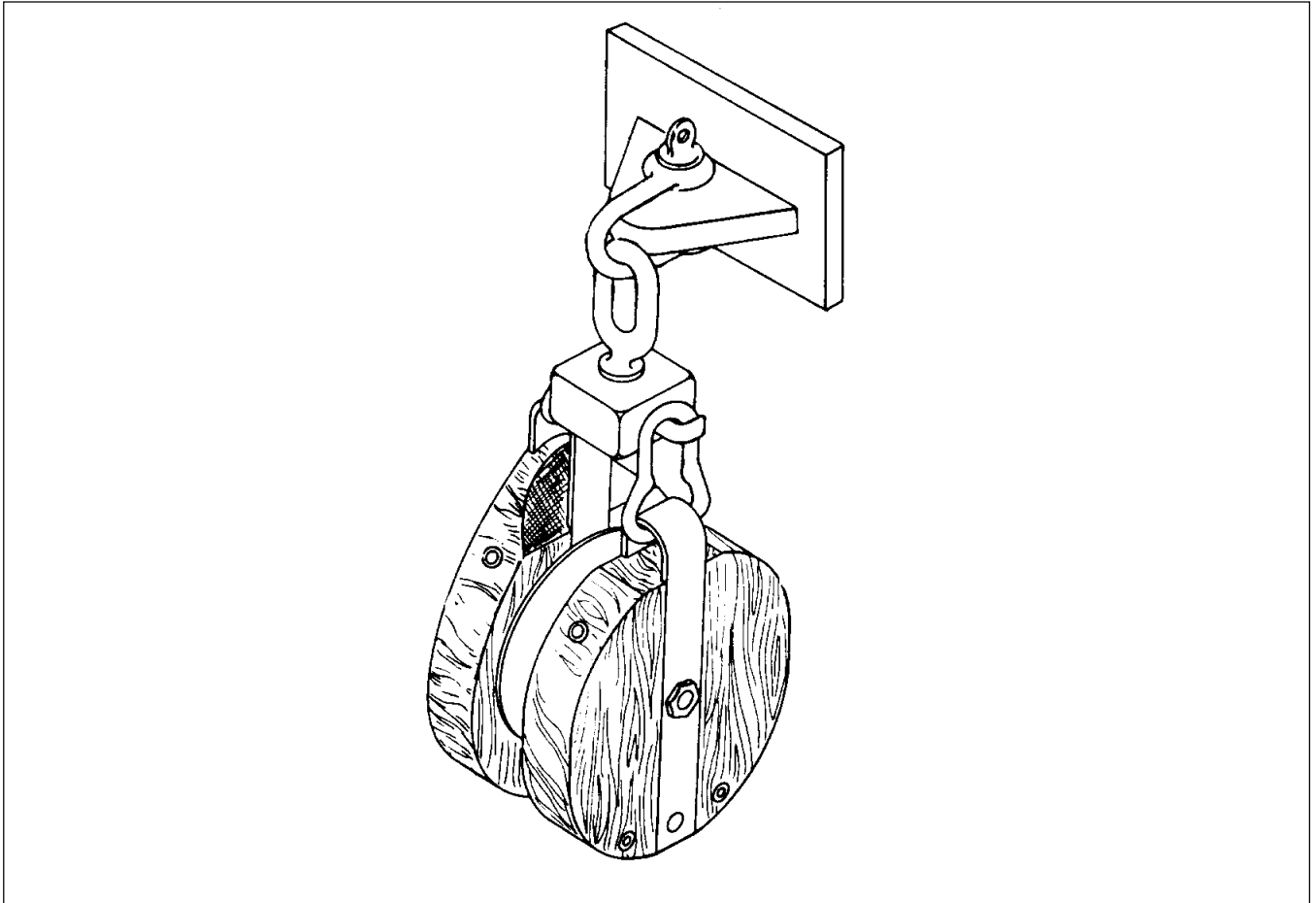
DRAWING NUMBER

NAVSHIPS 805-2213160C

REFERENCE

Single Probe Fueling System; Installation,
Operation, and Maintenance
NAVSHIPS 0978-LP-035-3010

Probe Fueling Hardware; Shipboard Level
Maintenance NAVSEA 0920-LP-103-2010

BLOCK, SNATCH, WOOD, 12-INCH, RIG 25, WITH UPSET SHACKLE**DESCRIPTION**

The 12-inch Wood Snatch Block, Rig 25 with Upset Shackle is a standard, wood fiber-rope snatch block with a swivel eye and shackle.

FUNCTION

The 12-inch Wood Snatch Block, Rig 25 with Upset Shackle is used as the messenger fairlead block at probe receiving stations. It is secured to the messenger fairlead block padeye adjacent to the probe receiver.

NATIONAL STOCK NUMBER

3940-00-003-0706

DRAWING NUMBER

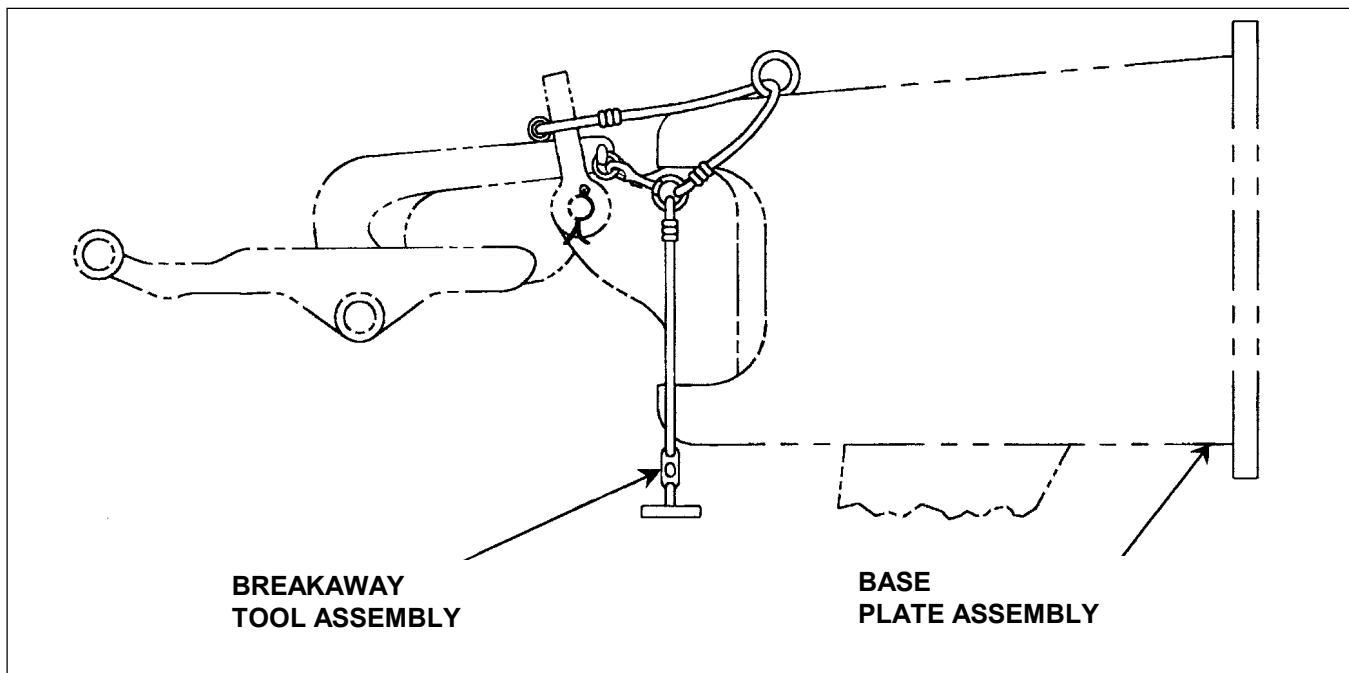
NAVSHIPS 805-2213794

REFERENCE

Underway Replenishment (NWP 4-01.4)

Boatswain's Mate 3 and 2 Training Course Manual
(NAVEDTRA 12100)

BREAKAWAY TOOL, DOUBLE PROBE

**DESCRIPTION**

The Double Probe Breakaway Tool consists of a wire rope lanyard with an aluminum pipe handle swaged to a snap hook, ring, and 3-inch long 3/16-inch cotter pin. A second wire rope lanyard, also swaged to the snap hook, fairleads through an eyebolt tapped into the top of the baseplate assembly, then loops around the pelican hook bail.

FUNCTION

The Double Probe Breakaway Tool is used to perform two functions. First it pulls the bail cotter pin, then it releases the pelican hook bail, allowing the pelican hook to open and free the spanwire from the double probe receiver.

DRAWING NUMBER

NAVSEA 6574375 Rev A

INSTL DWG 6902192

NATIONAL STOCK NUMBER

4010-01-317-2583

REFERENCE

Underway Replenishment (NWP 4-01.4)

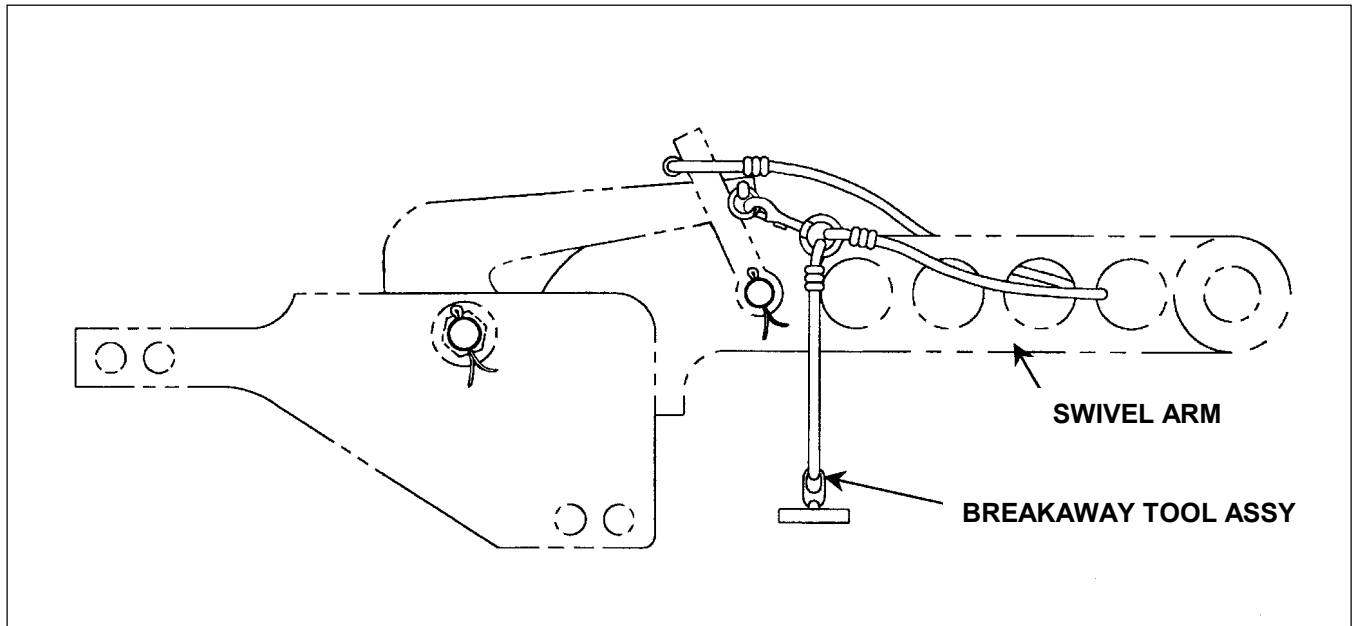
Single Probe Fueling System; Installation,

Operation, and Maintenance

NAVSHIPS 0978-LP-035-3010

Probe Fueling Hardware; Shipboard Level

Maintenance NAVSEA 0920-LP-103-2010

BREAKAWAY TOOL, SINGLE PROBE**DESCRIPTION**

The Single Probe Breakaway Tool consists of a wire rope lanyard with an aluminum pipe handle swaged to a snap hook, ring, and a 3-inch long 3/16-inch cotter pin. A second wire rope lanyard, also swaged to the snap hook fairleads through the inboard hole of the single probe swivel arm, then loops around the pelican hook bail.

FUNCTION

The Single Probe Breakaway Tool is used to perform two functions. First it pulls the bail cotter pin, then it releases the pelican hook bail, allowing the pelican hook to open and free the spanline from the single probe receiver.

DRAWING NUMBER

NAVSEA 6242988 Rev B

NATIONAL STOCK NUMBER

4010-01-317-2582

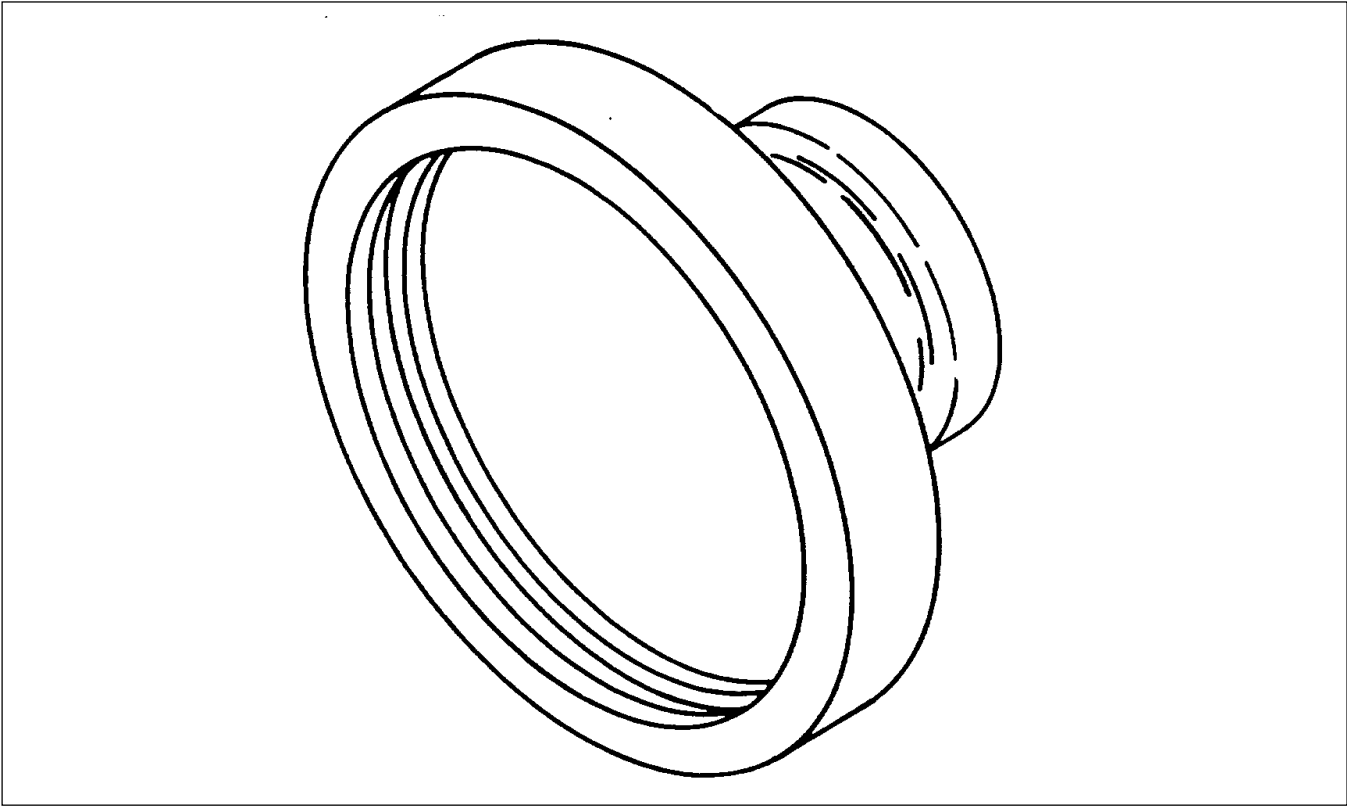
REFERENCE

Underway Replenishment (NWP 4-01.4)

Probe Fueling Handbook
NAVSHIPS 0978-LP-035-3010

Probe Fueling Hardware; Shipboard Level
Maintenance NAVSEA 0920-LP-103-2010

CAP, HOSE, SPLIT CLAMP, 7-INCH, 4-INCH AND 2-1/2 INCH

**DESCRIPTION**

The Split Clamp Hose Fitting Cap consists of an aluminum casting with a female split clamp fitting. An O-ring is fitted in the groove to provide a seal.

FUNCTION

The Split Clamp Hose Fitting Cap is used to protect a male split clamp fitting and to seal it off. The cap may also be used when hydrostatically testing a section of hose. When used in this manner either the cap or a hose plug must be modified to permit attachment of the test equipment.

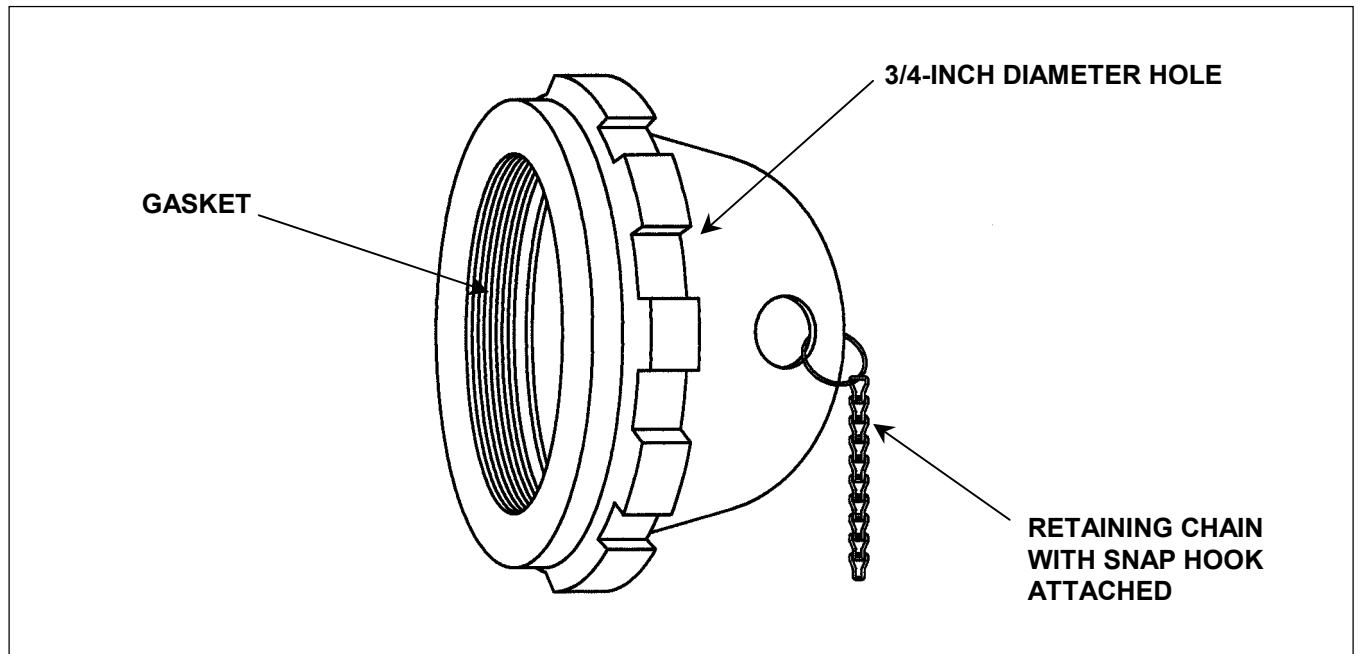
NATIONAL STOCK NUMBER

<u>Size (inches)</u>	<u>NSN</u>
2-1/2	4730-01-354-5382
4	4730-00-007-9403
7	4730-01-022-8263

DRAWING NUMBER

NAVSHIPS 805-4472652

CAP, HOSE, 4-INCH AND 2-1/2-INCH THREAD

**DESCRIPTION**

The Hose Thread Cap consists of a female-threaded bronze body with a slotted ring for a spanner wrench. A gasket is inside the cap to provide a tight seal. The hose cap has a snap hook and safety chain to prevent loss when unthreaded.

FUNCTION

The Hose Thread Cap is used with the 4-inch pigtail assembly to protect the threads and to seal off the outboard end of the hose. The 2-1/2-inch cap is used to cap the end of the 2-1/2-inch quick hose coupler

and a 4-inch cap may be used with the 4-inch quick hose coupler.

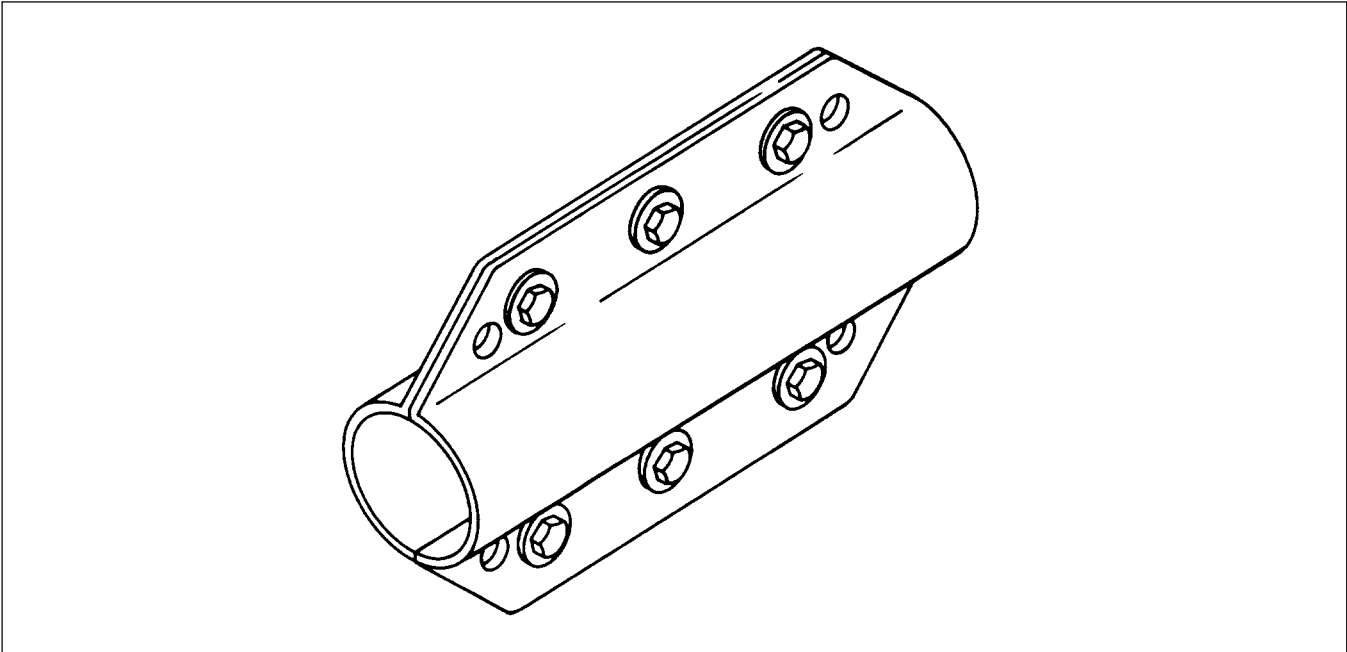
NATIONAL STOCK NUMBER

<u>Size (inches)</u>	<u>NSN</u>
2-1/2	4730-01-331-1699
4	1H 0000-LL-CJ6-8348 (P-NICN)

DRAWING NUMBER

4-inch	NAVSHIPS 805-4472658
2-1/2-inch	NAVSHIPS 805-4472658

CLAMP, HOSE, 2-1/2-INCH

**DESCRIPTION**

The Hose Clamp consists of two steel clamp halves. Six bolts secure the clamp halves. Four holes are provided for receiving shackles.

FUNCTION

The Hose Clamp is used with the 2-1/2-inch astern fueling rig. It is installed on the outboard end of the hose assembly and hose support line. The 1/2-inch wire rope connecting pendant and the 3-inch pickup float messenger are shackled to the outboard end of the clamp.

NATIONAL STOCK NUMBER

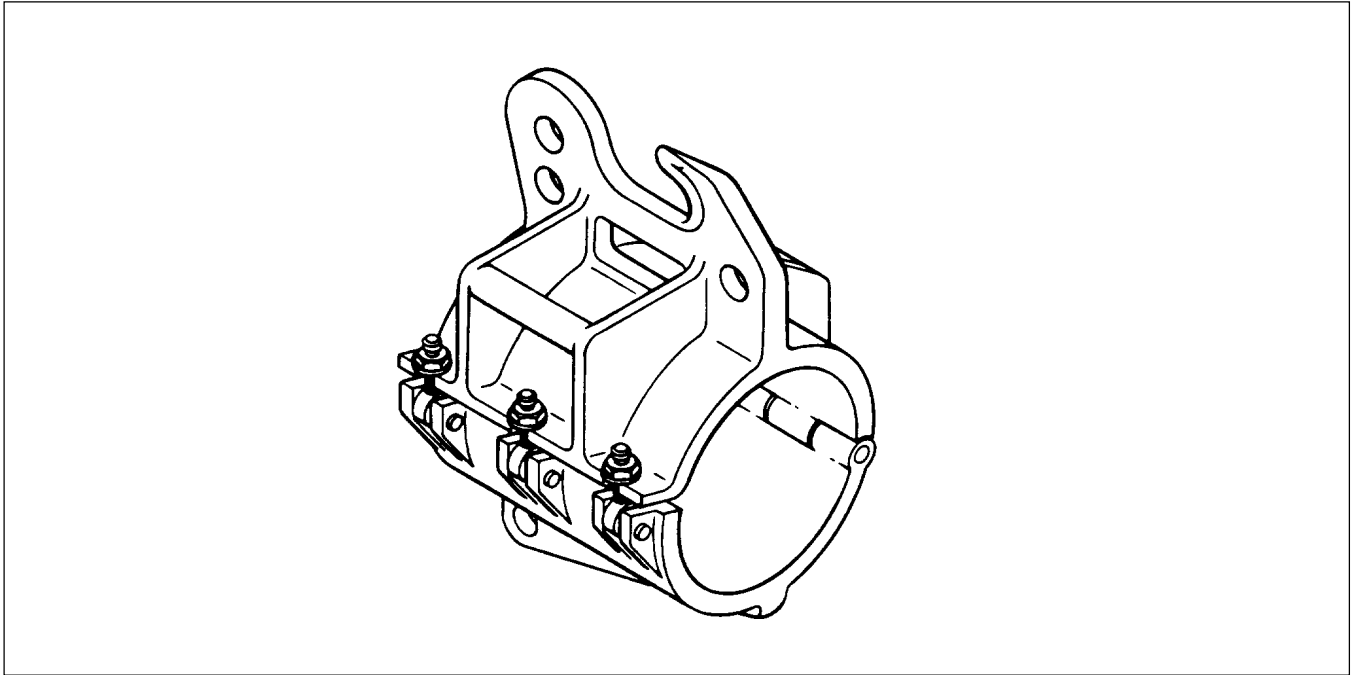
Not a Stock Item.

DRAWING NUMBER

NAVSHIPS 805-2252862

REFERENCE

Underway Replenishment (NWP 4-01.4)

CLAMP, HOSE, 4-INCH, RIDING LINE**DESCRIPTION**

The Riding Line Hose Clamp consists of two aluminum clamp halves. The upper half contains the riding line hook and handles to aid in handling the hose. The two halves are secured by a hinge pin on the one side and three eyebolts with nuts on the other.

FUNCTION

The Riding Line Hose Clamp is used on the 4-inch pigtail to provide a hook for a bight of the riding line.

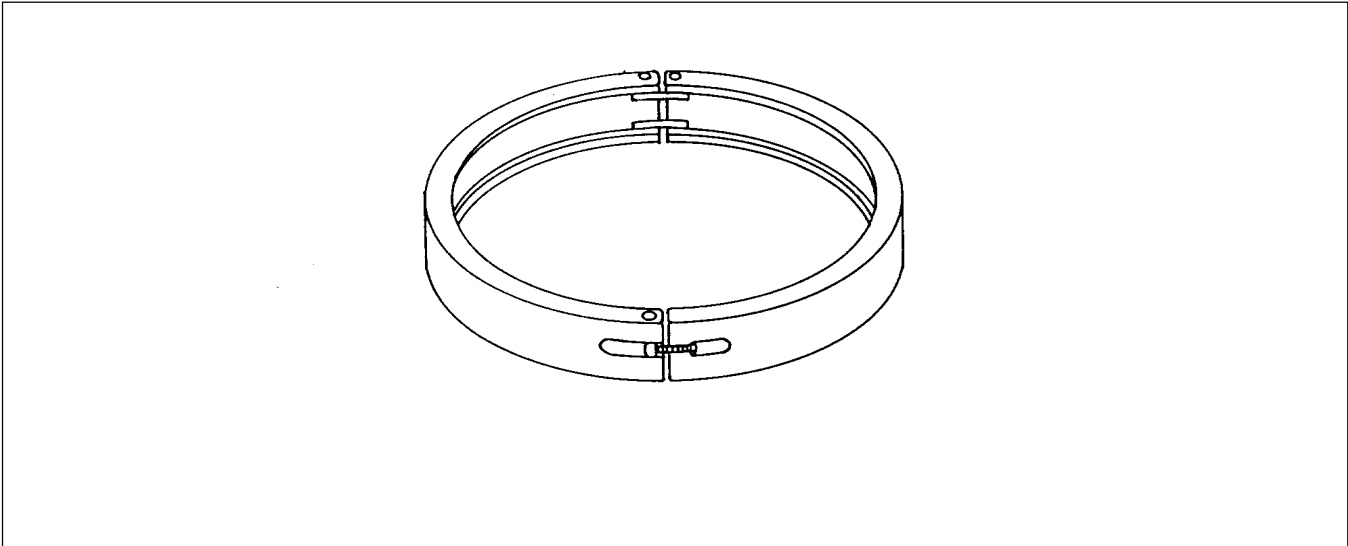
NATIONAL STOCK NUMBER

4730-01-022-4077

DRAWING NUMBER

NAVSHIPS 805-4472631

CLAMP, SPLIT, HOSE COUPLING ASSEMBLY, 7-INCH, 4-INCH AND 2-1/2-INCH



DESCRIPTION

The wrought or extruded aluminum Split Clamp consists of two hinged body halves held together by a filister head screw.

FUNCTION

The Split Clamp Assembly is used to join a male and female hose coupling to provide a secure and leak proof seal.

NATIONAL STOCK NUMBER

7-inch	5340-01-226-1885
	4730-00-793-9812
4-inch	4730-00-007-9402
2-1/2-inch	4730-01-271-1922

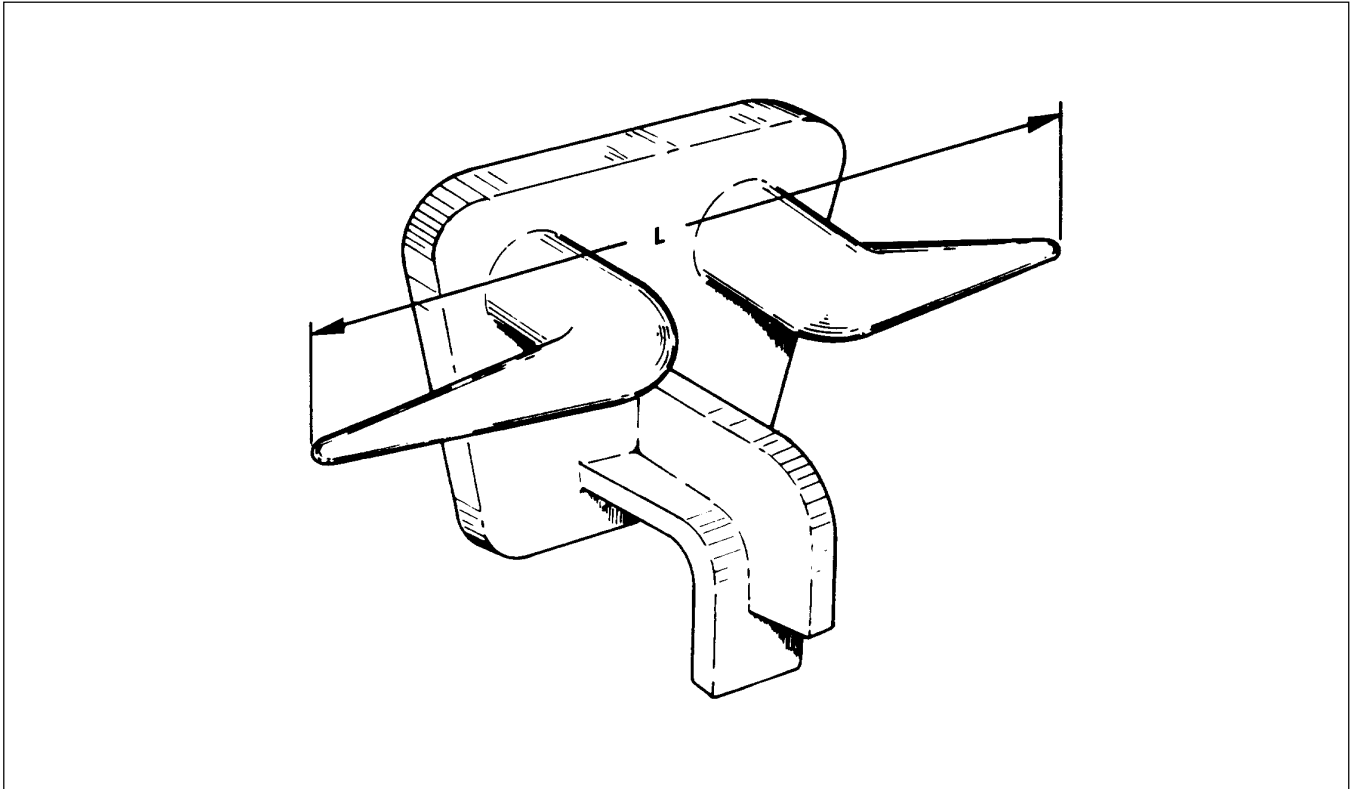
DRAWING NUMBER

NAVSHIPS 805-4472628

REFERENCE

Couplings, Segmented, and Split Clamps
Re-attachable 2-1/2-, 4-, and 7-inch for
Refueling-At-Sea Hose (MIL-C-24356)

CLEAT, THREE HORN

**DESCRIPTION**

The Three Horn Cleat consists of a steel or aluminum fabricated cleat with three horns as illustrated. There are two basic sizes L = 20 inches and L = 12 inches.

NATIONAL STOCK NUMBER

Not a stock item.

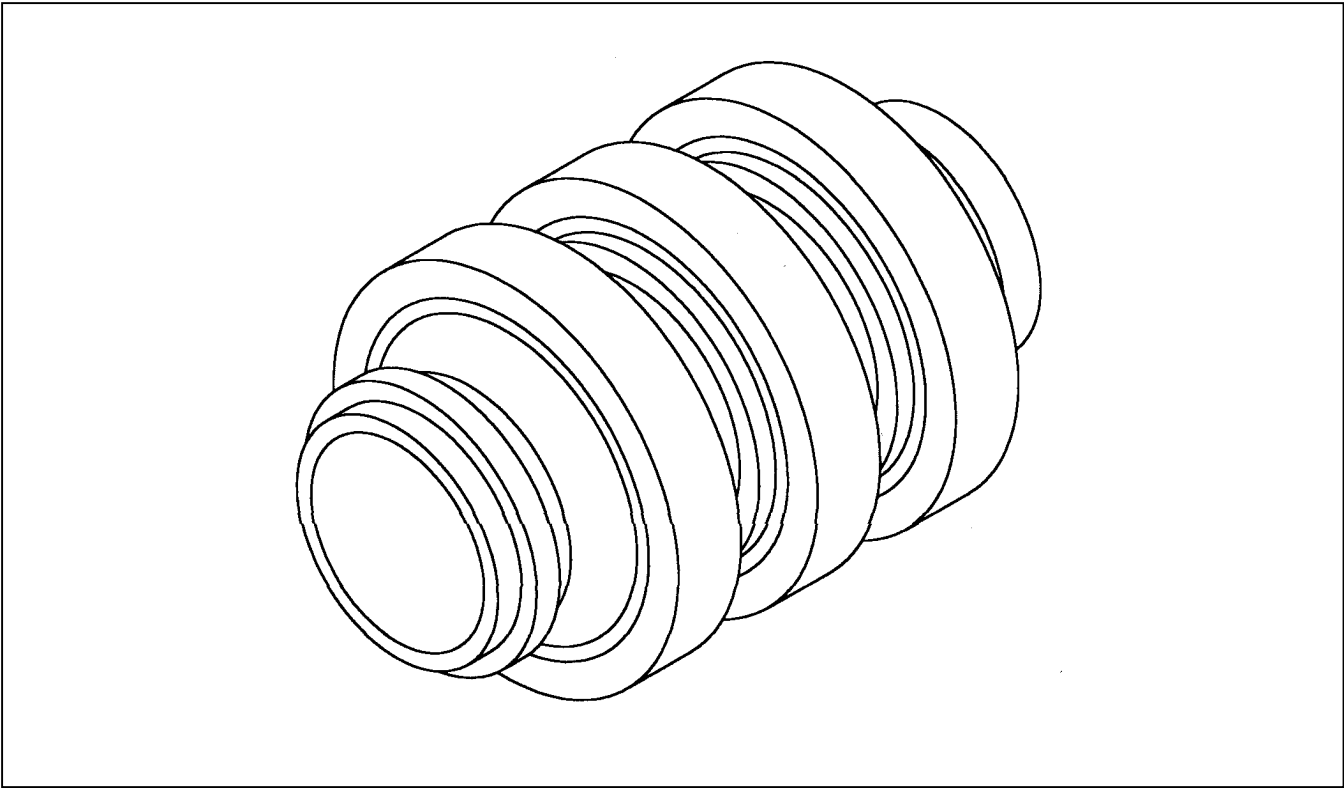
DRAWING NUMBER

NAVSHIPS 805-2554187

FUNCTION

Used for belaying a riding line and jigger line during refueling operations.

<u>20-inch</u>	<u>12-inch</u>	<u>For use with:</u>
4-inch	2-inch	circumference manila
2-1/2-inch	1-1/2-inch	circumference nylon
2-1/2-inch	1-1/2-inch	circumference dacron
3-inch	1-3/4-inch	circumference polypropylene
7/16-inch	1/4-inch	dia. 6 x 37 wire rope

COUPLING, AUTOMATIC DISCONNECT, 2-1/2-INCH FUELING HOSE**DESCRIPTION**

The Automatic Fueling Hose Disconnect Coupling consists of a coupling body that separates into two halves with automatic closure valves in each half to prevent spillage. The coupling body has two exterior handles to facilitate manual operation (coupling/uncoupling). The coupling has a male split clamp coupling end (outlet) and a female split clamp coupling end (inlet).

FUNCTION

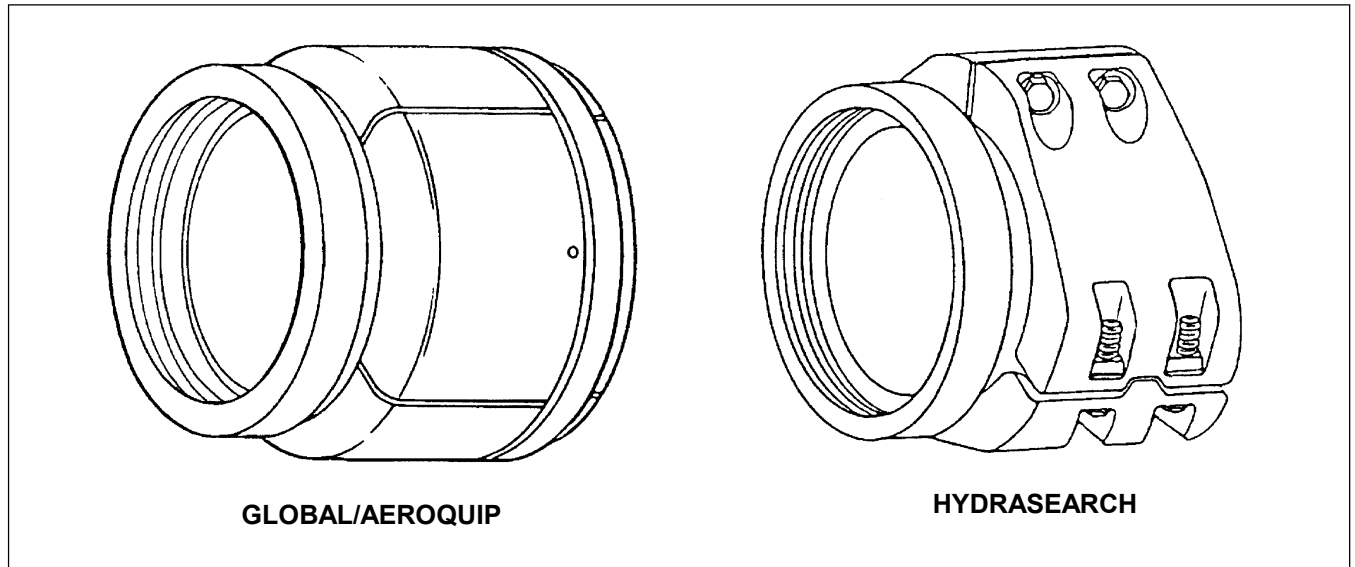
The Automatic Fueling Hose Disconnect Coupling is used with 2-1/2-inch fueling hose rigs to provide automatic disconnect with fuel shutoff (no spillage) at overload tensile pulls above 500 lbs. The coupling is used in rigs for transfer of fuel (JP-5 and DFM) or potable water.

NATIONAL STOCK NUMBER

4730-01-367-2004

DRAWING NUMBER

NAVSHIPS 803-2260817

COUPLING, HOSE, FEMALE SPLIT CLAMP, 7-INCH, 4-INCH AND 2-1/2-INCH**DESCRIPTION**

The Female Split Clamp Hose Coupling consists of a cast or wrought aluminum anodized nipple and wrought aluminum anodized segments. A female split clamp fitting containing a groove for an O-ring seal is also provided. The coupling is readily removable and re-attachable to a new section of hose.

FUNCTION

The Female Split Clamp Hose Coupling is used to provide an attachment point on the end of a length of fueling hose to make it readily connectable to another length of fuel hose.

NATIONAL STOCK NUMBER

<u>Size(inches)</u>	<u>NSN</u>
7	4730-00-793-9809
4	4730-00-007-2195
2-1/2	4730-01-154-6426

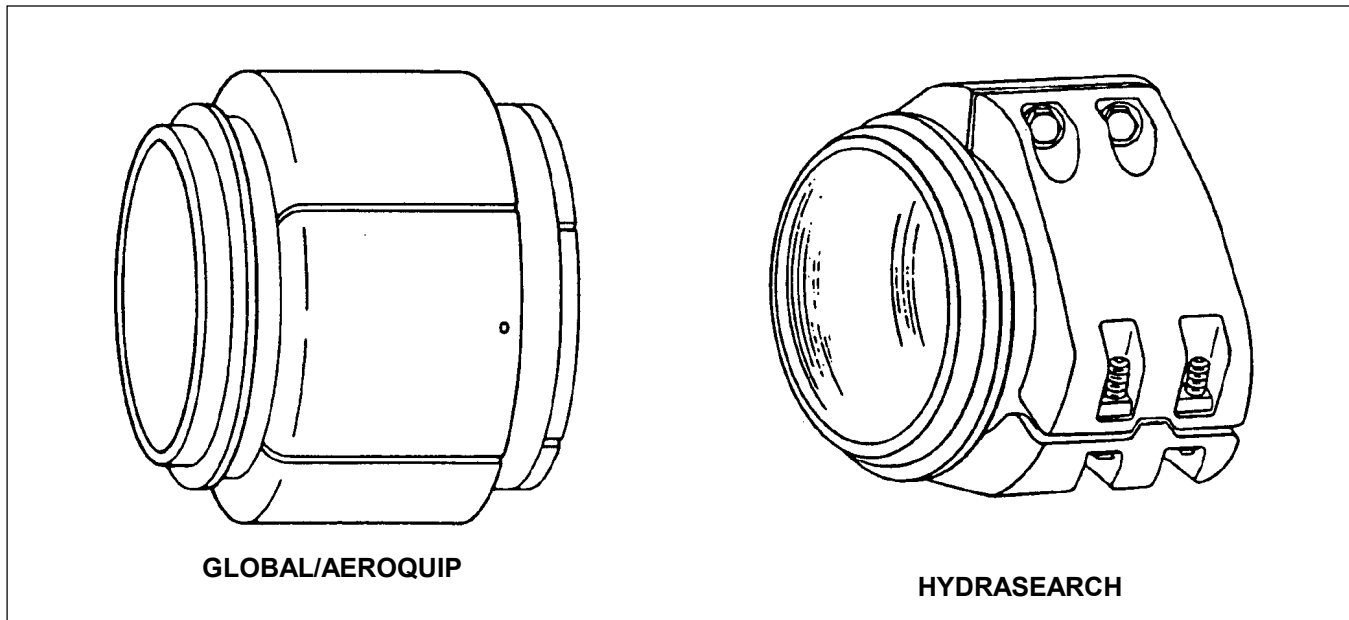
DRAWING NUMBER

NAVSHIPS 805-4472628

REFERENCE

Couplings Segmented, and Split Clamps
Re-attachable, 2-1/2-, 4-, and 7-inch, for
Refueling-At-Sea-Hose MIL-C-24356
Hose, Rubber, Petroleum Based Fuels and Water
Services, Discharge Only Smooth Bore,
Lightweight Buoyant Type MIL-H-22240
(SH)

COUPLING, HOSE MALE SPLIT CLAMP, 7-INCH, 4-INCH AND 2-1/2-INCH

**DESCRIPTION**

The Male Split Clamp Hose Coupling consists of a cast or wrought aluminum anodized nipple and wrought aluminum anodized segments. A male split clamp fitting is also provided. The coupling is readily removable and re-attachable to a new section of hose.

FUNCTION

The Male Split Clamp Hose Coupling is used to provide an attachment point on the end of a length of fueling hose to make it readily connectable to another length of fuel hose.

NATIONAL STOCK NUMBER

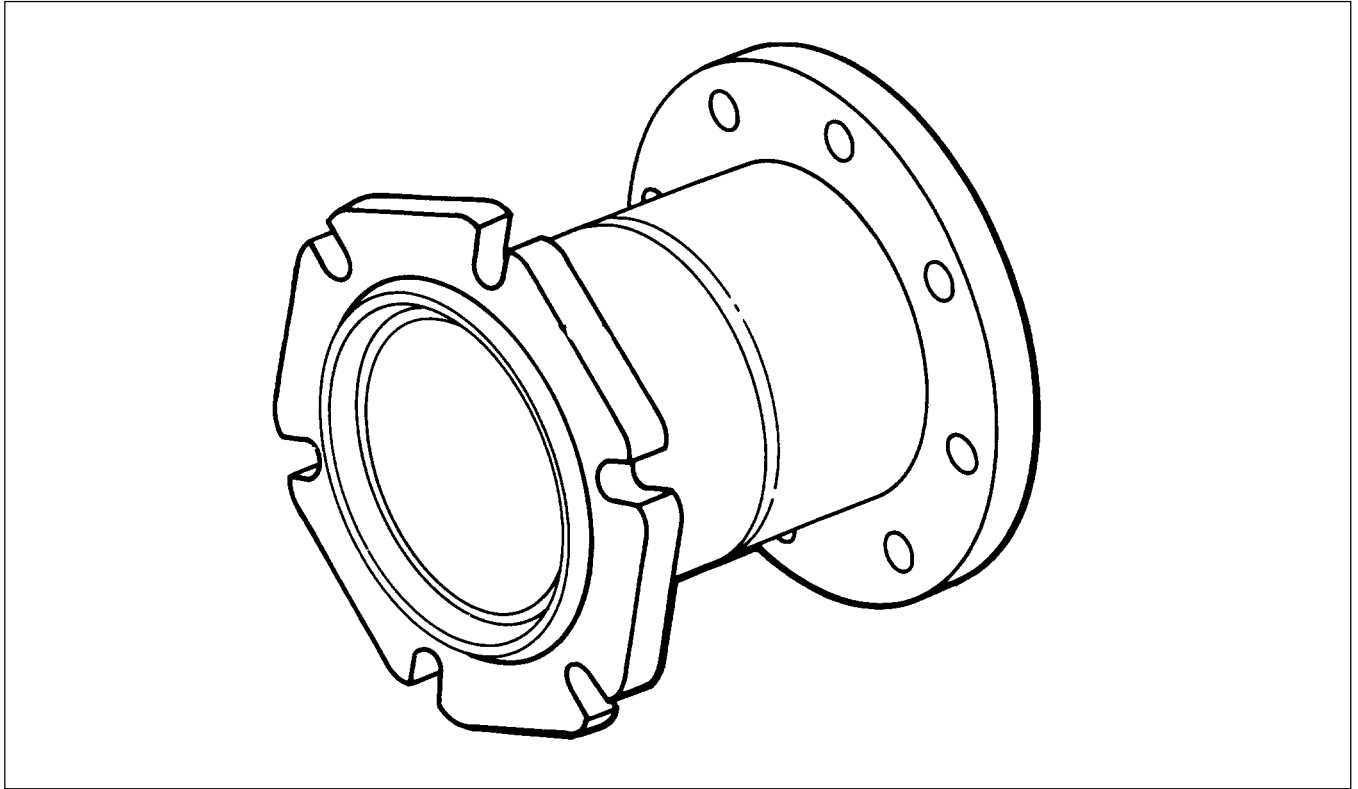
<u>Size (inches)</u>	<u>NSN</u>
7	4730-00-793-9810
4	4730-00-007-2194
2-1/2	4730-01-154-6425

DRAWING NUMBER

NAVSHIPS 805-4472628

REFERENCE

Couplings, Segmented, and Split Clamps Re-attachable, 2-1/2-, 4-, and 7-inch, for Refueling-At-Sea Hose MIL-C-24356
Hose, Rubber, Petroleum Based Fuels and Water Services, Discharge Only Smooth Bore, Lightweight Buoyant Type MIL-H-22240 (SH)

COUPLING, HOSE, NATO BREAKABLE SPOOL, A-END**DESCRIPTION**

The NATO Breakable Spool A-End consists of a cast iron spool with a standard hose flange on one end and a slotted flange on the other. A machined groove around the spool weakens it to permit its being broken easily in an emergency by a blow from a sledgehammer.

FUNCTION

The NATO Breakable Spool A-End is used in Fueling operations with NATO/SEATO nation ships. It is furnished by the receiving ship and is bolted to the flange on the fuel riser.

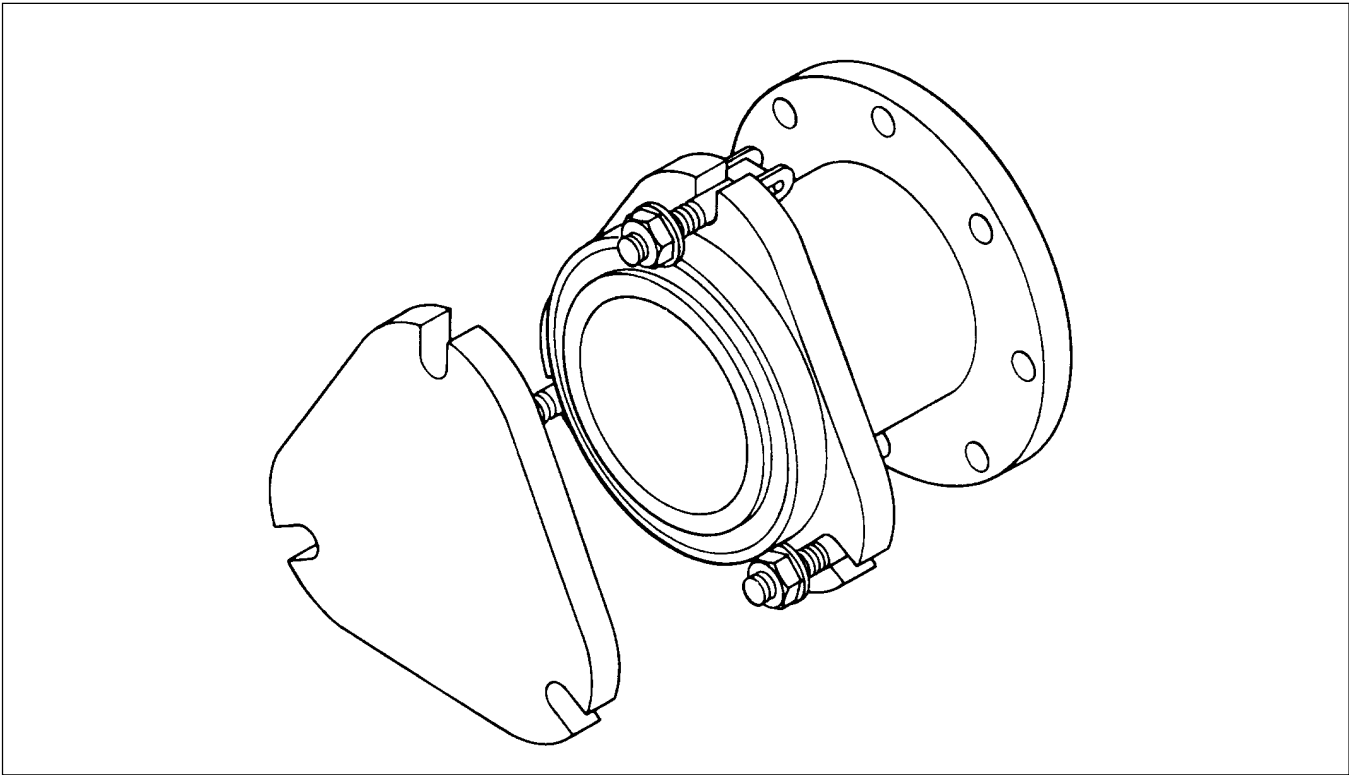
NATIONAL STOCK NUMBER

4730-00-237-8171

DRAWING NUMBER

NAVSHIPS S5501-169238

COUPLING HOSE, NATO BREAKABLE SPOOL, B-END

**DESCRIPTION**

The NATO Breakable Spool B-End is a flanged adapter assembly consisting of a hose flange on one end and a special floating ring flange with drop bolts on the other. The floating ring flange can be rotated to bring the drop bolts into line with the slots in the NATO Breakable Spool A-End. A gasket mounted in the outboard side of the B-end provides an oil-tight fit. A blank flange is attached to the B-end when the hose is passed to the receiving ship to prevent oil from spilling and water from entering the hose.

FUNCTION

The NATO Breakable Spool B-End is used by the delivery ship when fueling NATO/SEATO nation

ships equipped with the A-End of the NATO breakable spool.

NATIONAL STOCK NUMBER

Flange. Adapter	4730-00-778-3793
Blank Flange	4730-00-778-3792
Gasket	5330-00-778-3791

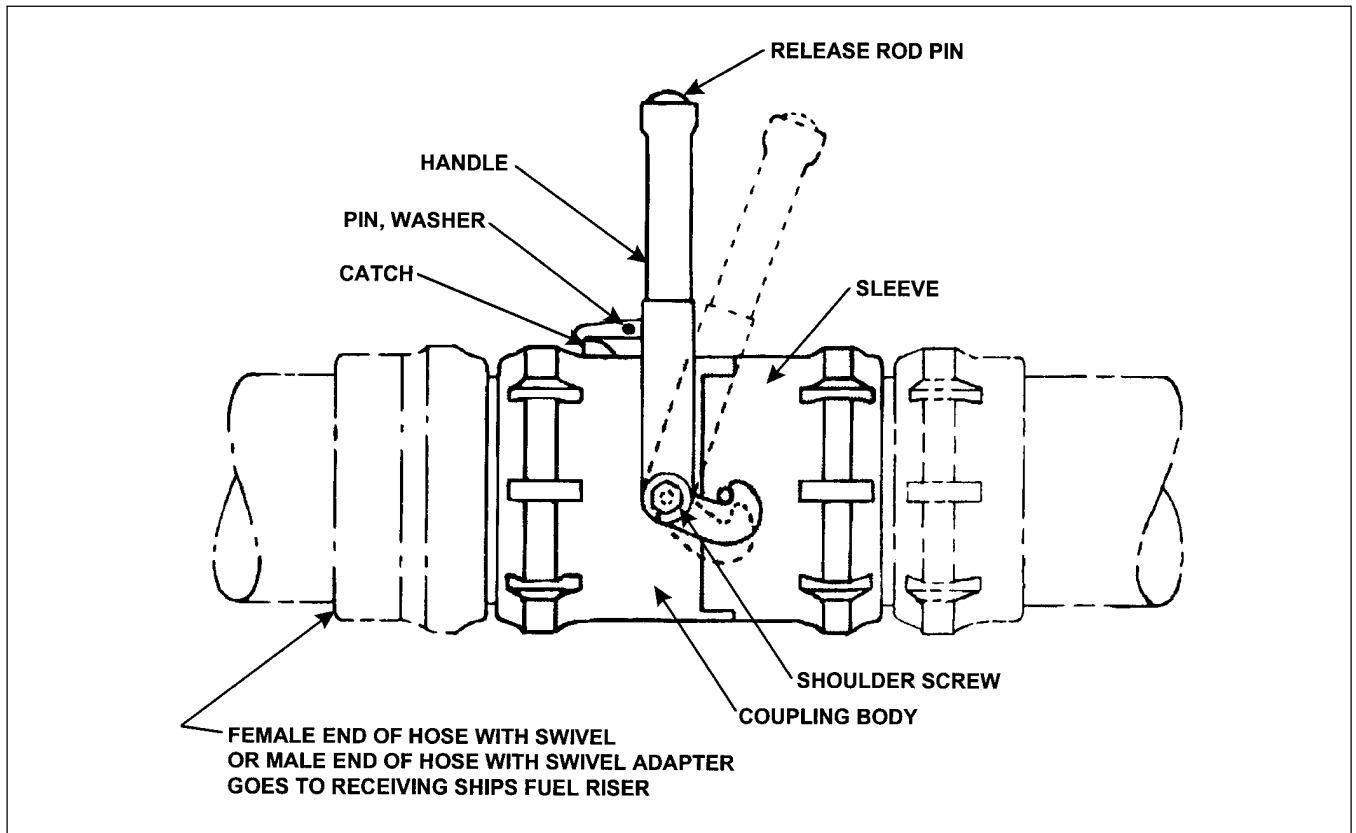
NOTE

Each component must be ordered separately. Coupling is not stocked in assembled form.

DRAWING NUMBER

NAVSHIPS S5501- 169238

COUPLING, HOSE, QUICK-RELEASE 4-INCH AND 2-1/2-INCH

**DESCRIPTION**

The Quick-Release Hose Coupling consists of a coupling body that separates into two halves; both halves come as a complete assembly. The coupling body contains a handle with a release rod pin, which releases the catch mechanism and permits operation of the handle to disconnect the coupling body and the sleeve. There is no valve in the coupling to prevent spillage. When the sleeve is separated from the coupling body, any fuel in the coupling will come out.

FUNCTION

The appropriate Quick-Release Hose Coupling is used with 4-inch and 2-1/2-inch fueling hose to provide a quick-release capability when fueling.

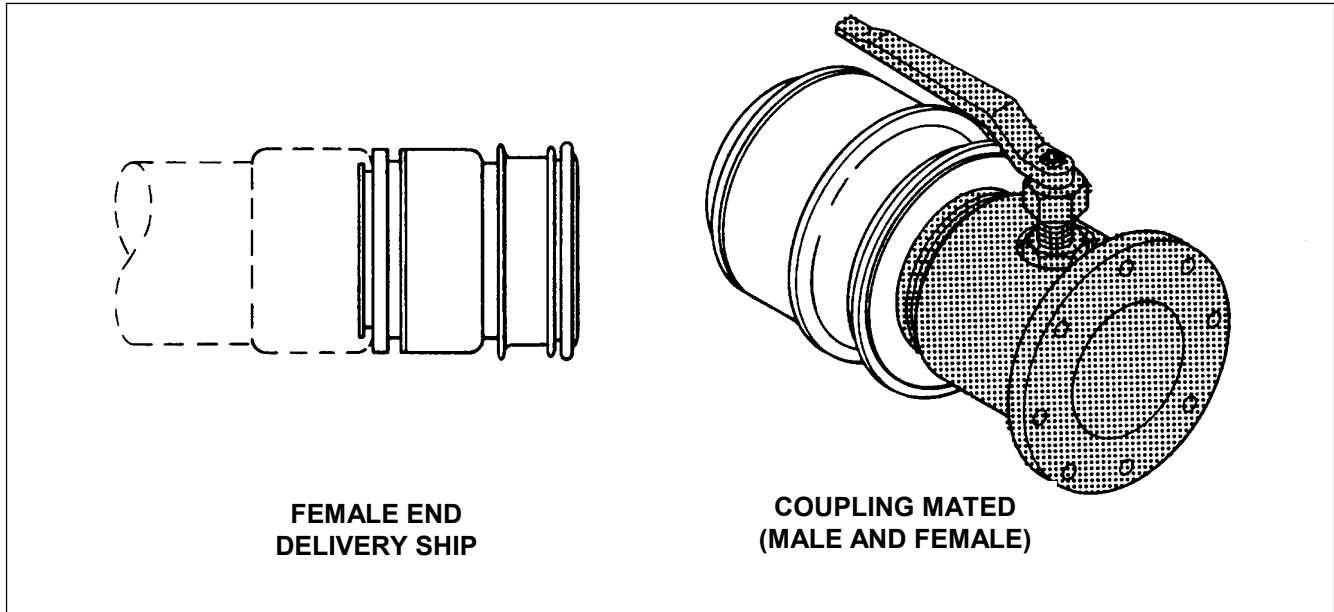
NATIONAL STOCK NUMBER

4-inch	4730-00-369-4604
2-1/2-inch	4730-00-369-4603

DRAWING NUMBER

FAS 4-Inch Quick-Release Coupling	NAVSHIPS 805-2556892
FAS 2-1/2-Inch Quick-Release Coupling	NAVSHIPS 805-2557603

COUPLING, HOSE, ROBB, FEMALE END

**DESCRIPTION**

The Female Robb Hose Coupling consists of a bronze body with a spring tensioned sleeve and ball race. When mated with the male end of the Robb coupling, the sleeve on the outside of the female end forces the balls down into the machined groove in the male end, holding the ends together. A valve located in the female end is held closed against a gasket by a heavy spring. Another gasket, the nipple gasket, provides a tight seal when both ends of the Robb are joined.

FUNCTION

The Female End Robb Hose Coupling is used to fuel ships with closed fueling systems. It consists of a female end secured to the end of the hose sent over by the delivery ship (illustrated here), and a male end attached to the fueling riser on the receiving ship.

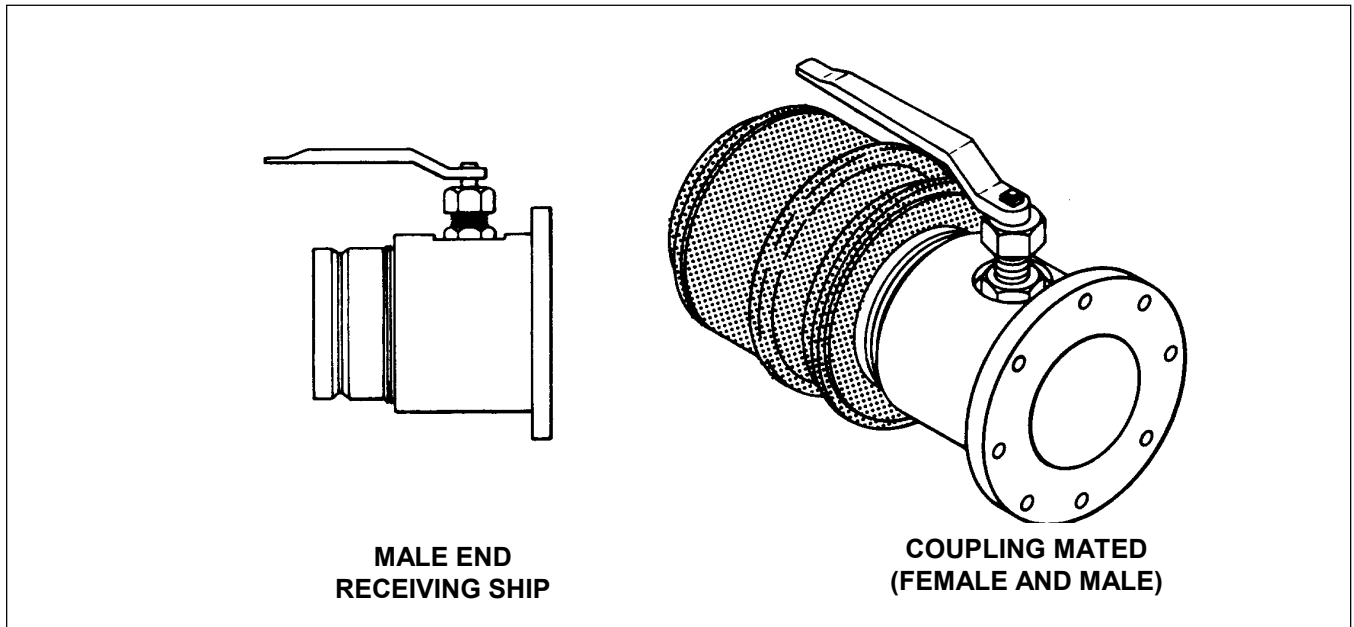
NATIONAL STOCK NUMBER

7-inch 4730-00-145-7362

DRAWING NUMBER

NAVSHIPS 5000-S4824-841597

COUPLING, HOSE, ROBB, MALE END

**DESCRIPTION**

The Male End Robb Hose Coupling consists of a bronze body that has a slightly tapered tube with a machined groove near the end. An operating lever moves a ring-shaped actuating cam. When the lever is turned to the open position, after the male and female ends have been joined, the cam is thrust forward opening the valve in the female end. A protective cap fits on the male end when not in use to prevent damage.

FUNCTION

The Male End Robb Hose Coupling is used to fuel ships with closed fueling systems. It consists of a

male end, which is attached to the fueling riser on the receiving ship (illustrated here), and a female end which is secured to the end of the hose sent over by the delivery ship.

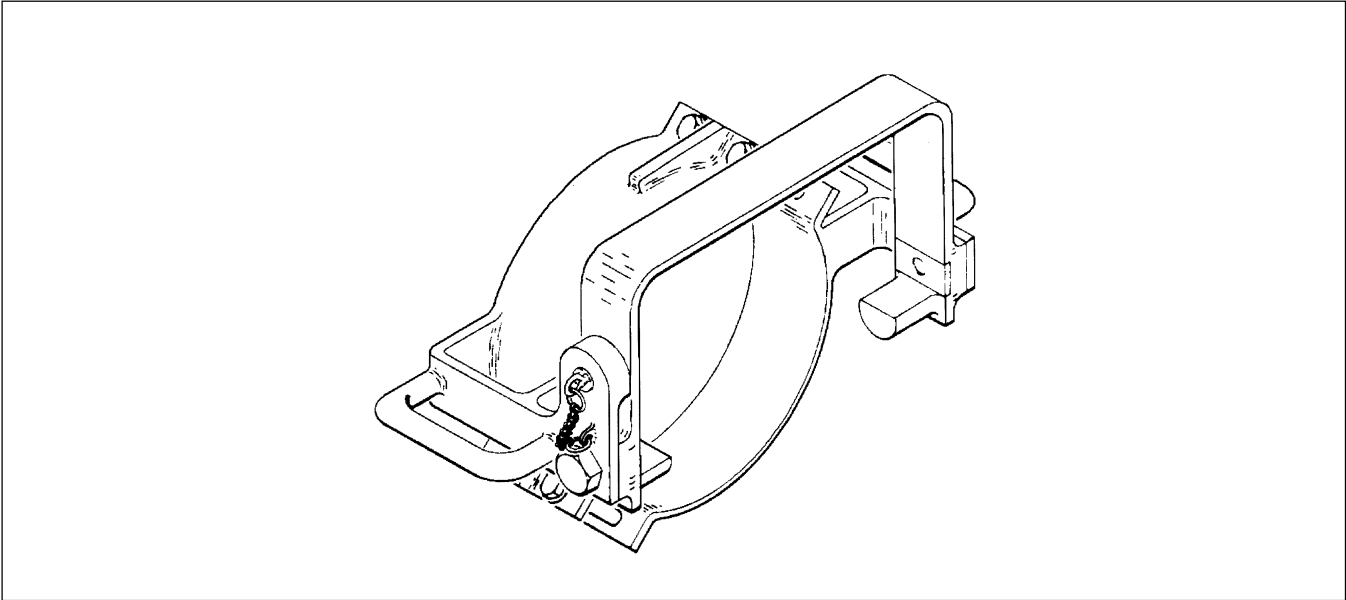
NATIONAL STOCK NUMBER

4730-00-640-1508

DRAWING NUMBER

NAVSHIPS 5000-S4824-841597

COUPLING, HOSE, ROBB QUICK TRIP DEVICE

**DESCRIPTION**

The Robb Hose Coupling Quick Trip Device consists of a clamp-type body with two fixed handles for lifting. The operating handle is flat and operates to move two semi-circular projections from the base of the handle that forces the Robb coupling sleeve back. A toggle pin is used to secure the handle in a locked position.

FUNCTION

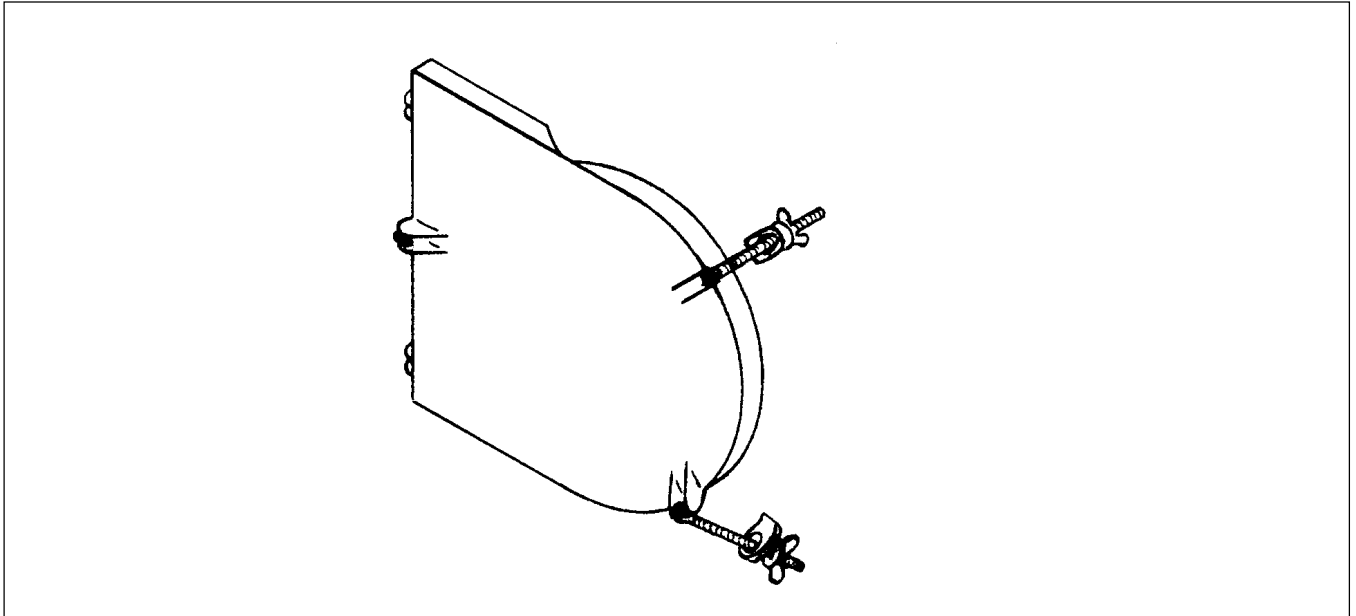
The Robb Hose Quick Trip Device is mounted on the female half of the Robb coupling and is used for a more rapid connect-up or release of the coupling.

NATIONAL STOCK NUMBER (P-NICN)

1H 0000-LL-TSL-2620

DRAWING NUMBER

NAVSHIPS 805-2556863

COVER PLATE, PROBE RECEIVER**DESCRIPTION**

The Probe Receiver Cover Plate consists of an aluminum plate hinged on one end, with wing nuts and dogs for securing the cover plate to the probe receiver.

FUNCTION

The Probe Receiver Cover Plate is used to secure the probe receiver in a stowed position and to

prevent water or other material from entering the fuel piping system.

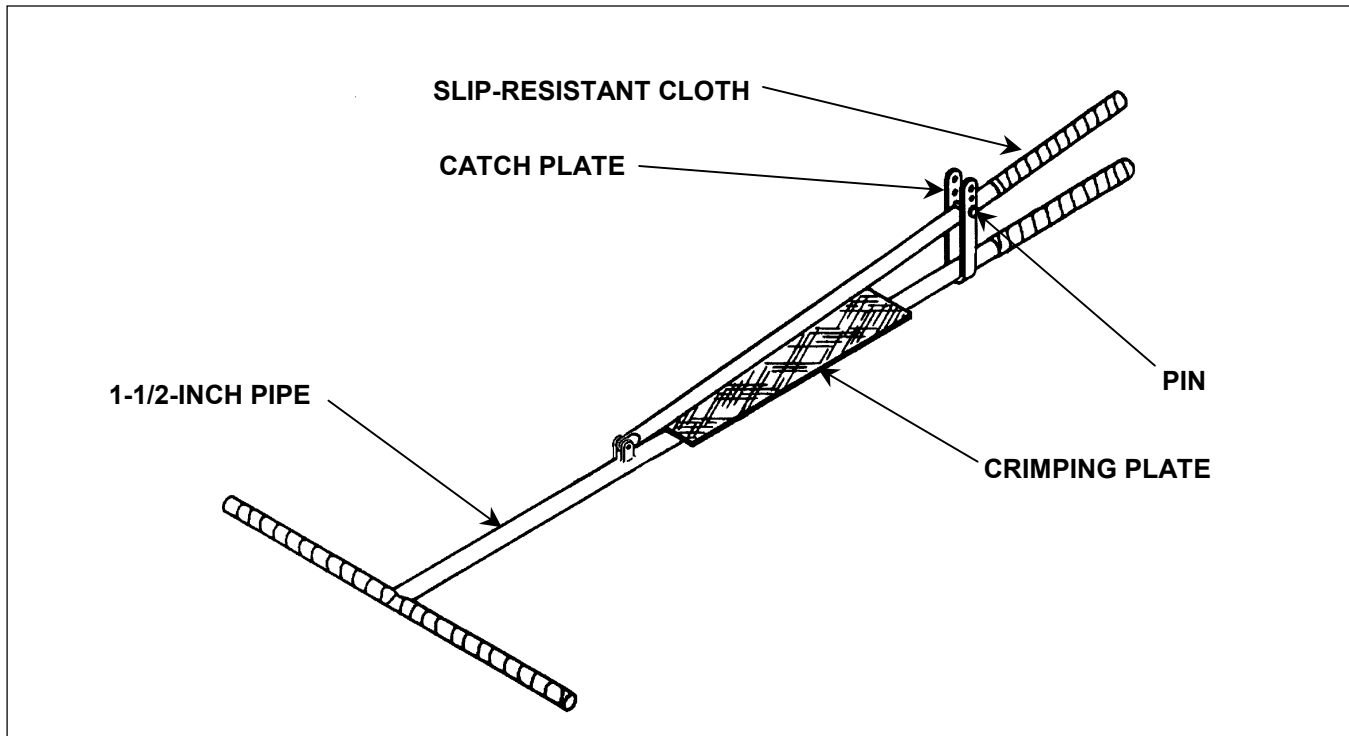
NATIONAL STOCK NUMBER

2040-00-851-9474

DRAWING NUMBER

NAVSHIPS 805-2217230

CRIMPER, HOSE

**DESCRIPTION**

The Hose Crimper consists of 3 pieces of 1-1/2-inch galvanized steel pipe and a 1/4-inch diamond pattern crimping plate. A clevis made from 10.2 lb plate provides a pivot point for the upper piece of pipe and a catch plate, also of 10.2 lb plate, is provided with a pin and 3 position holes to secure the upper pipe when the hose is crimped. Non-slip cloth of silicon carbide covers the handles.

FUNCTION

The Hose Crimper is used to clamp off a section of fuel hose when changing an end fitting. It prevents any fuel left in the hose from coming out. To be used only on the collapsible Fueling at Sea Hose, specification MIL-H-22240, shown on page 2-44.

STOCK NUMBER (P-NICN)

1H 0000-LL-TSH-1665

DRAWING NUMBER

NAVSHIPS 805-2554813

CROOK, HOSE**DESCRIPTION**

The Hose Crook is made from an 11-1/2 foot piece of 1-1/4-inch aluminum tubing. One end is bent in a semi-circle to form the crook. Another piece of 1-1/4-inch tubing, 18 inches long, is bent the other way and joined to the crook by welding. This piece is also supported by a triangular piece of 1/4-inch aluminum plate, about 8 by 7 inches on the sides, next to the tubing. A piece of slip resistant cloth 6 by 24 inches is bonded to the end to form a handle.

FUNCTION

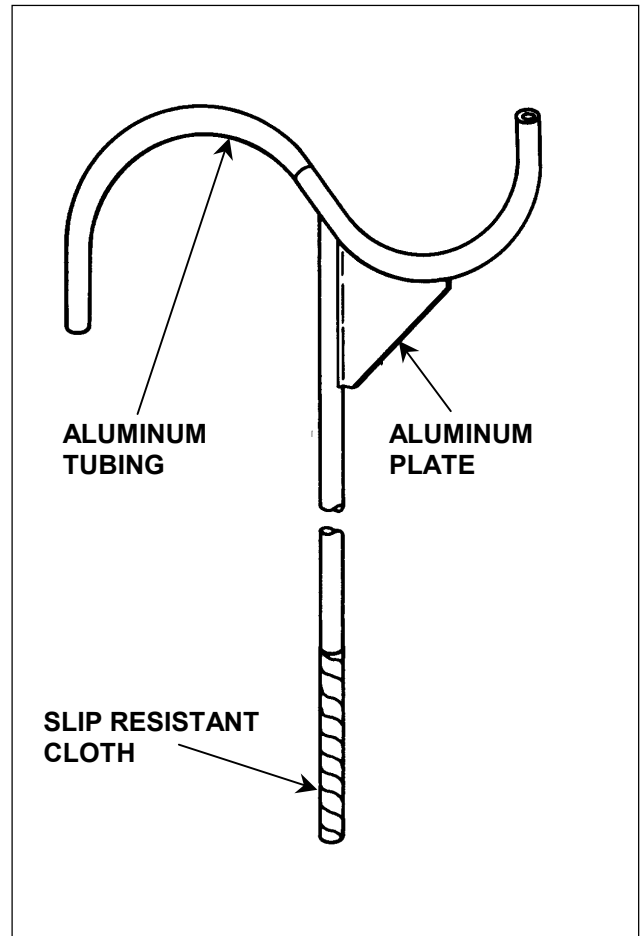
The Hose Crook is used by fueling station personnel to aid in handling the hose rig in the delivery ships.

NATIONAL STOCK NUMBER (P-NICN)

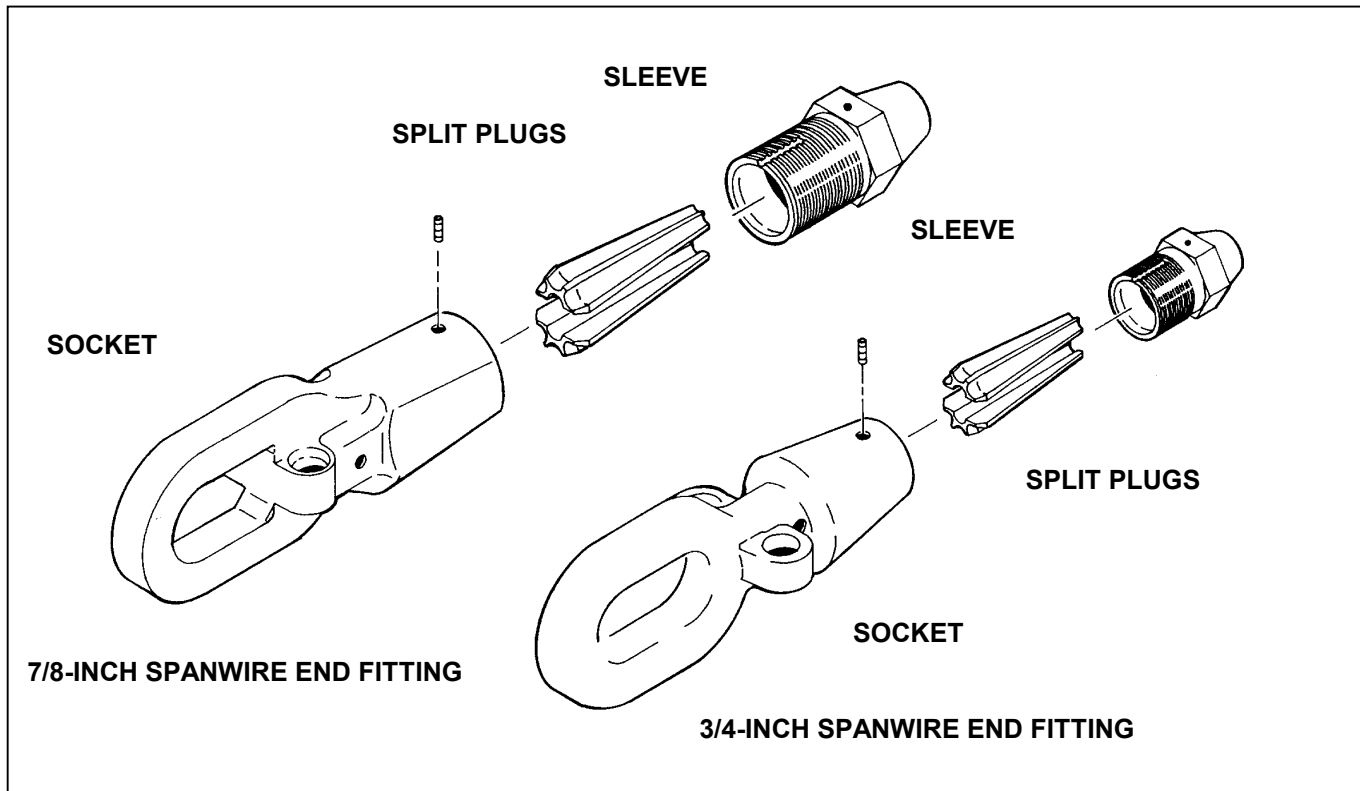
1H 0000-LL-CQA-1573

DRAWING NUMBER

NAVSHIPS 805-2554182



END FITTING, SPANWIRE

**DESCRIPTION**

The 3/4-inch Spanwire End Fitting is a modified standard fiege fitting. It is modified by the addition of a set screw in the socket and a slot for the set screw in the threaded sleeve to prevent the socket from unscrewing and being lost in the water while being retrieved after breakaway. Eyes have also been added for an easing out line.

The 7/8-inch Spanwire End Fitting is also a modified standard fiege fitting. It is modified to add the set screw and the easing out line eyes. In addition, the 7/8-inch oval eye socket has been machined down to fit the double probe receiver.

Both fittings are reusable except for the split plugs. New split plugs must be used each time the fitting is installed on a spanwire.

FUNCTION

The Spanwire End Fitting is used to secure the end of the spanwire to the pelican hook on the receiving ship's probe receiver. This end fitting is used on Navy Standard spanwire winches and other spanwire winches equipped with a slip clutch, which do not require weak-link end fittings. The 3/4-inch end fitting is for single hose fuel rigs and the 7/8-inch end fitting is for double hose fuel rigs. By adding a shackle and pelican hook, the end fitting can be used for Robb coupling or NATO fueling operations.

DRAWING NUMBER

3/4-inch	NAVSEA 6242966
7/8-inch	NAVSEA 6242967

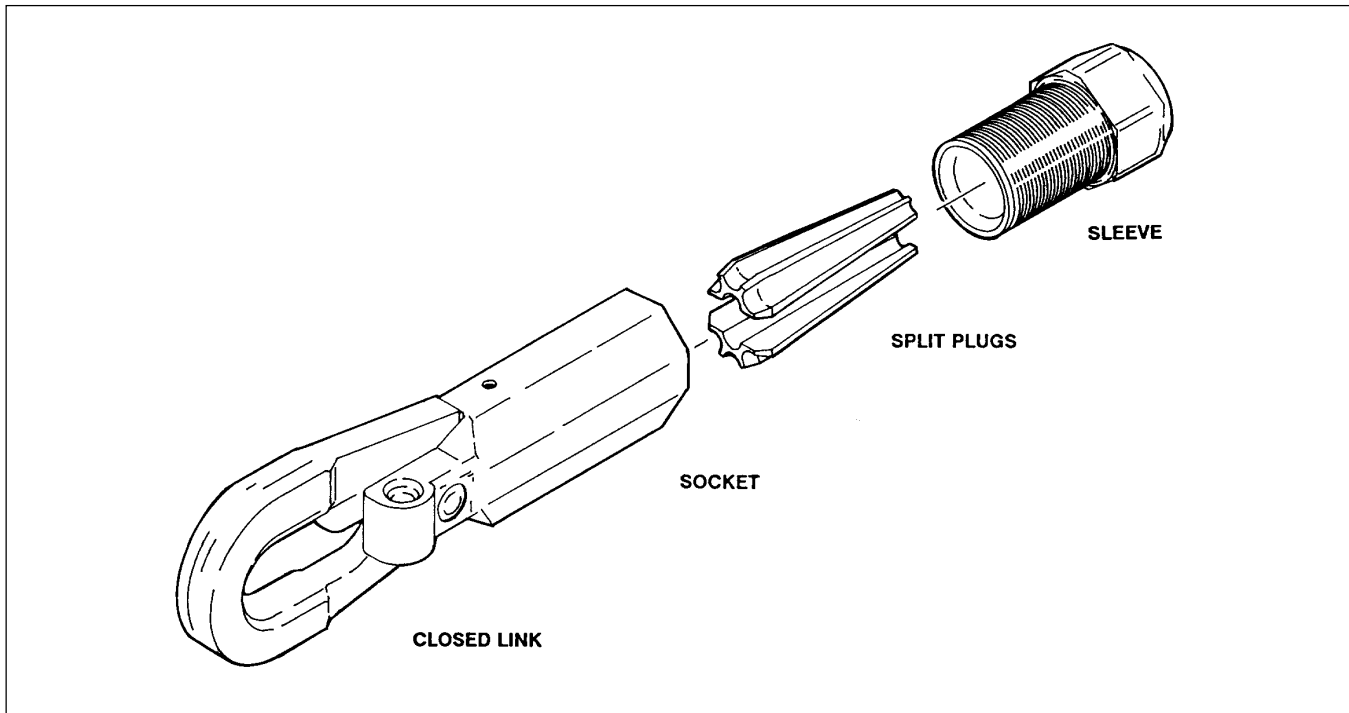
REFERENCE

Underway Replenishment (NWP 4-01.4)
Single Probe Fueling System; Installation,
Operation, and Maintenance
NAVSHIPS 0978-LP-035-3010
Double Probe Fueling System; Installation,
Operation, Maintenance and Parts List
NAVSEA 0955-LP-026-8010

NATIONAL STOCK NUMBER

Complete end fitting (including split plugs)
3/4-inch 4030-01-315-4279
7/8-inch 4030-01-316-4428
Split plugs only
3/4-inch 4030-00-032-2831
7/8-inch 4030-01-199-5649

END FITTING, SPANWIRE WEAK LINK

**DESCRIPTION**

The outboard end of the Spanwire Weak Link End Fitting is a special closed link that is designed to break away from the socket at a pre-determined load. The link is attached to an octagonal socket by a permanently installed pin. The socket contains enclosed eyes for the easing out line. It threads onto a sleeve that contains the end of the wire rope and plugs for wedging the wire rope to secure it in the end fitting. The sleeve and socket have left-hand threads so that a non-weak link end fitting cannot be installed inadvertently.

FUNCTION

The Spanwire Weak Link End Fitting is used to secure the end of the spanwire to the pelican hook

on the receiving ship's probe receiver. The weak-link end fitting is used on non-Navy Standard spanwire winches that do not have slip clutches. The weak link is designed to fail before a tightline condition can part the spanwire or cause structural damage to one of the ships. The 3/4-inch weak link end fitting is used on single hose rigs and the 7/8-inch is used on double hose rigs. By adding a shackle and pelican hook to the weak link, the end fitting can be used for Robb coupling or NATO fueling operations.

DRAWING NUMBER

3/4-inch	NAVSHIPS 803-2252855
7/8-inch	NAVSHIPS 803-2252856

REFERENCE

Underway Replenishment (NWP 4-01.4)
Single Probe Fueling System; Installation,
Operation, and Maintenance
NAVSHIPS 0978-LP-035-3010
Double Probe Fueling System; Installation,
Operation, Maintenance and Parts List
0955-LP-026-8010
Single Probe Fueling System
NAVSEA 0920-LP-046-3010

Double Probe Fueling System
NAVSEA 0955-LP-026-9010

NATIONAL STOCK NUMBER

Complete weak link end fittings (including split
plugs)

3/4-inch	1450-00-119-1704
7/8-inch	1450-00-119-1714
Split plugs only	
3/4-inch	4030-00-032-2831
7/8-inch	4030-01-199-5649

FITTING, RIDING LINE, FLOW-THROUGH, 7-INCH, 4-INCH AND 2-1/2-INCH**DESCRIPTION**

The Flow-Through Riding Line Fitting consists of an aluminum casting with a male split clamp coupling on one end and a female split clamp coupling on the other. The web on top of the fitting contains three holes, two for stress wires and one to suspend the fitting from a trolley. A hook is provided in the web for passing the riding lines. The smaller web on the bottom with one hole is used to suspend the lower hose riding line fitting of a double hose rig.

FUNCTION

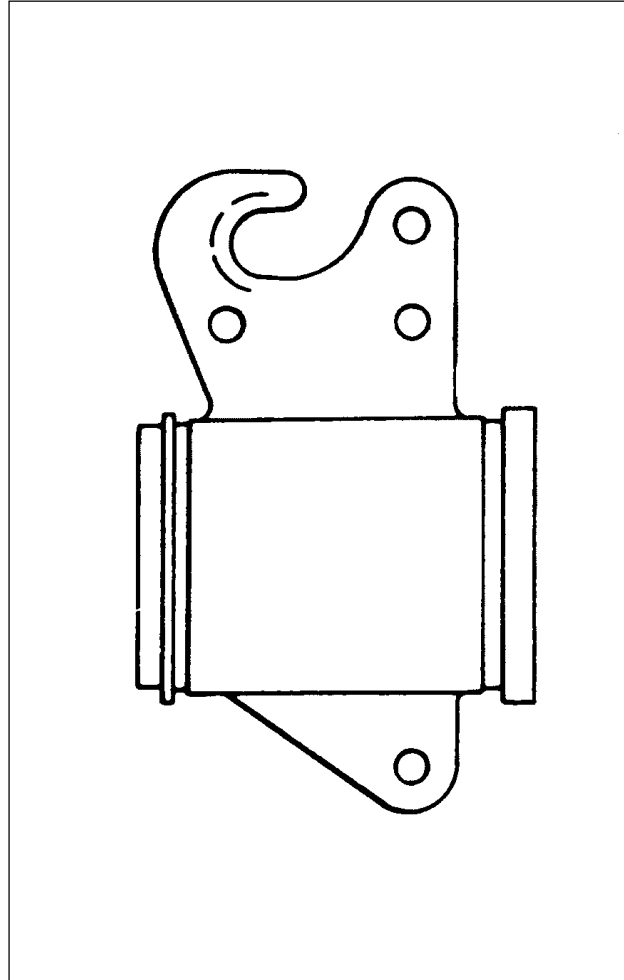
The Flow-Through Riding Line Fitting is used to join hose lengths together and provides a means to suspend them from a trolley. It also contains the hook over which a riding line is passed by the receiving ship during conventional fueling only.

NATIONAL STOCK NUMBER

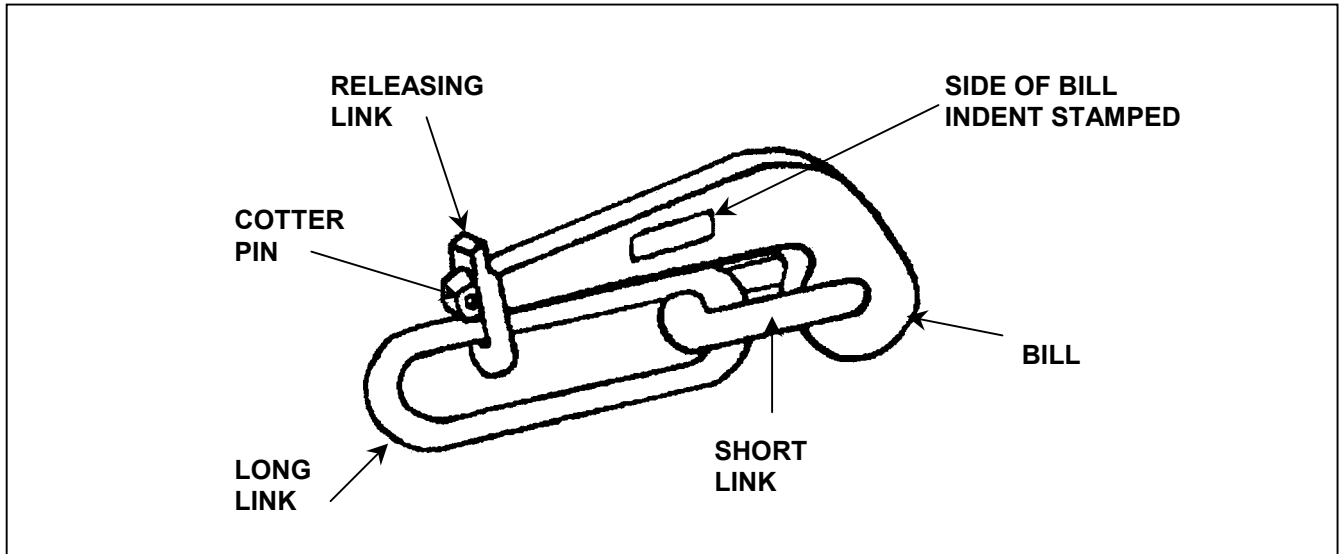
2-1/2-inch	4730-01-105-9486
4-inch	4730-01-291-6648
7-inch	4730-01-022-3966

DRAWING NUMBER

7-inch	NAVSHIPS 810-1385969
4-inch	NAVSHIPS 805-4472630
2-1/2-inch	NAVSHIPS 803-2260819



HOOK, PELICAN, FUELING

**DESCRIPTION**

The Fueling Pelican Hook consists of a long link, short link, bill and releasing link. A cotter pin is used to secure the releasing link when the pelican hook is closed. Measure the diameter of the long or short links to find the size of the pelican hook if the size stamped on the bill is not identifiable. The size should be indent stamped a minimum depth of 1/16" on the bill, for example:

1/2-INCH PELICAN HOOK
3,000# WORKING LOAD

FUNCTION

The 1/2-inch Fueling Pelican Hook is used to suspend the riding line fittings from their trolleys and to suspend the hose from the free trolley attached to the end of the hose. It provides an easily releasable attachment point.

The 1-inch Pelican Hook is used on the out board end of the spanwire when the fueling-at-sea

coupling is a Robb Coupling, a 4-inch Pigtail or a NATO Breakable Spool; it is not used with the probe fueling system. It is attached to the 3/4-inch spanwire with a 5/8-inch shackle for single-hose rigs, and attached with a 3/4-inch shackle to a 7/8-inch spanwire for all double hose rigs. It is used to provide a quick release attachment in the event an emergency breakaway of the spanwire is required.

NATIONAL STOCK NUMBER

1/2-inch Stock	4030-00-266-7408
1-inch Stock	4030-00-266-7413

DRAWING NUMBER

FAS 1/2-inch Pelican Hook

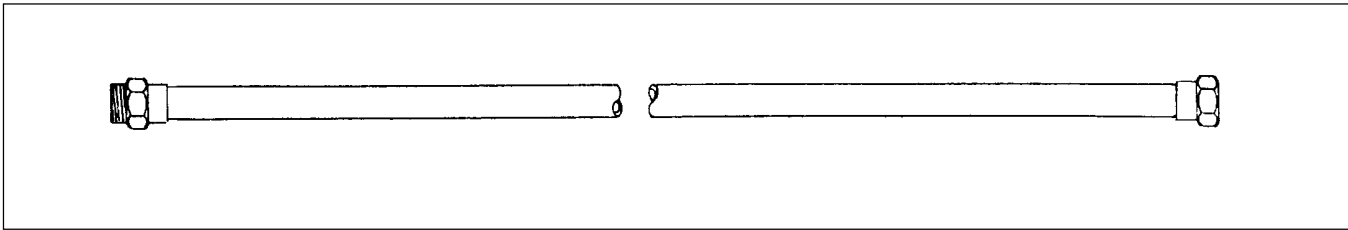
NAVSHIPS 805-2556882

FAS 1-inch Pelican Hook

BUSHIPS 804-860234

(PC Nos. 2, 3, 4, 5, and 16)

HOSE, 2-1/2-INCH, NEOPRENE FUELING



DESCRIPTION

The 2-1/2-inch Neoprene Fueling Hose consists of a 50-foot length of neoprene hose with a threaded male coupling at one end and a threaded female coupling at the other end.

NATIONAL STOCK NUMBER

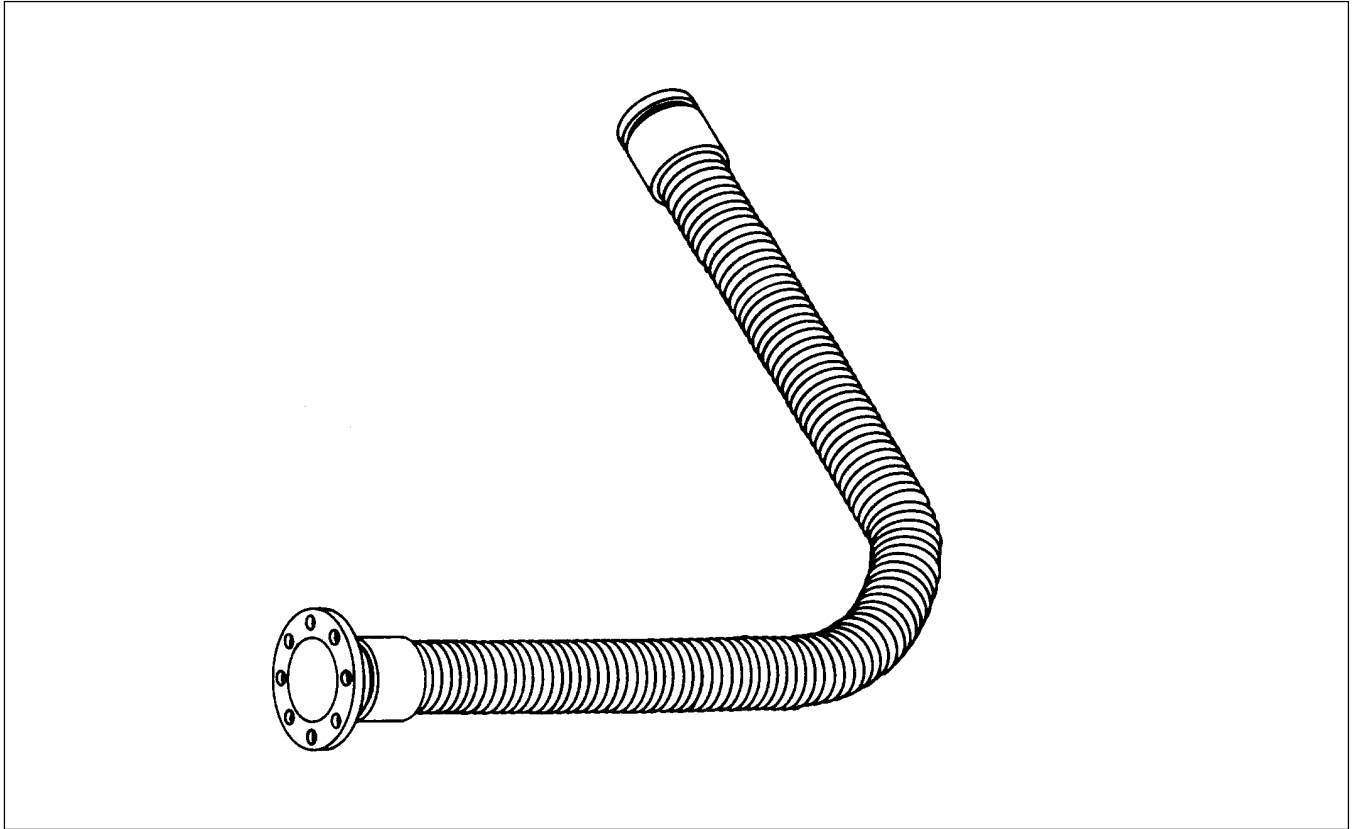
4720-00-837-7178

REFERENCE

Underway Replenishment (NWP 4-01.4)

FUNCTION

The 2-1/2-inch Neoprene Fueling Hose is used with the 2-1/2-inch astern fueling rig.

HOSE ASSEMBLY, 7-INCH WIRE REINFORCED, PROBE RECEIVER**DESCRIPTION**

The 7-inch Wire Reinforced Probe Receiver Hose Assembly consists of an 8-foot section of 7-inch wire reinforced synthetic rubber hose. A 7-inch coupling female clamp end, with O-ring and split clamp, is fitted to one end of the hose. The other end is fitted with a 7-inch hose coupling O-ring seal, split clamp and flange adapter.

FUNCTION

The 7-inch Wire Reinforced Probe Receiver Hose Assembly provides a flexible, but non-collapsible, hose connection between the flanged fuel riser and

the probe fueling receiver assembly on both single and double receivers.

DRAWING NUMBER

NAVSHIPS 805-2213794

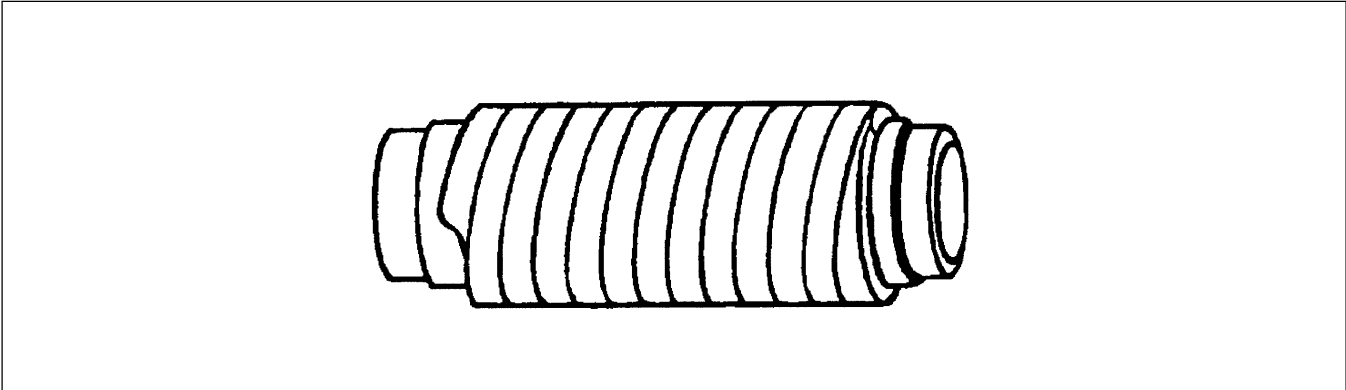
NATIONAL STOCK NUMBER

4720-00-933-1454

REFERENCE

Single Probe Fueling System; Installation,
Operation, and Maintenance
NAVSHIPS 0978-LP-035-3010

HOSE, FUELING AT SEA, 7-INCH, 4-INCH AND 2-1/2-INCH ALONGSIDE

**DESCRIPTION**

The 7 and 4-inch Alongside Fueling At Sea Hoses consist of a hose body with an inner tube of synthetic rubber compounds utilizing copolymer product of butadiene and acrylic nitrile as the basic material. The fabric reinforcement is nylon or polyethylene glycol terephthalate and the cover is oil and abrasion-resisting synthetic rubber. The standard unit of issue for the 7-inch hose is 35 feet. The standard unit of issue for the 4-inch is 30 feet. Hoses may be cut to suit length of installation.

The 2-1/2-inch Hose consists of a hose body with an inner tube in accordance with MIL-H-22240 Type C. The standard unit of issue is 35 feet. Hoses may be cut to suit length of installation. Hose end couplings are in accordance with MIL-C-24356.

FUNCTION

The 4 and 7 inch Alongside Fueling At Sea Hoses, as configured above, are used during the transfer of DFM and JP-5 during alongside refueling at sea operations. The 2-1/2-inch Hose is used during the transfer of DFM, JP-5 and water during refueling at sea operations.

NOTE

Virgin hose from stock can be used for DFM, JP-5 or water. After first product transfer, hose takes on that product's identity for all following transfers. Ships force is to color code hose.

NATIONAL STOCK NUMBER

For alongside hose only

<u>Size</u> <u>inches</u>	<u>Length</u> <u>feet</u>	<u>NSN</u>
2-1/2	35	4720-01-151-5619
4	30	4720-00-163-0217
7	35	4720-00-817-7781

REFERENCE

Hose, Rubber, Petroleum Based Fuels and Water Services, Discharge Only, Smooth Bore, Lightweight Buoyant Type A for alongside hose MIL-H-22240 (SH)

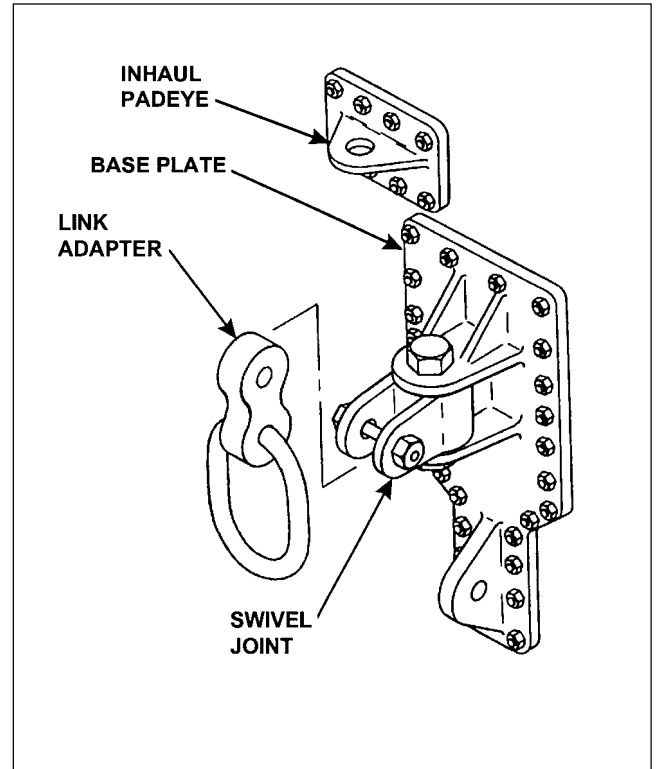
Hose Rigs, 2-1/2-inch Replenishment At Sea: Rigging, Operation and Maintenance With Illustrated Parts NAVSEA S9571-AH-MMO-010

JOINT, SWIVEL, SINGLE PROBE RECEIVER**DESCRIPTION**

The Single Probe Receiver Swivel Joint assembly consists of 3 major components: a swivel joint, a conventional link adapter, and an inhaul padeye. The swivel joint consists of a basic baseplate for attaching the unit to the ship's supporting structure by welding, bolting, or riveting. Attached to the baseplate is a swivel with vertical and horizontal bolts that allow the unit to swivel freely throughout the fueling rig operating range. The horizontal bolt is removable and serves as the connection for attaching either the probe swivel arm or the conventional link adapter to the swivel. Also attached to the baseplate is a vertical padeye for attaching an inhaul block. The next component, the conventional link adapter, consists of a padeye with two holes. A round bodied free fitting link is permanently installed through one of the holes. The other hole is used to connect the adapter to the swivel by use of the swivel's horizontal bolt. The last component, the inhaul padeye, is a horizontal padeye with an integral base for attaching the unit to ship's supporting structure by welding, bolting, or riveting. It serves as the attachment point for the probe inhaul block and must be installed at fixed distances above and to either side of the swivel to provide exact alignment of the inhaul. The choice of side to which the padeye is installed is based on the direction from which the inhaul is made.

FUNCTION

The Single Probe Receiver Swivel Joint assembly is required as the means of attaching the single probe receiver to a ship's supporting structure. It may also be used for fueling with other systems by installing the conventional link adapter and shifting the inhaul block.

**NATIONAL STOCK NUMBER**

2040-00-851-9471

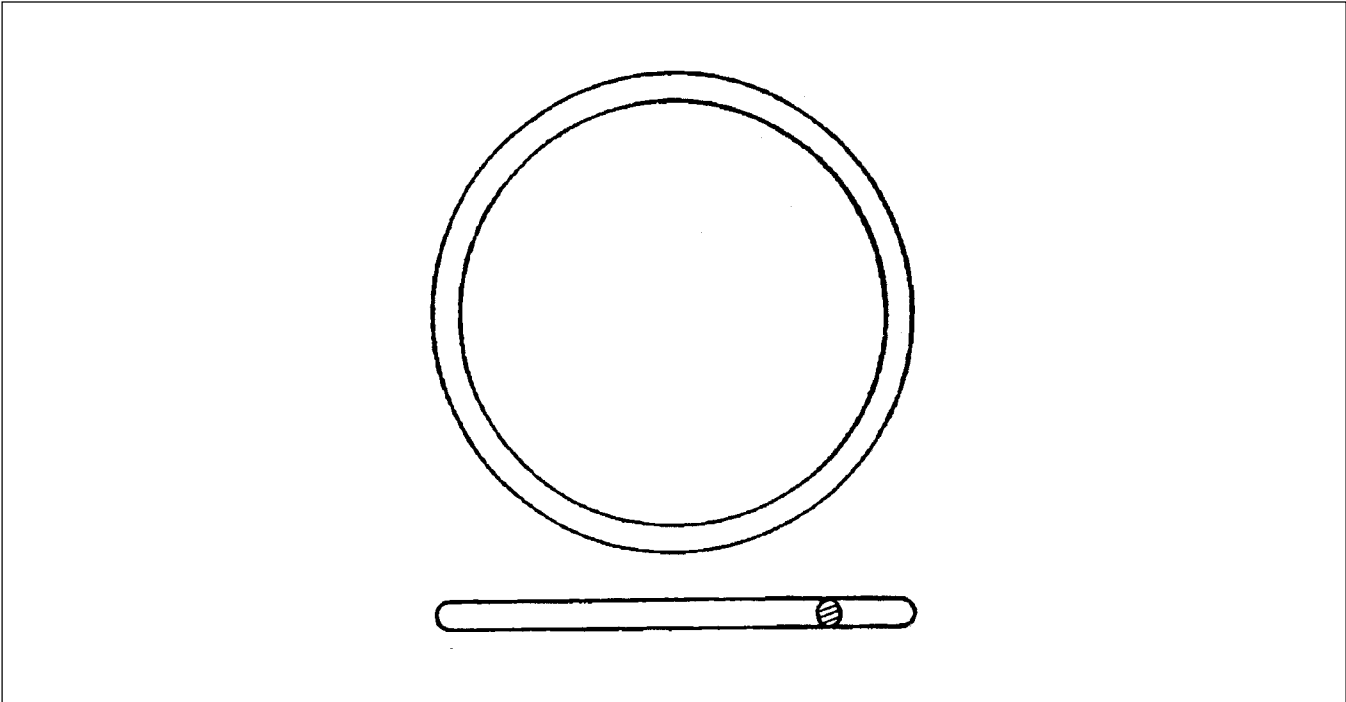
DRAWING NUMBER

NAVSHIPS 805-2213159

REFERENCE

Underway Replenishment (NWP 4-01.4)
 Single Probe Fueling System; Installation,
 Operation, and Maintenance
 NAVSHIPS 0978-LP-035-3010

O-RING SEAL, 7-INCH, 4-INCH AND 2-1/2-INCH



DESCRIPTION

The O-ring is a round cross-section gasket made of synthetic rubber, compound Buna-N.

FUNCTION

The O-ring is used to provide a seal when a male and female split clamp couplings are joined

together. It fits the circular groove of the female split clamp fitting.

NATIONAL STOCK NUMBER

7-inch	5330-01-416-4113
4-inch	5330-01-416-4114
2-1/2-inch	5330-00-194-3724

PAN, DRIP

DESCRIPTION

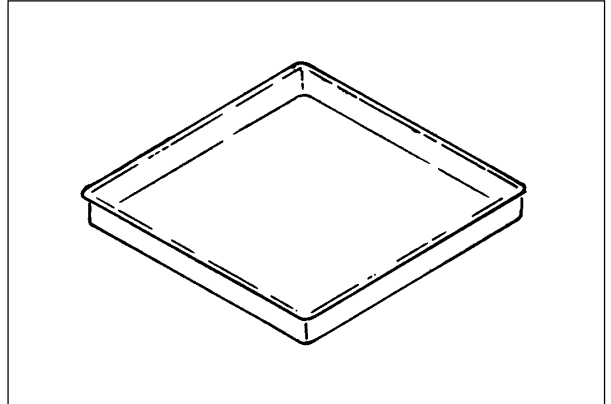
The Drip Pan is fabricated from sheet steel to a size of approximately 24 inches square by about 3 inches deep.

FUNCTION

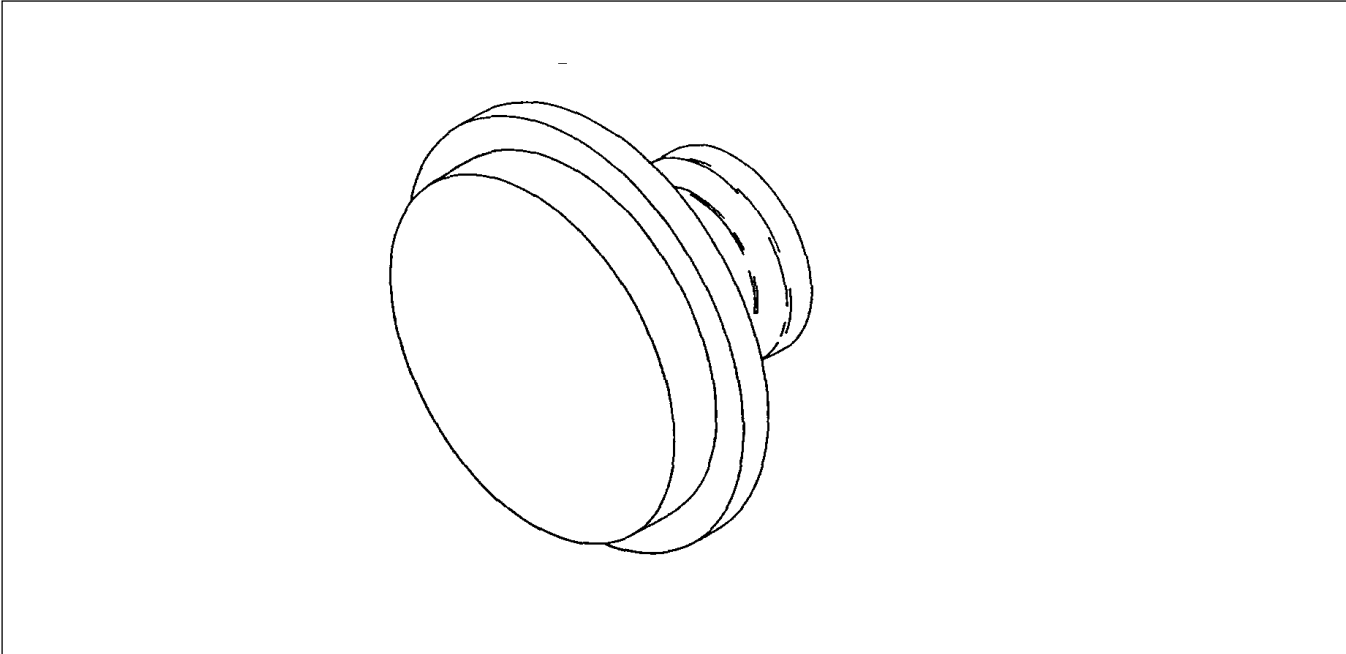
The Drip Pan is used to contain any leakage, which might occur at a fueling station, and to make clean up easier after fueling.

NATIONAL STOCK NUMBER

Sheet, Metal (Steel) 9515-00-230-6710



PLUG, HOSE, MALE SPLIT CLAMP, 7-INCH, 4-INCH, AND 2-1/2-INCH



DESCRIPTION

The Male Split Clamp Hose Plug consists of an aluminum casting with a male split clamp fitting. An O-ring is fitted in the groove of the female fitting when using the hose plug.

FUNCTION

The Male Split Clamp Hose Plug is used to protect a female split clamp fitting and to seal it off. The plug may be used to plug the end of the probe tube when the probe is stowed. The hose plug may also be used when hydrostatically testing a section of hose. When

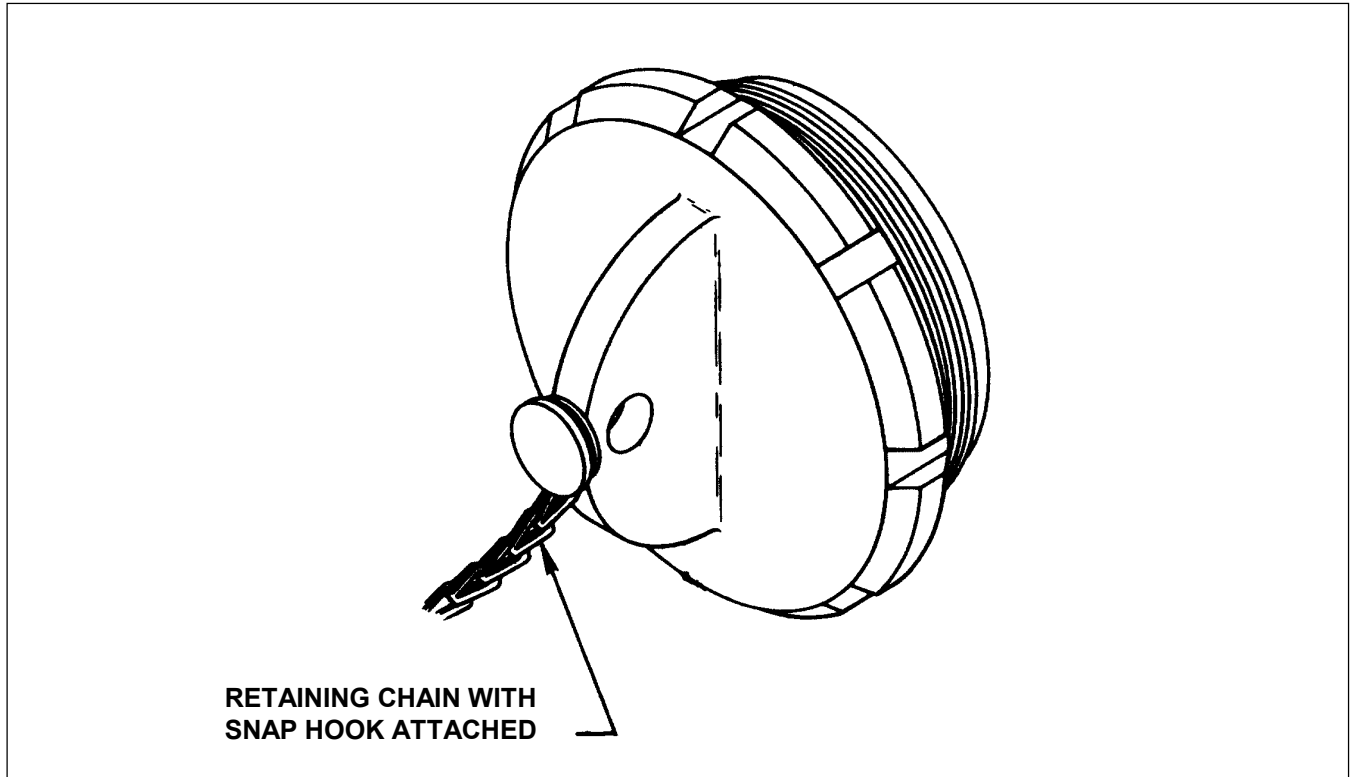
used in this manner either the plug or hose cap must be modified to permit attachment of the test equipment.

NATIONAL STOCK NUMBER

2-1/2-inch	4730-01-418-4150
4-inch	4730-00-009-5179
7-inch	4730-00-023-2705

DRAWING NUMBER

NAVSHIPS 805-4472657
 NAVSHIPS 803-2260817

PLUG, HOSE, 4-INCH AND 2-1/2-INCH HOSE THREAD**DESCRIPTION**

The Hose Plug consists of a male threaded bronze body with a slotted ring for a spanner wrench. The hose plug has a snap hook and safety chain to prevent loss when unthreaded.

FUNCTION

The Hose Plug is used to protect the threads on a female fitting and to seal it off. The Hose Plug may

be used to plug the female end of the 4-inch pigtail hose when removed from the basic rig.

NATIONAL STOCK NUMBER

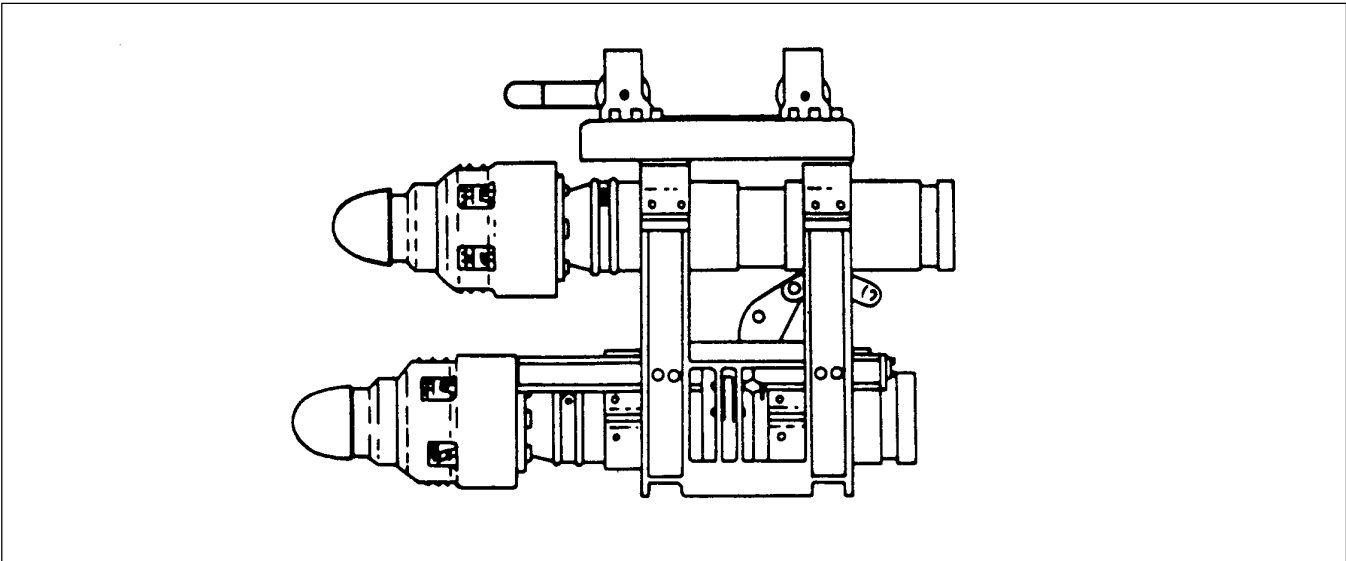
2-1/2-inch 4210-00-240-5537

4-inch 4210-00-240-5541

DRAWING NUMBER

805-4472661

PROBE, DOUBLE

**DESCRIPTION**

The Double Probe assembly consists of 3 major components: the probes, probe tubes, and trolley assembly. The probes and probe tubes are identical to the probe and probe tube described in the single probe assembly. The trolley assembly is clamped to the two outer grooves of the probe tubes. Its upper part, containing the four sheaves is similar to the one used in the single probe assembly. The upper probe is clamped in a fixed position in the assembly while the lower probe is clamped in a cradle-like assembly with a sliding mechanism. During engagement the sliding mechanism permits the lower probe to be aligned first with the lower double probe receiver. The lower probe then slides back until the upper probe is engaged in the receiver. Engagement of the lower probe follows the engagement of the upper probe. When fueling to a single probe receiver the lower probe shall be retracted and locked in the trolley assembly to permit fueling with the upper Probe. There are two points of attachment for the fueling-at-sea messenger. The one for the double probe inhaul is located between the upper and lower probes in the Trolley Assembly and is used when fueling to a double probe receiver. The other point located on the trolley sheave assembly is used when fueling to a single receiver with the double probe.

FUNCTION

The Double Probe assembly is used for transferring DFM or JP-5 fuels to receiving ships having a double probe receiver assembly or a single probe receiver assembly when the lower probe is locked in a retracted position.

DRAWING NUMBER

NAVSEA 810-2223300

NATIONAL STOCK NUMBER

Double Probe (Senders) with Trolley Assembly
2040-00-629-9904

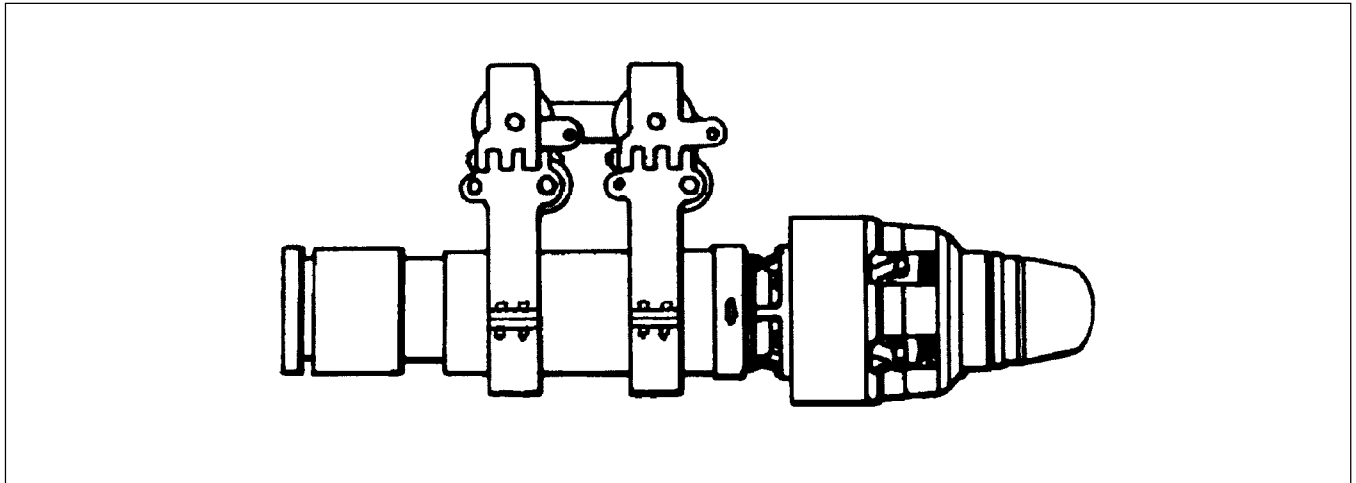
Trolley and Bridle Stress Wire
2040-01-113-5689

Frame Assembly only
2040-01-095-4480

REFERENCE

Underway Replenishment (NWP 4-01.4)
Double Probe Fueling System; Installation,
Operation, Maintenance and Parts List
NAVSEA 0955-LP-026-8010
Operating Instructions Double Probe Fueling
System
NAVSEA 0955-LP-026-9010
Probe Fueling Hardware; Shipboard Level
Maintenance NAVSEA 0920-LP-103-2010

PROBE SINGLE

**DESCRIPTION**

The Single Probe assembly consists of 3 major components: the probe, probe tube, and the trolley assembly. The probe is the major component of the three. Its assembly includes six spring-loaded locking mechanisms, which are triggered by six spring-loaded lock arms as the probe is mated in the probe receiver. The trigger locking mechanisms lock the probe in the receiver. The probe also includes a spring loaded sliding sleeve valve that is actuated as the probe is mated and allows the transfer of fuel. The nose of the probe is tapered and provides self aligning features. The next component, the probe tube, is an aluminum tube. One end is configured to connect to the probe by means of a split clamp. The other end is configured to connect to the split clamp hose coupling again by use of a split clamp. Three grooves in the tube provide clamping areas for either the single or the double probe trolley assemblies. The final component, the trolley assembly, is clamped to two grooves of the probe tube. Its assembly includes four sheaves, fitted with permanently lubricated bronze bushings, which allow the probe to travel freely along the spanwire yet hold the probe in alignment with the

spanwire. The upper portion of the trolley assembly may be hinged open to insert the spanwire between the upper and lower sheaves. Once the spanwire is inserted the upper portion is secured shut with two lock pins which in turn are secured with cotter pins. The trolley assembly also includes padeyes for attaching the remating line hook and stress wire.

FUNCTION

The Single Probe assembly is used for transferring DFM and JP-5 fuels to receiving ships having a single or double probe receiver.

NATIONAL STOCK NUMBER

2040-00-850-5144

DRAWING NUMBER

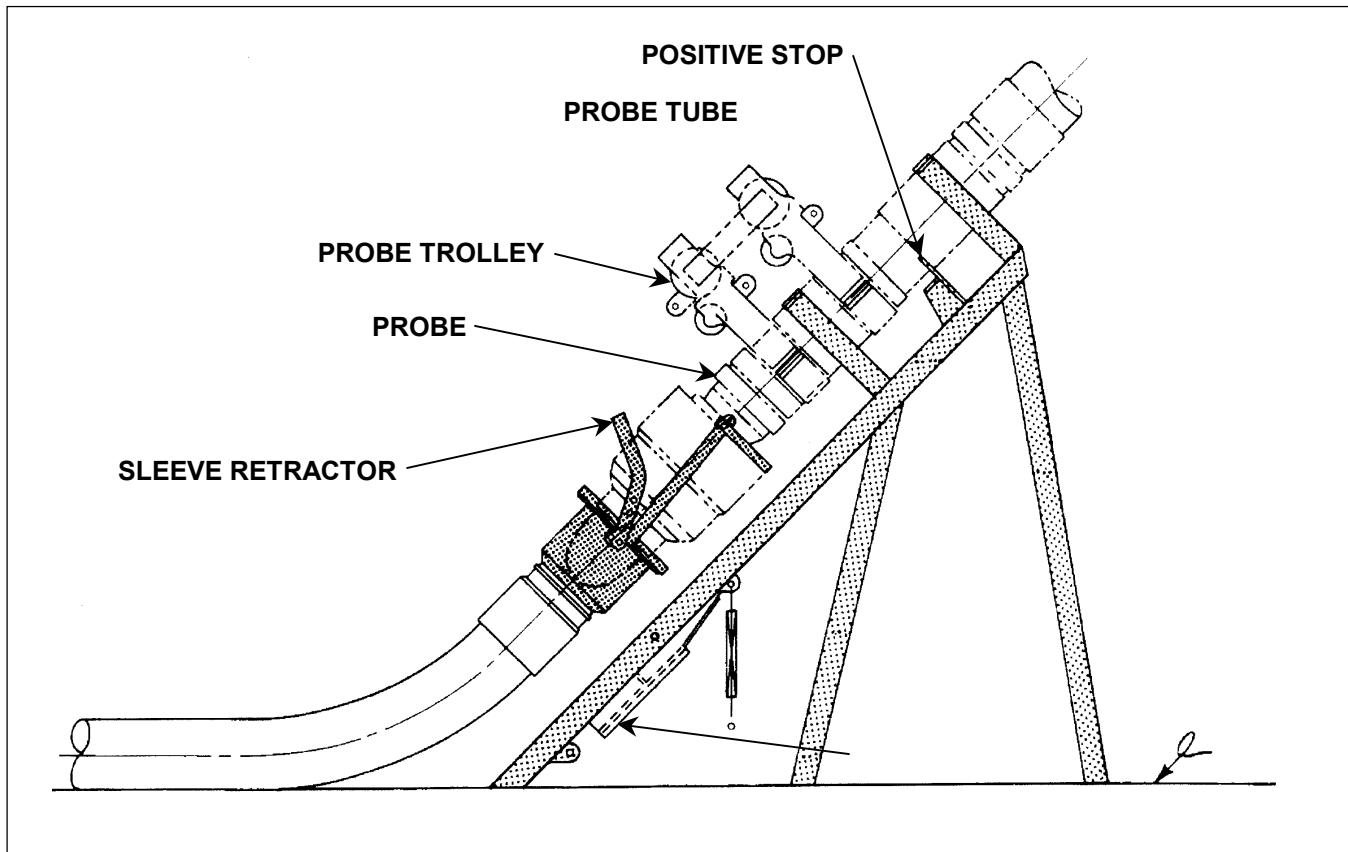
NAVSHIPS 810-2255758

REFERENCE

Underway Replenishment (NWP 4-01.4)
Single Probe Fueling System; Installation,
Operation, and Maintenance
NAVSEA 0978-LP-035-3010

Probe Fueling Hardware; Shipboard Level
Maintenance NAVSEA 0920-LP-103-2010

RACK, SINGLE PROBE STOWAGE



DESCRIPTION

The Single Probe Stowage Rack consists of a sloping rack to which are attached 2 stowage cradles, a positive stop, and a hinged support plate. The stowage cradles are lined with rubber to prevent damage to the probe tube and include removable bolted stowage bars for firmly locking the probe in the rack. The hinged support plate is fitted with a wood block with a spherical recess to fit the probe nose and aid in easing the probe into the rack. It is also fitted with a turnbuckle with a permanent pin on one end and a removable toggle pin on other end. Once the probe is secured in the rack, the toggle pin may be removed and the support plate hinged down so that the probe sleeve retractor may be used to

drain or purge the Probe. Four legs support the sloping rack. The entire assembly is either welded or bolted to the ship's deck.

FUNCTION

The Probe Stowage Rack is used to provide rigid stowage for the single probe and may also be used when draining the probe.

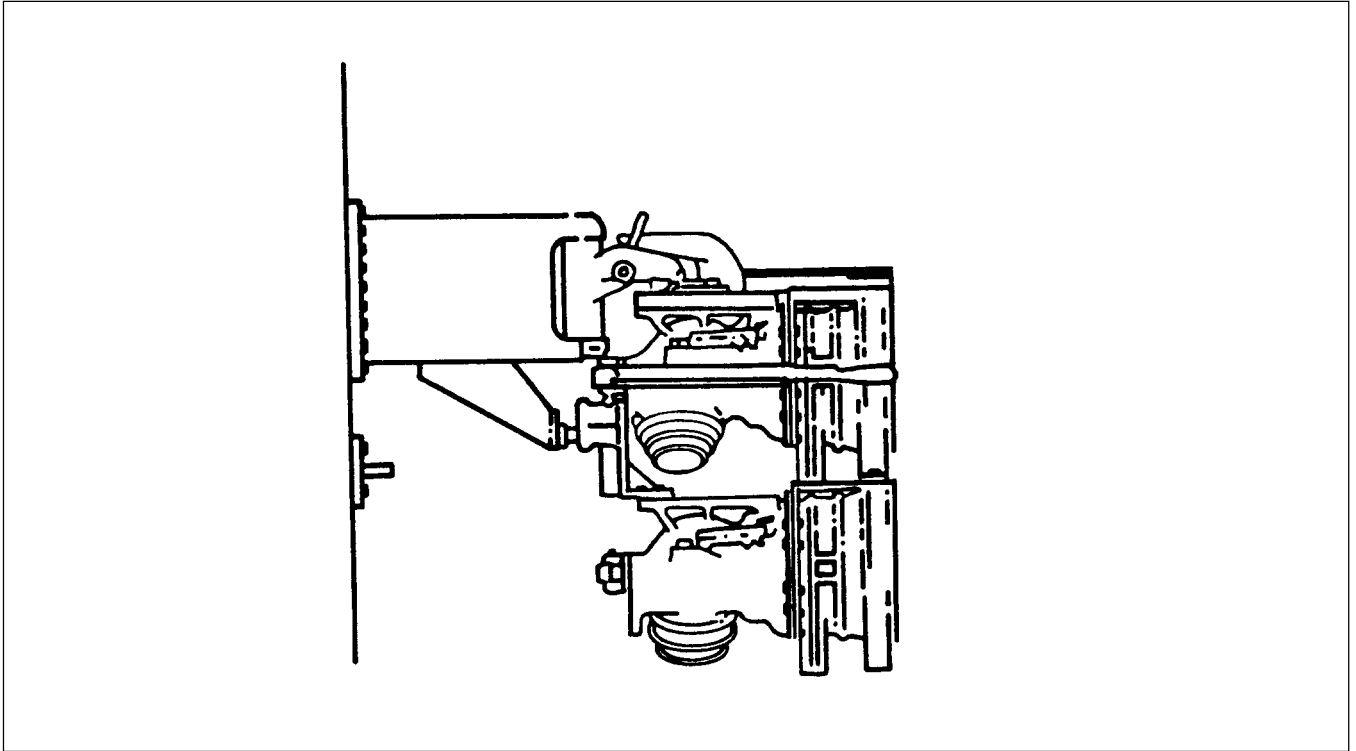
NATIONAL STOCK NUMBER

Not a stock item.

DRAWING NUMBER

Stowage Rack for Single Probe
 NAVSHIPS 803-5001034
 NAVSHIPS 528-2227928

RECEIVER, DOUBLE PROBE

**DESCRIPTION**

The Double Probe Receiver assembly is comprised of 4 major components: the two receiver assemblies, a swivel arm assembly, a baseplate assembly, and an inhaul block assembly. The two receiver assemblies are identical to the single probe receiver, except that the bellmouths are shorter and include surfaces for bolting the units together. The housings include bolting surfaces for a trackway and the fuel outlets are angled outward. A vertical trackway with readjusted internal surfaces is bolted between the two housings. An enclosed horizontal trackway is bolted to the top of the upper bellmouth and housing. The next component, the swivel arm assembly, includes a pelican hook and bale similar to those of the single probe swivel arm. Four rollers are attached to the side of the swivel arm and ride in the trackway on the top receiver. One end of the arm includes a positive stop for the spanwire. A hole penetrates the other end of the arm. The baseplate assembly has a flanged surface for attaching the assembly to the supporting structures. It includes a swivel with a vertical and a horizontal pin for free

operation throughout the fueling rig's operating range. The swivel arm is connected to the swivel by the horizontal pin of the swivel. Attached to the bottom of the baseplate is a ball on a supporting structure. The ball fits in the vertical trackway between the receiver housings and forms a captured sliding connection. The next component, the inhaul block assembly, consists of a horizontal padeye with integral baseplate for attaching the unit to supporting structures. The padeye is installed at fixed distances below and to either side of the baseplate assembly. The choice of the side to which it is installed is based on the side from which the inhaul is accomplished. An inhaul block is shackled to the padeye.

FUNCTION

The Double Probe Receiver assembly is used to receive DFM or JP-5 from ships equipped with either the single or double probe senders.

RECEIVER**S9570-AD-CAT-010****NATIONAL STOCK NUMBER**

Double Receivers:

Type "A" (Left Hand)
2040-01-113-5688Type "B" (Right Hand)
2040-01-113-5687Type "C" (Right and Left Hand)
2040-01-113-5686Double Receiver Cover
No NSN AssignedHose Assembly (Two Required for each Double
Receiver)
4720-00-933-1454

A left-hand, double probe receiver (Type A) has both hose assemblies connected on the left side, as one looks inboard into the receiver.

A right hand double probe receiver (Type B) has both hose assemblies connected on the right, as one looks inboard into the receiver.

A right and left hand double probe receiver (Type C) has the upper hose assembly connected on the left side and the lower hose assembly connected on the right side as one viewed inboard into the receiver.

DRAWING NUMBER

NAVSHIPS 805-2223301

REFERENCE

Underway Replenishment (NWP 4-01.4)

Double Probe Fueling System; Installation,
Operation, Maintenance and Parts List
NAVSEA 0955-LP-026-8010Operation Instructions Double Probe Fueling
System NAVSEA 0955-LP-026-9010Probe Fueling Hardware; Shipboard Level
Maintenance NAVSEA 0920-LP-103-2010

RECEIVER, SINGLE PROBE**DESCRIPTION**

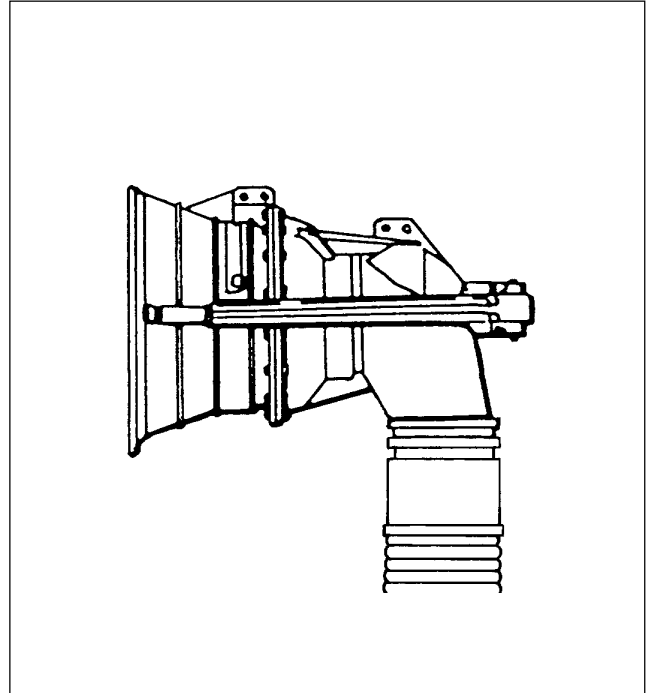
The Single Probe Receiver consists of three major components: a bellmouth, a housing, and a manual release lever assembly. The bellmouth has internal tapering surfaces that provide a self-aligning feature for proper engagement of the probe. It also contains an internal surface for triggering the locking mechanisms of the probe. The housing is permanently bolted to the bellmouth. Its assembly includes two spring-loaded flags, which provide visual indication of proper engagement of the probe and receiver and a seal to provide a leak-proof connection with the probe. The internal surfaces of the housing are configured to provide an unrestricted flow path for the fuel and the end of the housing is configured to connect to one end of the probe receiver hose by use of split clamps. Pads are provided on both the bellmouth and the housing for attachment to the probe swivel arm. The manual release lever assembly is bolted to the housing and may be installed on either side of the housing. Its assembly includes a plunger, which is actuated by the lever to disengage the probe, and seals to prevent leakage. When not in use, the lever is stowed to the housing with a pip type pin.

FUNCTION

The Single Probe Receiver assembly is used to receive DFM, or JP-5 from ships equipped with either the single or the double probe sender.

DRAWING NUMBER

NAVSHIPS 810-2255761

**NATIONAL STOCK NUMBER**

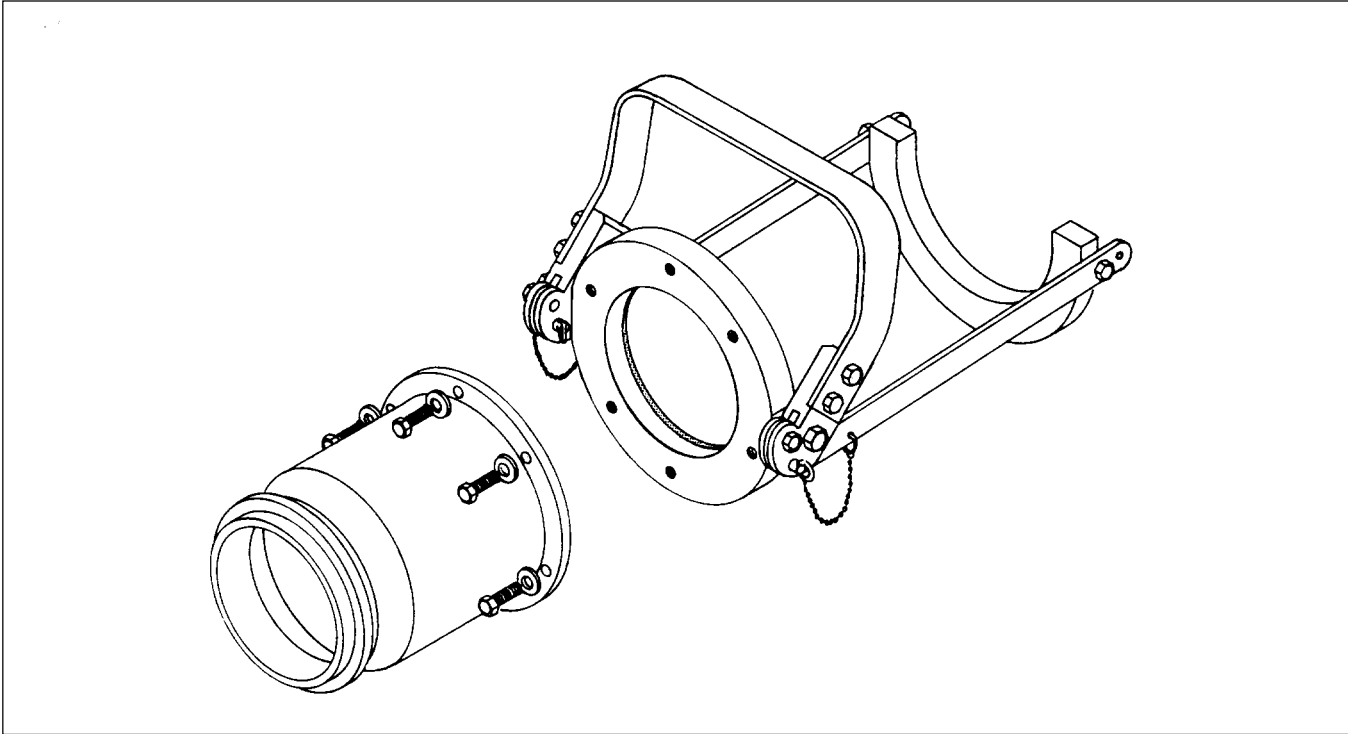
2040-00-850-5146

REFERENCE

Underway Replenishment (NWP 4-01.4)
Single Probe Fueling System; Installation,
Operation, and Maintenance
NAVSEA 0978-LP-035-3010

Probe Fueling Hardware; Shipboard Level
Maintenance NAVSEA 0920-LP-103-2010

RETRACTOR, SLEEVE, PROBE

**DESCRIPTION**

The Probe Sleeve Retractor consists of a handle which, when lowered, moves the ring of the sleeve retractor tube to open the valve in the nose of the probe. The half ring engages the rear of the probe and is connected to the handle by means of the link.

FUNCTION

The Probe Sleeve Retractor is used for draining fuel from the rig with probe installed, for conducting the pre-operational inspection of the sleeve valve, or for retracting sleeve valve to provide access in replacement of probe nose seal.

NATIONAL STOCK NUMBER

4730-00-822-2206

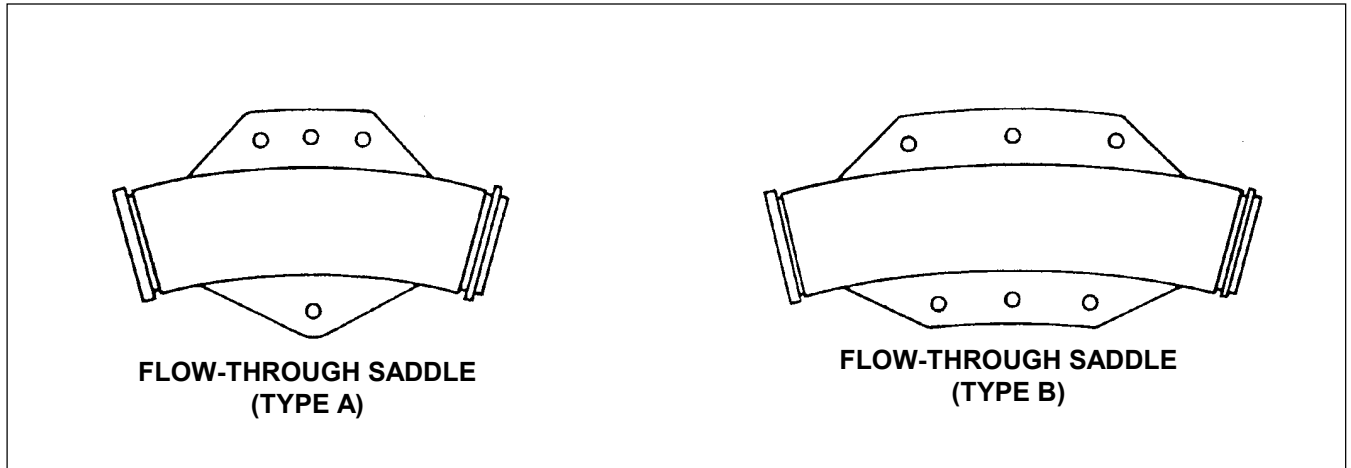
DRAWING NUMBER

NAVSHIPS 805-2214629 Rev. B

REFERENCE

Underway Replenishment (NWP 4-01.4)
Single Probe Fueling Operator's Handbook
NAVSEA 0920-LP-046-3010
Probe Fueling Hardware; Shipboard Level
Maintenance NAVSEA 0920-LP-103-2010

SADDLE, HOSE, FLOW-THROUGH, 7-INCH, 4-INCH AND 2-1/2-INCH

**DESCRIPTION**

The Flow-Through Hose Saddles consist of an aluminum casting with a female split clamp fitting on one end and a male split clamp fitting on the other. There are two types of saddles. Type A has a broad web with three attachment holes on top and a web with one hole on the bottom. Type B is longer than Type A and has a broad web with three attachment holes on top and a web with three holes on the bottom.

FUNCTION

The Flow-Through Hose Saddles are used to join two sections of fueling hose and provide an attachment point from which the hose rig is supported. Type A hose saddles are used for single hose rigs and for the lower hose in a double hose rig. Type B saddle is used for the upper hose of a double hose rig.

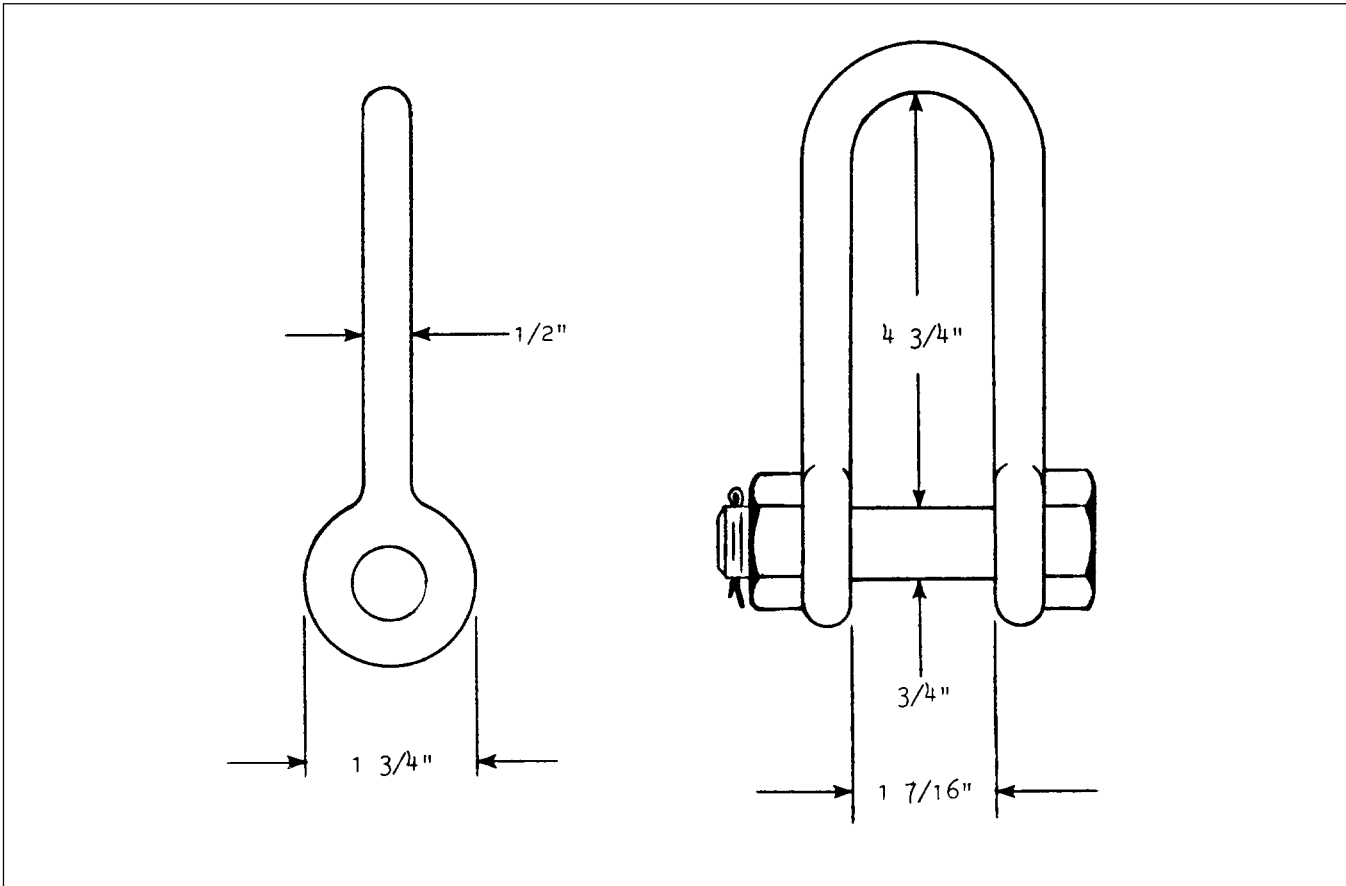
NATIONAL STOCK NUMBER

7-inch Type B	4730-00-900-8536
7-inch Type A	4730-00-900-8535
4-inch Type A	4730-01-106-8915
2-1/2-inch Type A	4730-01-134-7821

DRAWING NUMBER

7-inch Type A and Type B	NAVSHIPS 810-1385957
4-inch	NAVSHIPS 805-4472629
2-1/2-inch	NAVSHIPS 803-2260818

SHACKLE, SPECIAL FUELING

**DESCRIPTION**

The Special Fueling Shackle is a galvanized forged steel safety chain shackle with the throat opening of a $\frac{7}{8}$ -inch shackle but with the elongated body of a $\frac{1}{2}$ -inch shackle. The throat opening and bolt are sized to fit the web of the flow-through riding line fitting. The body is sized to accept a $\frac{1}{2}$ -inch pelican hook and is elongated so that the pelican hook will freely clear when it is tripped.

FUNCTION

The Special Fueling Shackle is required to connect a riding line fitting to its supporting hardware.

NATIONAL STOCK NUMBER

4030-01-097-6471

DRAWING NUMBER

NAVSHIPS 805-2556884

STRAP, ANTI-TOPPLING**DESCRIPTION**

The Anti-Toppling Strap for the yo-yo block consists of a 3/4-inch diameter steel rod, 22-inches long, with both ends hammer forged to a thickness of 1/4-inch for a length of 5 inches. It is then templated to the contour of the block cheeks and attached with 4 hex bolts and nuts or welded in place. Each block requires two Anti-Toppling straps.

FUNCTION

The Anti-Toppling Strap is used to prevent the yo-yo block on the inboard saddle from turning over (toppling).

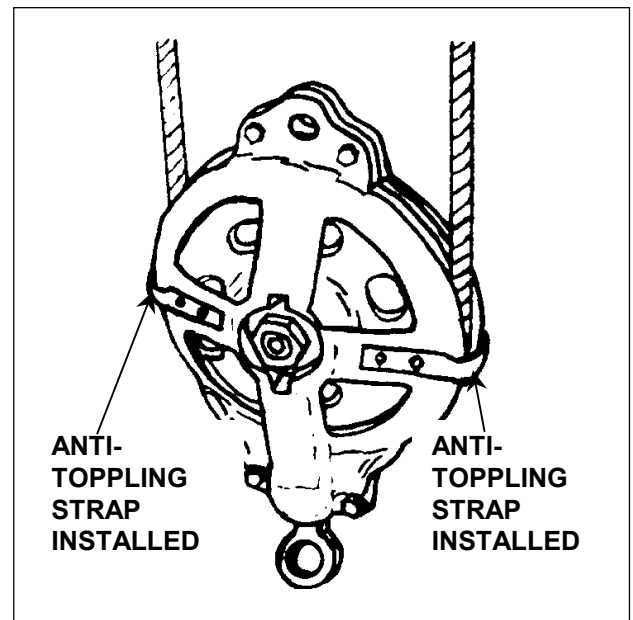
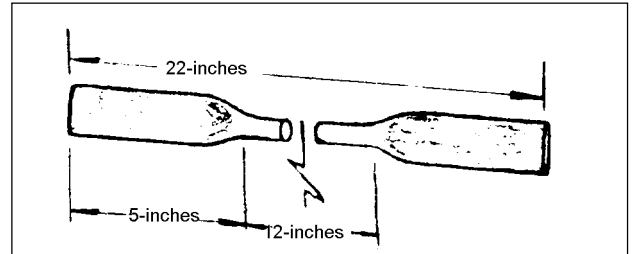
NATIONAL STOCK NUMBER

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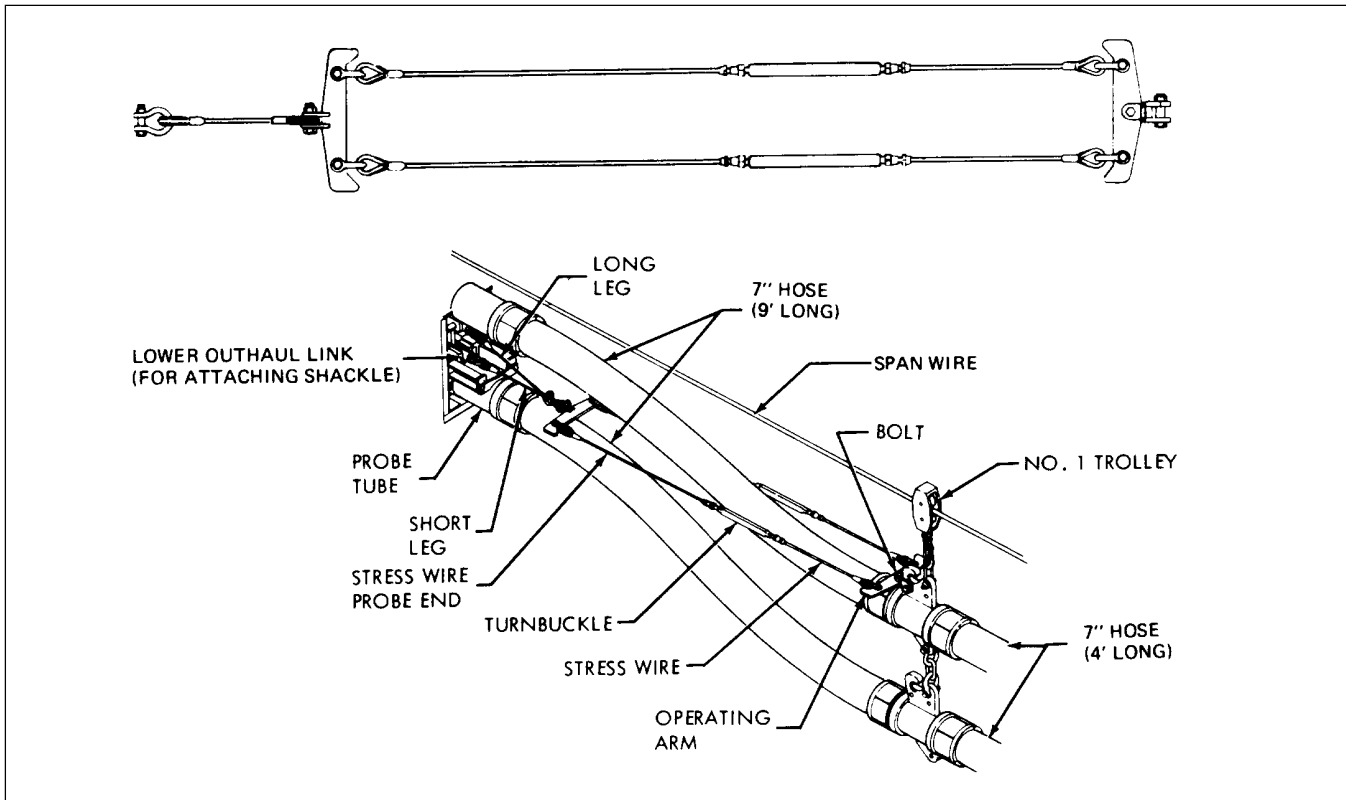
DRAWING NUMBER

FAS Anti-Toppling Strap Yo-Yo-Block
NAVSHIPS 805-2554179

FAS Double Hose Rigging & Miscellaneous Gear
NAVSHIPS 805-2556875



BRIDLE STRESS WIRE ASSEMBLY

**DESCRIPTION AND FUNCTION**

The Bridle Stress Wire Assembly is attached between the double probe outhaul links and the top of the fueling rig No. 1 trolley's riding line fitting. The bridle stress wire prevents any stress from being applied to the hoses during inhaul or outhaul of the double probe assembly.

NATIONAL STOCK NUMBER

2040-00-629-9905

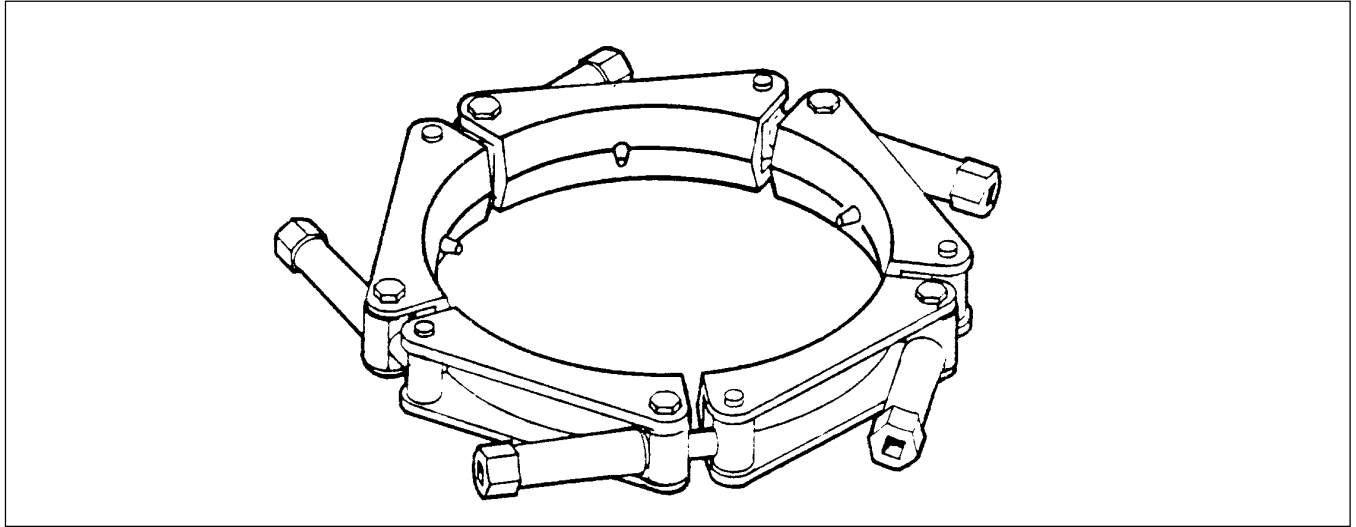
DRAWING NUMBER

NAVSHIPS 805-2227937

REFERENCE

Underway Replenishment (NWP 4-01.4)
 Double Probe Fueling System; Installation,
 Operation, Maintenance and Parts List
 0955-LP-026-8010

TOOL, ASSEMBLY, SEGMENTED HOSE COUPLING, AEROQUIP TYPE, KIT



DESCRIPTION

The Aeroquip Segmented hose Coupling Assembly Tool Kit consists of:

6 and 7-inch assembly tool kit <u>quantity</u>	2-1/2 and 4-inch assembly tool kit <u>quantity</u>	<u>Parts</u>
5	4	Adapter pads
10	4	Locating pins
5	4	Frames
5	4	Bolts
10	8	Bearing screws
5	4	Bolt guides
5	4	Handles
5	4	Bolt pins
15	8	Retaining rings
1	1	Box
1	1	Retaining ring pliers
1	1	Shipping container
1	1	Filler pad
1	1	Handle protector

The retaining ring pliers are used to remove a retaining ring to permit the bolt pin to slide out, thereby opening the tool so it may be placed around a hose coupling when assembling a hose coupling on a length of hose. The bolt pin and retaining ring are replaced in the tool before tightening on the hose coupling.

For assembling a 7-inch coupling the tool assembly is used without the adapter pads. The adapter pads must be used when assembling a 6-inch coupling. The 2-1/2-inch and 4-inch couplings are assembled with entirely different tool kits and require no adapter pads.

FUNCTION

The tool assembly is used to install or remove the re-attachable segmented hose couplings from a length of hose.

NATIONAL STOCK NUMBER

6 and 7-inch kit	5120-00-940-8459
2-1/2 and 4-inch kit	5180-01-296-0744

TOOL, PROBE RELATCHING

DESCRIPTION

The Probe Relatching Tool assembly consists of a 10-inch handle press fitted to a 3/4-inch diameter spindle with a "permapad" swivel that is held on by a retaining ring. This assembly is threaded through the top plates and is used to apply pressure in a manner similar to a bearing puller. Six tee arms transfer the force from the top plate to the relatching ring.

FUNCTION

The Probe Relatching Tool assembly is used to reset the probe locking mechanisms. It is used when any number of the locking mechanisms are not latched. It is also used to conduct the preoperational inspection of the probe.

NATIONAL STOCK NUMBER

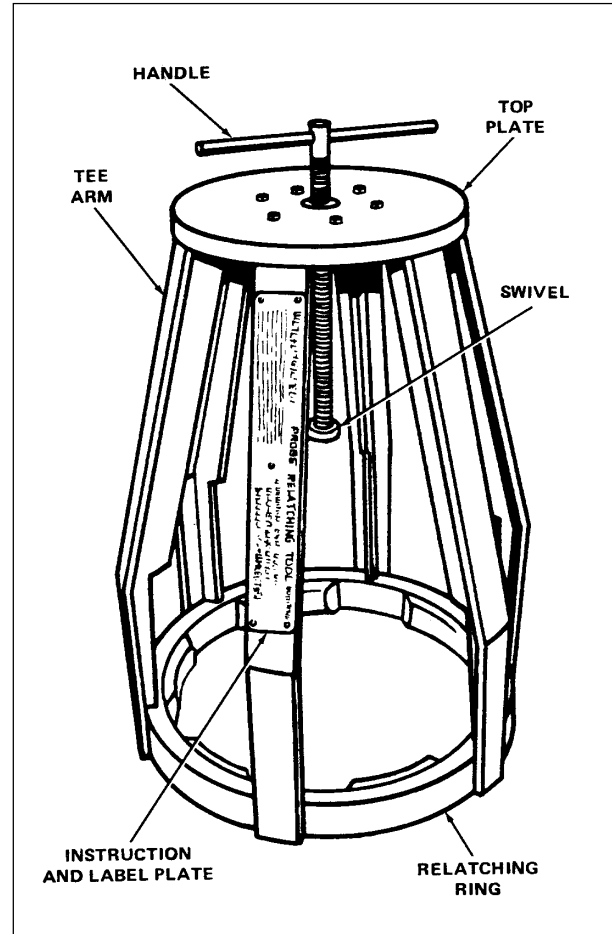
2040-00-472-5197

DRAWING NUMBER

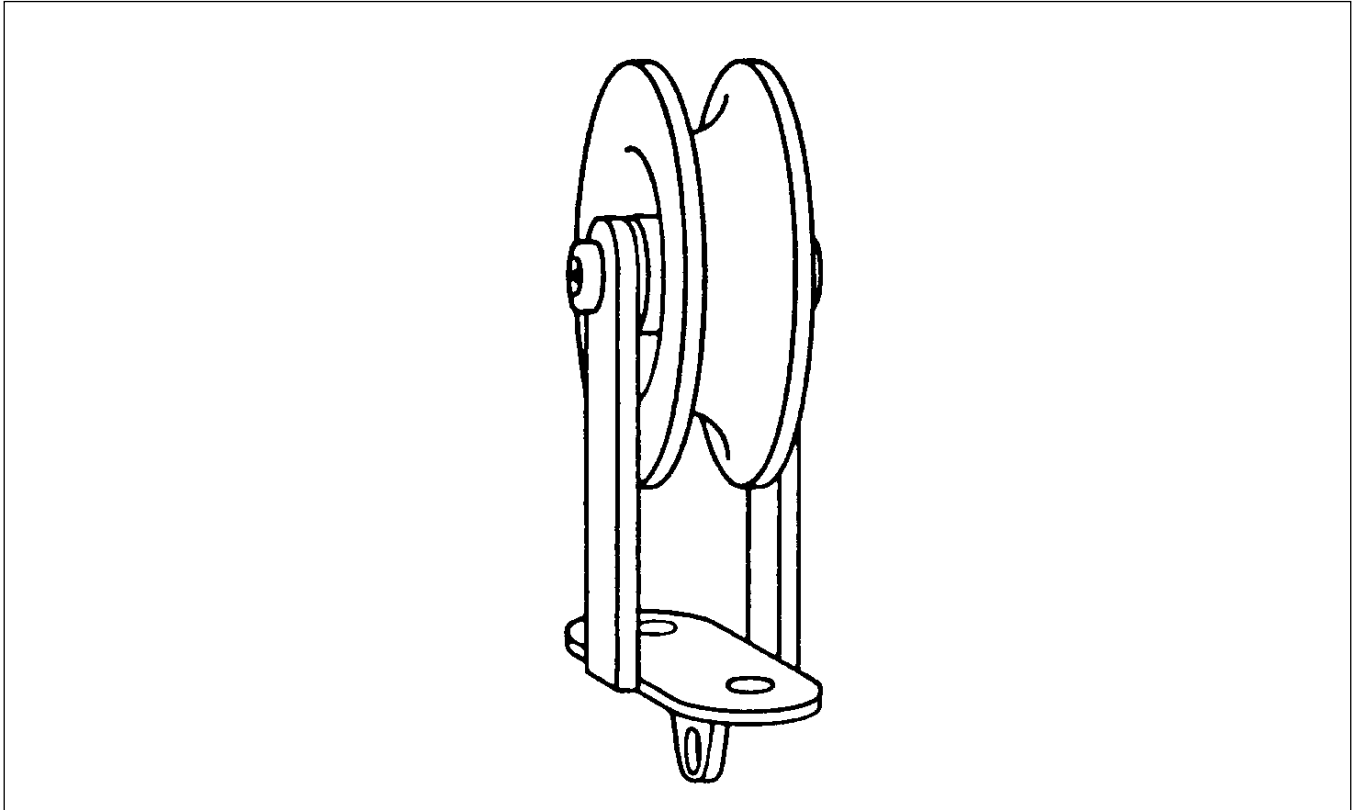
NAVSHIPS 805-2250560

REFERENCE

Underway Replenishment (NWP 4-01.4)
 Probe Fueling Hardware; Shipboard Level
 Maintenance NAVSEA 0920-LP-103-2010



TROLLEY, SPANLINE

**DESCRIPTION**

The Spanline Trolley is the basic fueling at sea synthetic line trolley. The Spanline Trolley consists of a single sheave between two side plates with a padeye below.

FUNCTION

The Spanline Trolley is used to support the 2-1/2-inch Hose Rig below a synthetic line (Spanline).

The padeye is provided in the bottom for attaching the suspension hardware for the 2-1/2-inch hose riding line fittings and flow-through saddles.

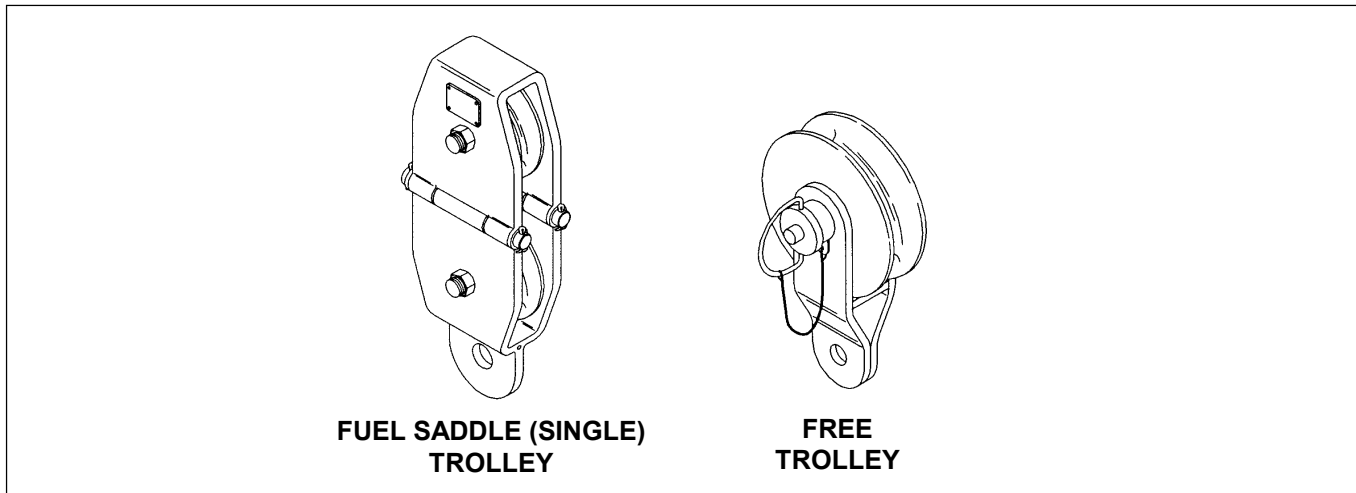
NATIONAL STOCK NUMBER

2020-01-136-5447

DRAWING NUMBER

NAVSHIPS 803-2260816

TROLLEY, SPANWIRE



DESCRIPTION

There are two basic types of fueling wire rope trolleys: the Fuel Saddle (Single) Trolley and the Free Trolley. The Free Trolley consists of two frame side plates, which are welded together, and a sheave that is secured by a quick-release pin. The pin allows guide removal from, or installation of the trolley on the spanwire. A padeye is located at the bottom of the trolley at the point where the side plates are welded together as an attachment point for the fuel hose supporting strap.

The Fuel Saddle (Single) Trolley is made up of a shell with an upper and lower half attached to each other with removable pins. Each half of the shell is fitted with a sheave retained with a through-bolt. The trolley is installed on the spanwire by removing one of the removable pins and hinging the two halves apart. The process is then reversed and the unit is installed. A padeye is provided on the bottom of the bottom half for attaching the suspension hardware for the fueling riding line fitting or saddle. Both trolleys are designed to be used on the 3/4-inch and 7/8-inch spanwires.

FUNCTION

The Free Trolley is used to support the outboard end of the fueling hose when using a coupling other than a probe (i.e., Robb coupling or breakable spool). Two or three Free Trolleys support the coupling and several feet of hose to keep them out of the water

when passing the hose. They are then removed from the spanwire by the receiving ship so the hose can be taken to the ship's riser. The Fuel Saddle (Single) Trolley is used to support the hose saddles on all spanwire rigs and to support the riding line fittings on other than probe spanwire rigs. The Fuel Saddle (Single) Trolley replaces the Elwood trolley.

DIMENSIONS AND TESTS

	Height (inches)	Length	Width	Weight
Free	8-1/2	3	2-1/2	6
Single	12-1/2	5	3-7/8	35

	Working Loads	Dynamic	Static
Free	500	750	1000
Single	3500	5250	7000

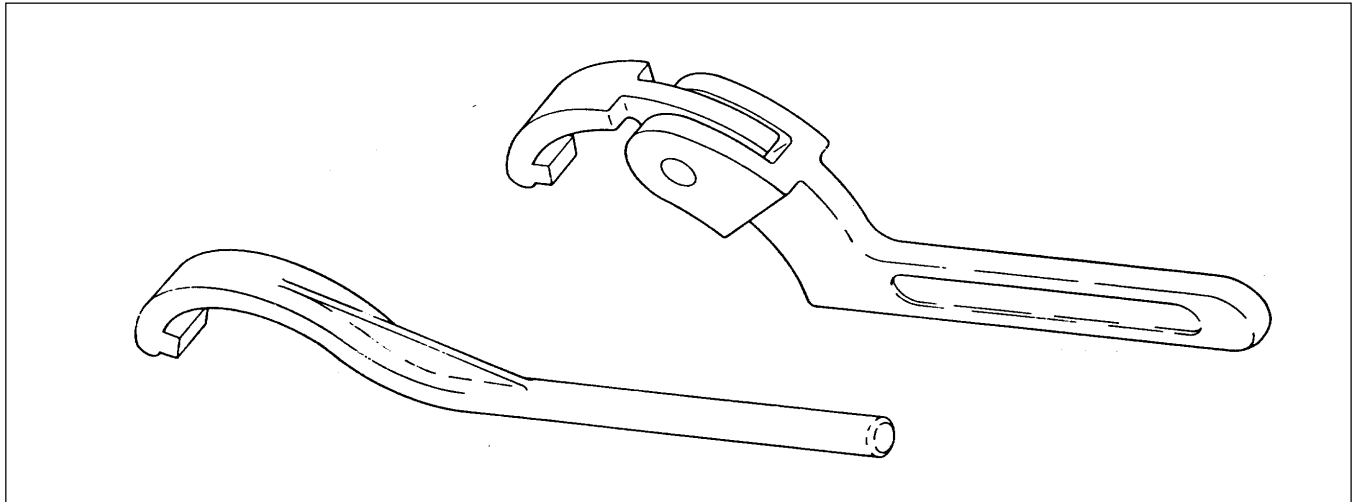
NATIONAL STOCK NUMBER

- Free Trolley
3950-01-180-4646
- Fuel Saddle (Single) Trolley
3950-LL-HA3-4373

DRAWING NUMBER

- Free Trolley
NAVSHIPS 803-2557585
- Fuel Saddle (Single) Trolley
NAVSHIPS 805-2219047

WRENCH, SPANNER

**DESCRIPTION**

The Spanner Wrench consists of a forged steel cadmium plated body with a case-hardened end. The fixed hook spanner contains a hook with a fixed radius. The adjustable spanner has a hook that is permitted to pivot about a pin permitting a change in the radius of the hook.

FUNCTION

The Spanner Wrench is used to tighten or loosen hose thread couplings and fittings. A fixed spanner will fit only one size. An adjustable spanner may be used for two or three related sizes.

DIMENSIONS

Varies according to size and type of wrench.

NATIONAL STOCK NUMBER**Adjustable Hook Type**

Circle Capacity Dia. (inches)	Hook Thickness	NSN
3/4 to 2	11/32	5120-00-288-6468
1-1/4 to 3	3/16	5120-00-293-0406
1-1/4 to 3	13/32	5120-00-277-9075
3 to 4-3/8	9/32	5120-00-277-9076
2 to 4-3/4	15/32	5120-00-277-9076
2 to 4-3/4	0.495	5120-00-596-4032
4-1/2 to 6-1/4	15/32	5120-00-277-9077
2-3/4 to 6-3/8	15/32	5120-00-494-1989
6-3/4 to 8-3/4	3/8	5120-00-293-1068

Nonadjustable Pin Type

13/64	1-1/4	No NSN Assigned
17/64	2-1/4	5120-00-293-0799
9/32	2-1/2	5120-00-288-8744
23/64	2-1/2	5120-00-835-9209
3/8	4	5120-00-494-1990
3/8	6	No NSN Assigned
1/2	6	5120-00-288-8749
3/16	7-1/4	No NSN Assigned

**PART 3 — SOLID CARGO CONNECTED REPLENISHMENT (CONREP)
SECTION A — INTRODUCTION**

DESCRIPTION OF PART 3

During Underway Replenishment, the majority of solid cargo is transferred by connected replenishment (CONREP). In this system the receiving ship and delivery ship steam side by side as cargo is transferred by wire rigging connecting the ships. The three basic methods, with variations, include: Missile/Cargo STREAM and two non-tensioned methods, Burton and Highline.

Essential to each method is the equipment necessary to initially pass the transfer rig, i.e. shot or bolo line, rigging messenger, phone/distance lines, etc. Each station must provide means for operating the rig, i.e. booms, M-frames, outriggers, sliding or fixed padeyes, winches or manpower, and associated rigging.

The actual method to be used will depend on: type and quantity of cargo to be transferred; capacity of the rig and associated equipment; weight, size and configuration of the heaviest and largest load; weather and sea conditions; type, location and alignment of sending and receiving stations used.

The wide variation in ship sizes, design and configuration precludes a standard installation for any one transfer method. Individual ship's plans provide the details for rigging a transfer or receiving station. In many cases a transfer or receiving station can be rigged for more than one transfer method.

The purpose of Part 3, Section A — Introduction is to describe the equipments and rigs used in the connected transfer of solid cargo during underway replenishment.

Section B — Equipment, provides descriptive data on items associated with the various transfer methods. The information contains: the family or generic name and specific name; an illustration; a description of the item and its function; capacity or limiting load if applicable; National Stock Number if assigned; drawing number; and/or appropriate references leading to more detailed information. In general, equipments utilized in storerooms, magazines, strikedown/strikeup and specific ship installations, are not included or are described in broad terms only.

PART 3

SOLID CARGO CONNECTED REPLENISHMENT (CONREP)

SECTION B — EQUIPMENT

Some Items of UNREP equipment are common to both Fuel and Cargo Underway Replenishment and are listed below. Pertinent information concerning these equipments is located in Part 1, Section B of this document. Only those equipments that are peculiar to Underway Replenishment — Cargo are presented in this section.

ITEMS COMMON TO FUEL AND CARGO UNDERWAY REPLENISHMENT	PAGE
Apparel, Safety	1-3
Bag, Shot Line Return	1-4
Blocks, Fiber Rope	1-5
Blocks, Wire Rope	1-6
Bolo, Line Throwing	1-8
Clamps, Wire Rope, Saddle	1-9
Cutter, Wire Rope (Hand Operated)	1-10
Cutter, Wire Rope (Velocity Pole Type)	1-11
Gun Kit, Line Throwing Rifle Adapter	1-12
Hook, Snap	1-14
Light, Chemical	1-15
Light, Contour, Hull	1-16
Light, Station Marker Box	1-17
Line, Bridge-to-Bridge Phone/Distance	1-18
Line, Female NATO Phone Connector	1-20
Line, Male NATO Phone Connector	1-21
Line, Station-to-Station Phone	1-22
Links, End	1-23
Marker, Station, Day	1-24
Messenger Assembly, STAR (SURF Traveling Actuated Remotely)	1-25
Paddles, Signal	1-26
Rope, Fiber (Synthetic and Natural)	1-27
Rope, Wire	1-30
Shackles, Steel	1-32
Tackle	1-36
Telephone, Sound Powered	1-37
Thimbles	1-38
Tool, Swaging	1-41
Tools	1-42
Wand, Signal	1-44

ADAPTER ASSEMBLY, CARGO HOOK**DESCRIPTION**

The Cargo Hook Adapter Assembly consists of an adapter which bolts to the STREAM trolley; a MK 1 MOD 0 jaw and jaw swivel which is pinned (bolted) to the adapter; and a MK 2 MOD 0 safety hook which is pinned (bolted) to the swivel.

FUNCTION

The Cargo Hook Adapter Assembly is used on cargo STREAM rigs to transfer stores, general cargo or personnel when the receiving station is a sliding padeye. If the receiving station is a fixed padeye or a pendant station, the Cargo Hook Adapter Assembly cannot be used because there is no way to lower the load to the deck of the receiving ship. For transfer to a fixed padeye or pendant receiving station, a cargo drop reel must be used to lower the load to the deck.

The cargo hook swivel allows rotation of the cargo hook for easy hookup of the load to be transferred. However, the swiveling and swinging motions of the cargo hook, which are helpful during hookup, may need to be controlled during transfer with tending lines. For this reason, transfer of long loads such as missiles, should be accomplished using a strongback rather than the Cargo Hook Adapter Assembly.

DRAWING NUMBER

Assembly/Adapter

NAVSHIPS 805-2549948

MK 1 MOD 0 Swivel and Pins

NAVORD 593164

MK 2 MOD 0 Cargo Safety Hook

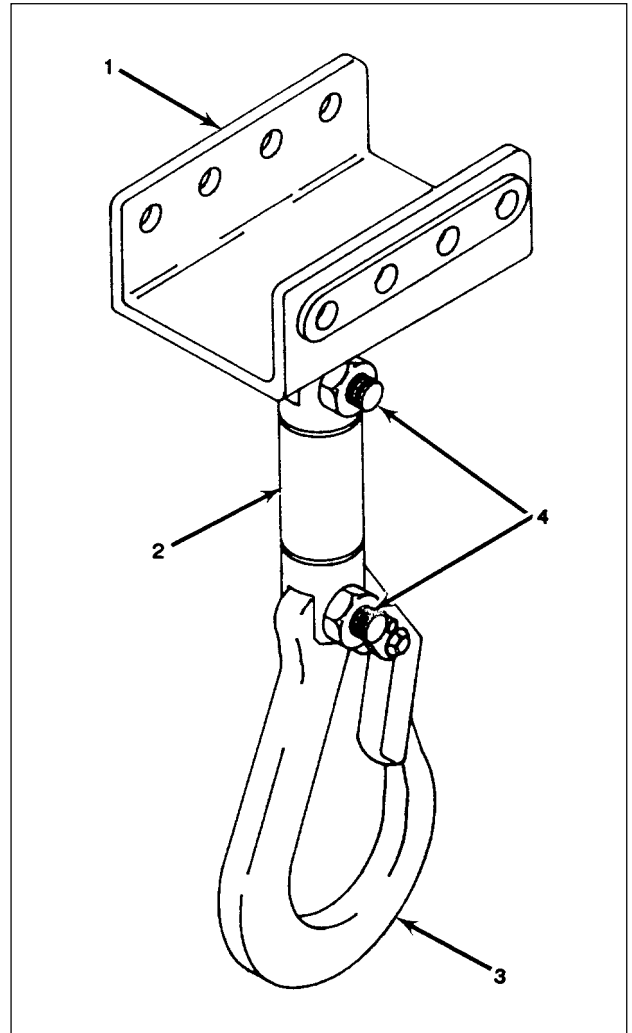
NAVORD 563869

NATIONAL STOCK NUMBER

(Refer to illustration.)

1. Adapter

1450-00-105-8452

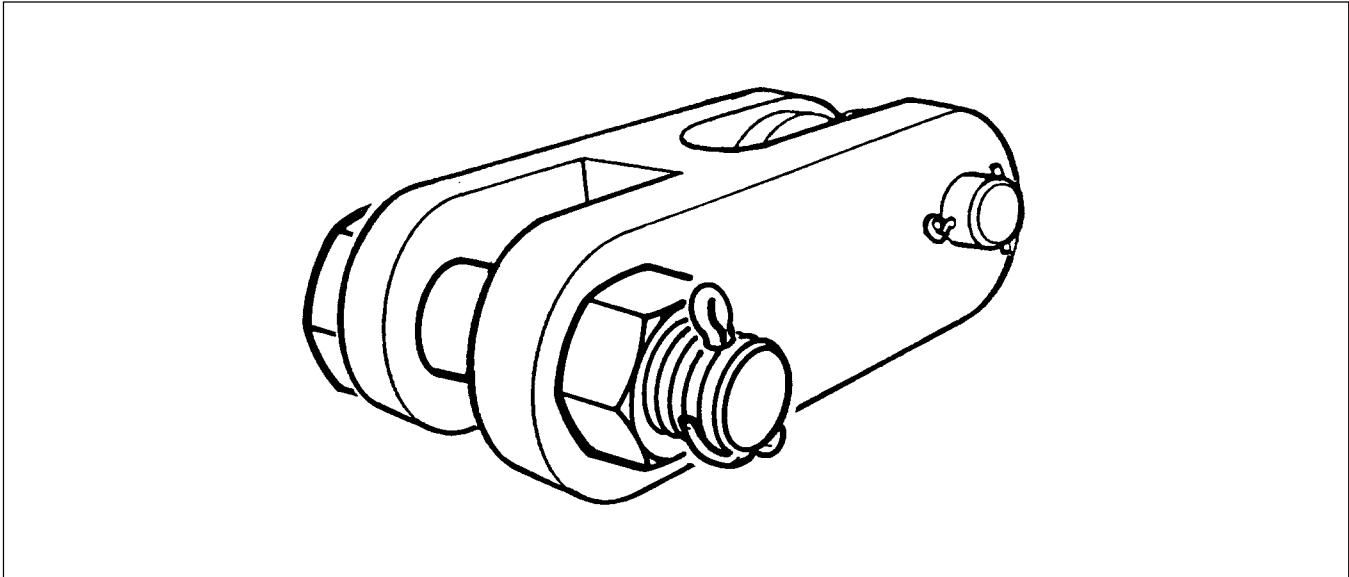


2. MK 1 MOD 0 Swivel (Jaw and Jaw)
4030-00-384-8894

3. MK 2 MOD 0 Cargo Safety Hook
4030-00-362-2175

4. Pins
5315-00-637-9950

ADAPTER, HIGHLINE SHEAR PIN

**DESCRIPTION**

The Highline Shear Pin Adapter assembly consists of an H-shaped frame with a bolt, nut and cotter pin from a 7/8-inch grade B safety shackle installed at one end of the frame and a shear pin assembly installed at the opposite end. The shear pin assembly consists of a shear pin, a spacer, and two cotter pins (refer to facing page).

FUNCTION

The Highline Shear Pin Adapter provides a 50,000-pound weak link in the cargo STREAM highline system to protect ship structure from damage in the event of a tightline when the highline winch is not equipped with a slip clutch. The Highline Shear Pin Adapter is used in place of a 7/8-inch grade B safety anchor shackle and is installed between the highline

end fitting and the pelican hook. Except for personnel transfer, the Highline Shear Pin Adapter shall be used for 4th generation highline winches. It is not required for Navy standard highline winches since they have slip clutches.

DRAWING NUMBER

Highline Shear Pin Assembly:
NAVSEA 5177046

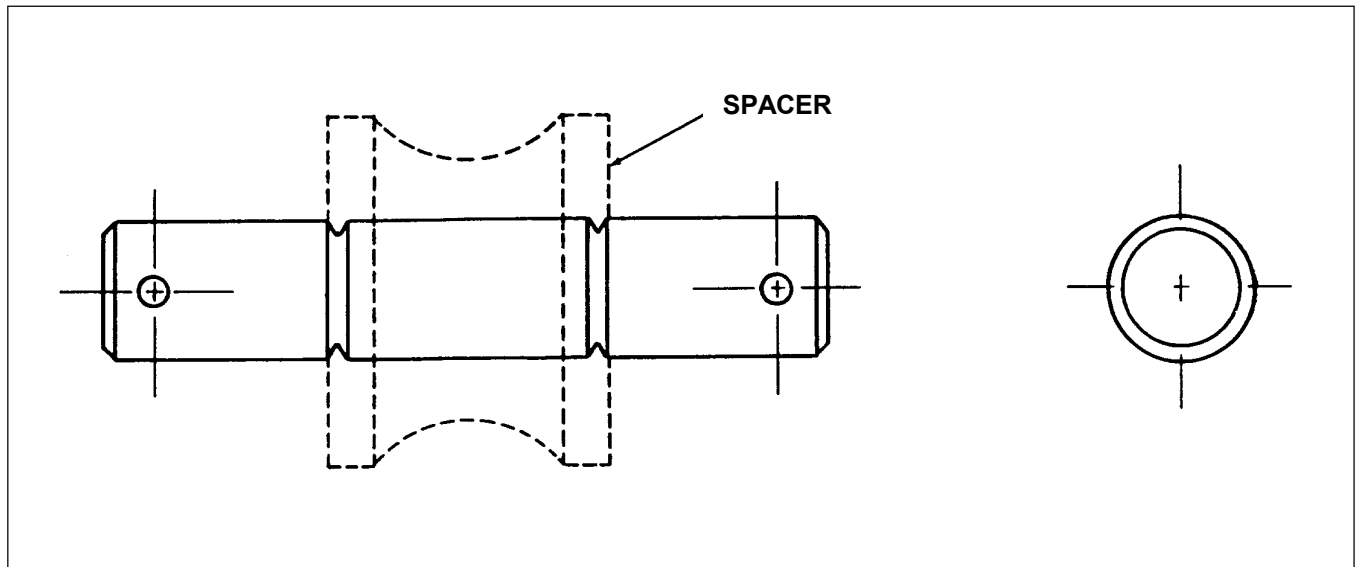
Shear Pin Replacement Assembly:
See facing page

NATIONAL STOCK NUMBER

Highline Shear Pin Adapter
1450-01-180-4917

Shear Pin Replacement Assembly
See facing page

**STAR SHEAR PIN ASSEMBLY AND HIGHLINE SHEAR PIN ADAPTER SHEAR PIN
REPLACEMENT ASSEMBLY**

**DESCRIPTION**

The STAR Shear Pin Assembly and Highline Shear Pin Adapter Shear Pin Replacement Assembly is designed with strict quality control to fail in shear at the prescribed load.

FUNCTION

The Shear Pin Assembly prevents deformation of the supporting ship's structure and damage to equipment when excessive tension is placed on the highline. The Shear Pin Assembly is only to be used

when specified by ship's rigging drawings or NWP 4-01.4.

NATIONAL STOCK NUMBER

Shear Pin Assembly 5315-01-180-4915

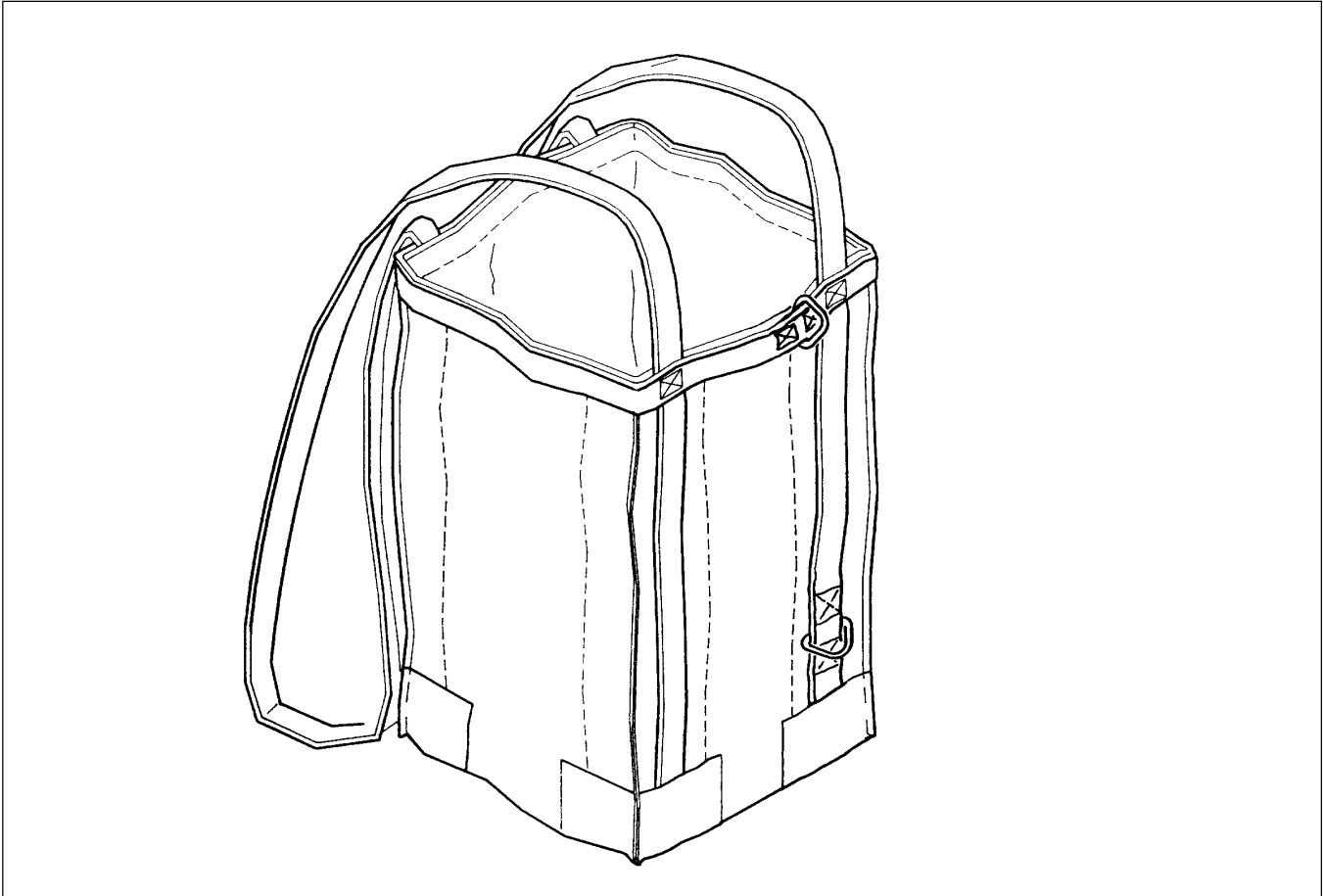
CAPACITY (NOMINAL)

Shear Pin - 50,000 lb

DRAWING

Shear Pin - 5760343

BAG, CARGO

**DESCRIPTION**

The Cargo Bag is a cube-shaped bag with a square bottom and four rectangular sides. The bag sides and bottom are polyester with reinforcement of woven nylon webbing. The bottom corners are further reinforced with leather to protect the bag from scuffing on non-skid decks. There are two straps for use as slings. Three D-rings serve as attachment points for steadying or tag lines for use when lifting or lowering the Cargo Bag on a transfer rig. Two D-rings are sewn to the front of the Cargo Bag and one D-ring is sewn to the back.

FUNCTION

The Cargo Bag is used for underway transfer of any light, loose items on the cargo STREAM rig or synthetic highline rig.

DRAWING NUMBER

NAVSHIPS 805-2556865

NATIONAL STOCK NUMBER

2090-00-351-2299

BLOCK, WIDE THROAT (FOR 3/4-INCH WIRE ROPE)**DESCRIPTION**

The Wide Throat Block is a special high speed, single sheave, roller bearing block of steel construction. The wide throat allows a 3/4-inch, drilled eye fiece fitting to be passed through for reeving 3/4-inch wire rope without disassembly of either the block or the fiece fitting.

The block is equipped with a swivel and locking device, a becket and two shackle mounting ears. The becket and sheave assembly is tested to 100,000-pound loads.

FUNCTION

The Wide Throat Block is used as a fairlead for the 3/4-inch or 1/2-inch cargo STREAM inhaul wire rope for conducting System Operability Tests (SOTs). The block is shackled to a pad on or near the ship's bulwark outboard of the cargo STREAM delivery station. The highline is shackled to the becket of the block. The inhaul is reeved through the block and attached to the outhaul. The hauling lines are then cycled for testing.

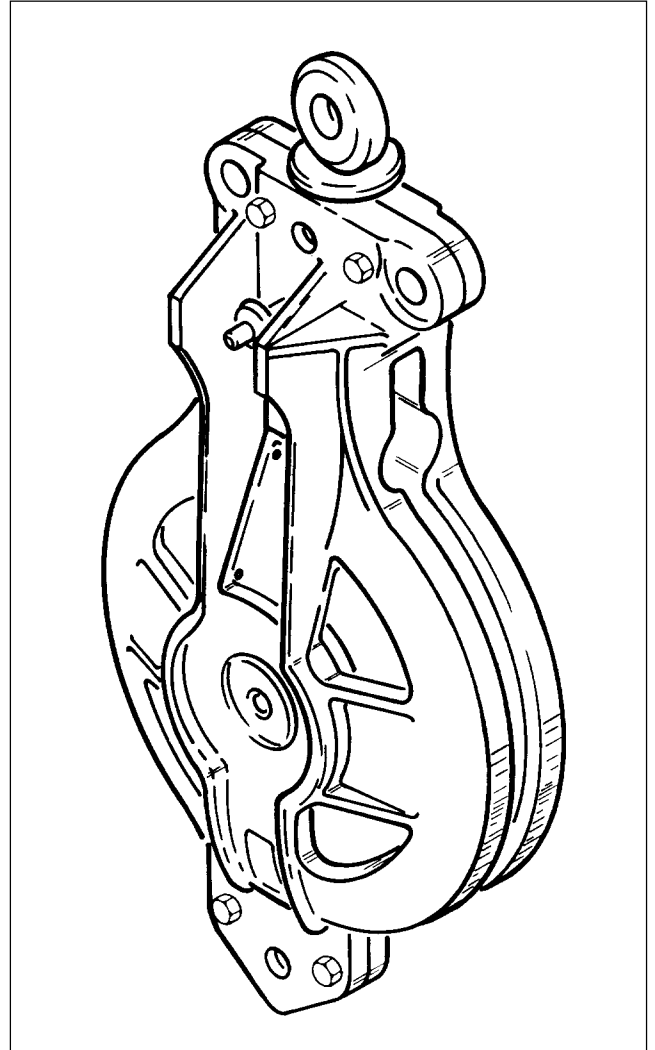
The block may also be used as an ordinary fairlead block for 1/2- or 3/4-inch wire rope rigging systems.

DRAWING NUMBER

NAVSHIPS 805-2549932

NATIONAL STOCK NUMBER

3950-00-784-2908



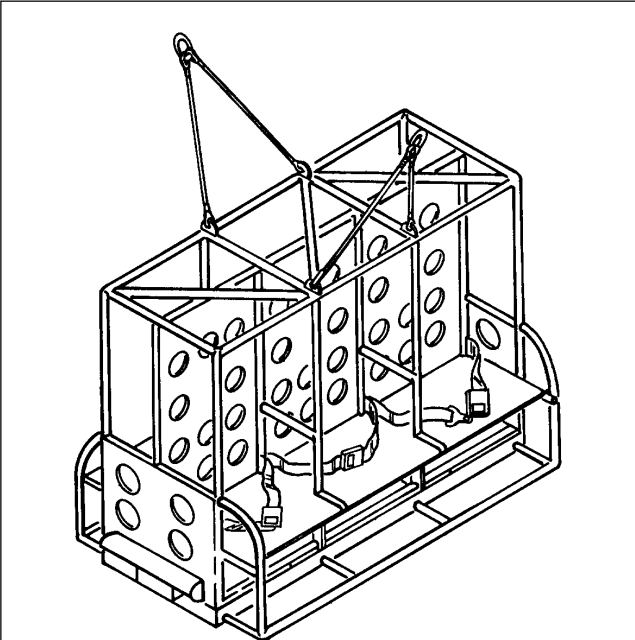
CHAIR, TRANSFER

DESCRIPTION

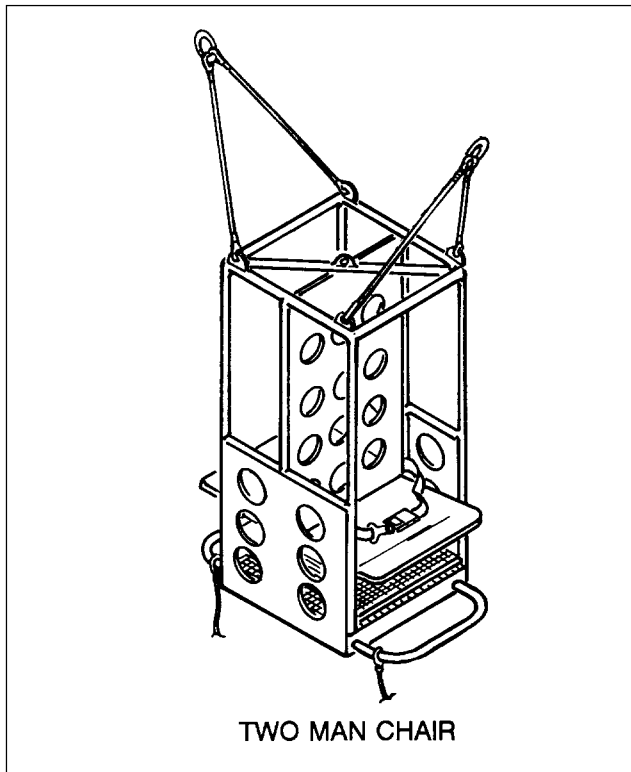
The one-man Transfer Chair is constructed of aluminum pipe frame in the form of a cage, fitted with a sheet aluminum seat and a quick acting safety belt. The two- and six-man transfer chairs are constructed of steel pipe.

FUNCTION

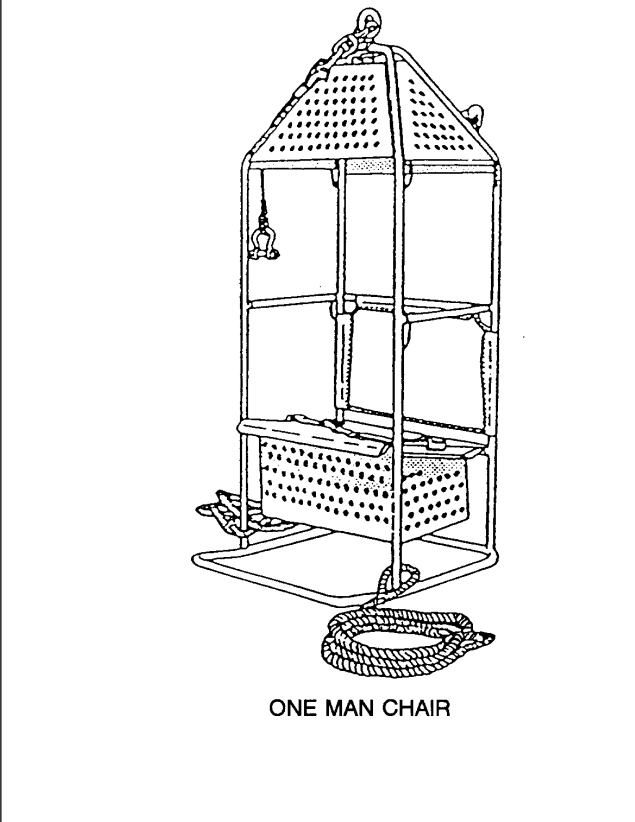
The one-man chair is used for synthetic highline and STREAM personnel transfers between ships at sea. The two- and six-man chairs are used with STREAM only. The six-man chair is not carried aboard Navy ships. This special chair is provided to Merchant Ship Naval Augmentation Program (MSNAP) UNREP ships only. It is used to transport a large number of personnel from a Navy UNREP ship to an MSNAP UNREP ship to work cargo breakout during resupply of the Navy UNREP ship.



SIX MAN CHAIR



TWO MAN CHAIR



ONE MAN CHAIR

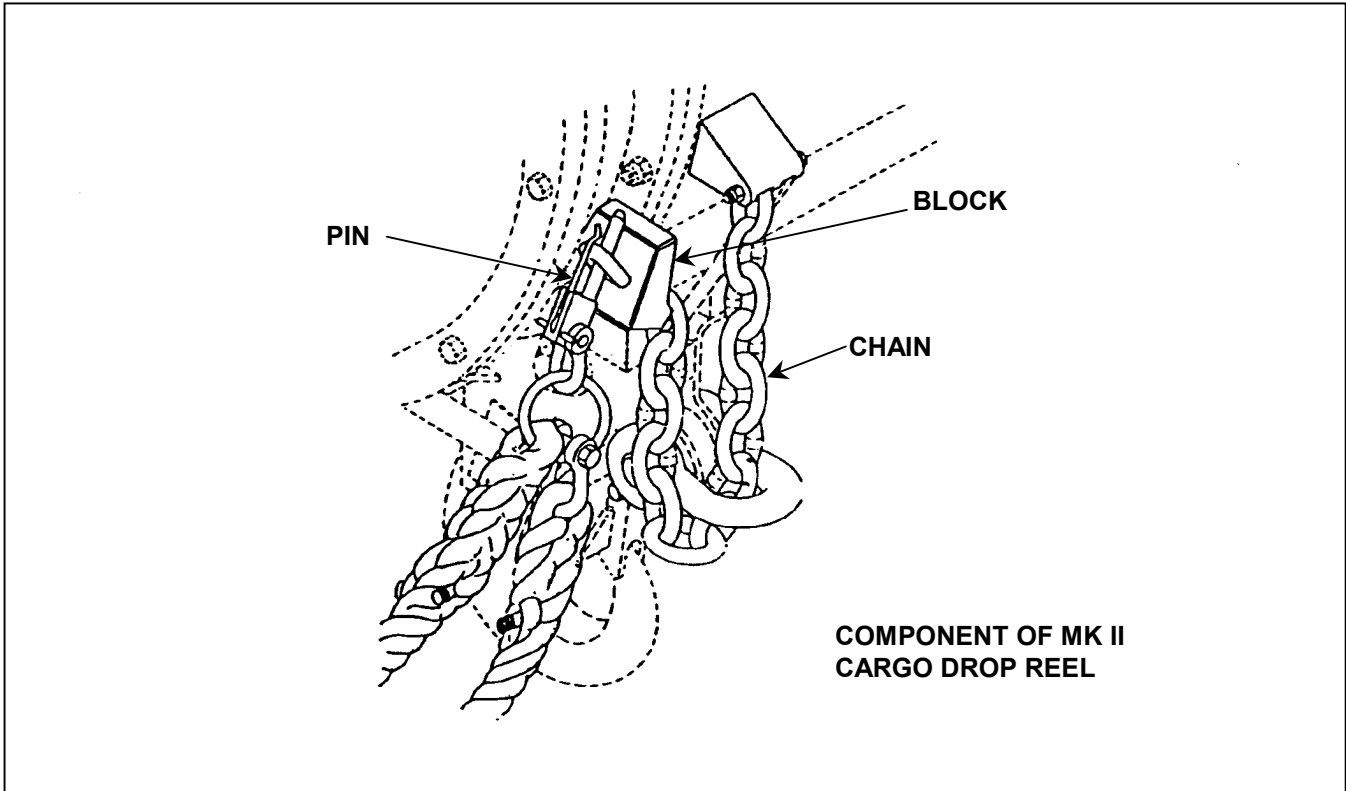
NATIONAL STOCK NUMBER

1-man	4020-00-369-4531
2-man	2090-01-237-1151
6-man	No NSN Assigned.

DRAWING NUMBER

1-man	NAVSHIPS 805-2555037
2-man	NAVSEA 53711-5177057
6-man	NAVSEA 53711-5621729

DEVICE, POSITIVE LOCK



DESCRIPTION

The Positive Lock Device consists of wire rope and chain support pad, safety chain, positive lock block, hook shackle, positive lock pin with a retaining spring, and a two part brake release lanyard. The device is a component of the MK II Cargo Drop Reel as issued.

FUNCTION

The Positive Lock Device provides a back-up in the event of failure of the cargo drop reel brake or wire rope. Should a failure occur, the weight of the load is transferred to the safety chain preventing loss of the load.

NATIONAL STOCK NUMBER

Chain	4030-01-048-6568
Block	4030-01-048-6544
Pin	5340-01-093-5844

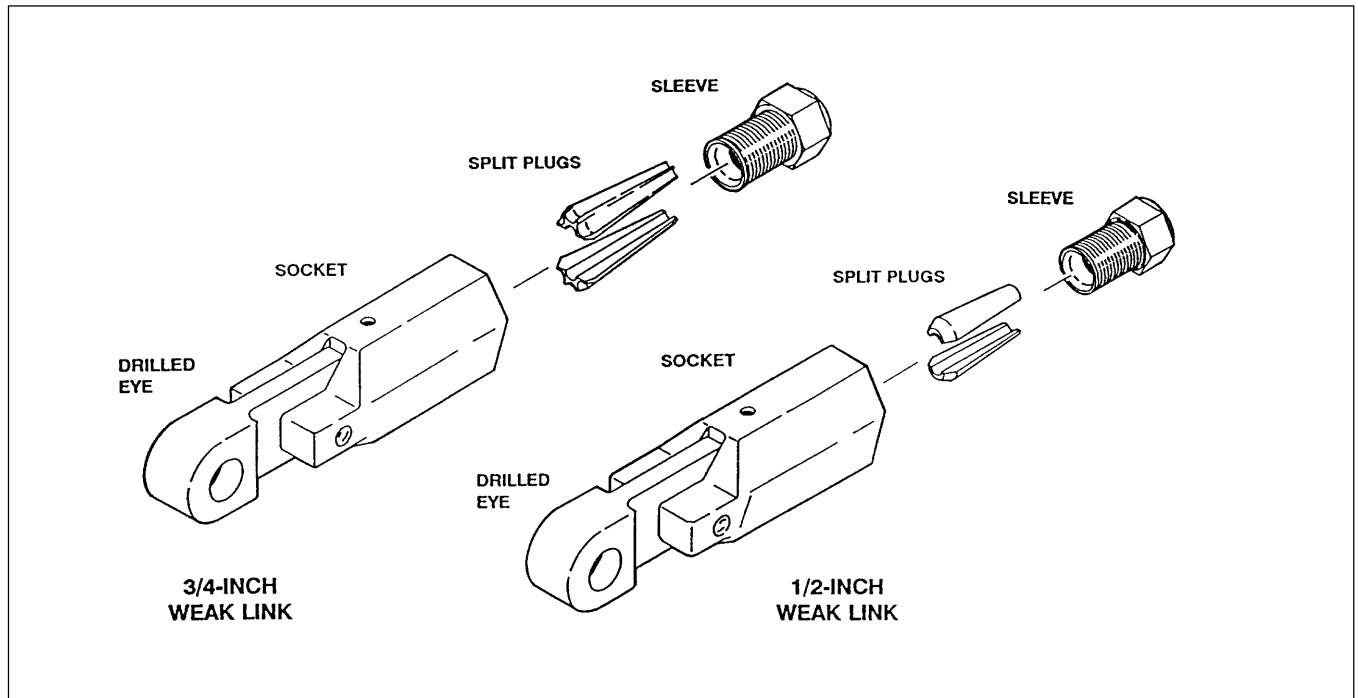
DRAWING NUMBER

MK 11	NAVSHIPS 2580100
Chain	2580226
Block	2580227
Pin	2580228

REFERENCE

Underway Replenishment (NWP 4-01.4)
 MK II Cargo Drop Reel, 5700 Pound Capacity;
 Operation and Maintenance
 NAVSEA 0920-LP-098-9010

END FITTING, INHAUL/OUTHAUL WEAK LINK

**DESCRIPTION**

The Inhaul/Outhaul Weak Link End Fitting contains a special drilled eye end piece containing the reduced section shear area which is designed to fail at a predetermined load. The end piece is attached to an octagonal socket by a permanently installed pin. The socket threads onto a sleeve that contains the end of the wire rope and plugs for wedging the wire rope to secure it in the end fitting. The sleeve and socket have left-hand threads so that a non-weak link end fitting cannot be installed inadvertently.

FUNCTION

The Inhaul/Outhaul Weak Link End Fitting is used only on non-Navy Standard hauling winches which do not have slip clutches. The weak link end fitting is used to secure the end of the inhaul or outhaul wire rope to the STREAM trolley. The weak link is designed to break away from the socket before a tightline condition can part the wire rope or cause other equipment damage.

NOTE

A weak link end fitting is never to be used in a personnel STREAM rig.

DRAWING NUMBER

1/2-inch NAVSEA 803-6397265

3/4-inch NAVSEA 803-6397264

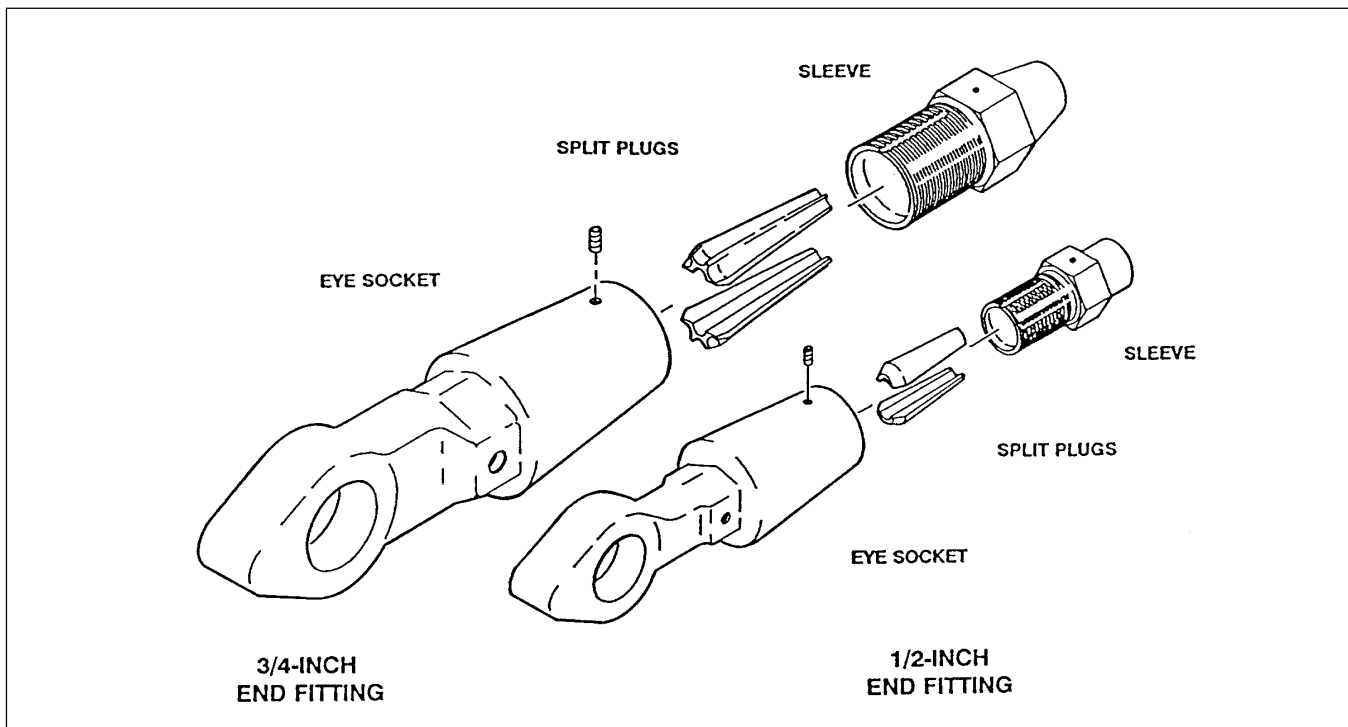
REFERENCE

Underway Replenishment (NWP 4-01.4)

NATIONAL STOCK NUMBER

<u>Size</u>	<u>NSN</u>
Complete end fitting (including split plugs)	
1/2-inch	1450-01-067-5601
3/4-inch	1450-01-067-5602
Split plugs only	
1/2-inch	4030-01-308-4255
3/4-inch	4030-00-032-2831

END FITTING, INHAUL/OUTHAUL



DESCRIPTION

The Inhaul/Outhaul End Fitting is an eye socket fiece fitting. It is modified by the addition of a set screw in the socket and a slot for the set screw in the threaded sleeve to prevent the socket from unscrewing from the sleeve as line tensions vary.

FUNCTION

The Inhaul/Outhaul End Fitting is used to secure the end of the inhaul or outhaul wire rope to the STREAM trolley. This end fitting is used on Navy standard hauling winches and other hauling winches equipped with slip clutches which do not require weak link end fittings.

DRAWING NUMBER

1/2-inch NAVSEA 803-5184178
 3/4-inch NAVSEA 803-5184179

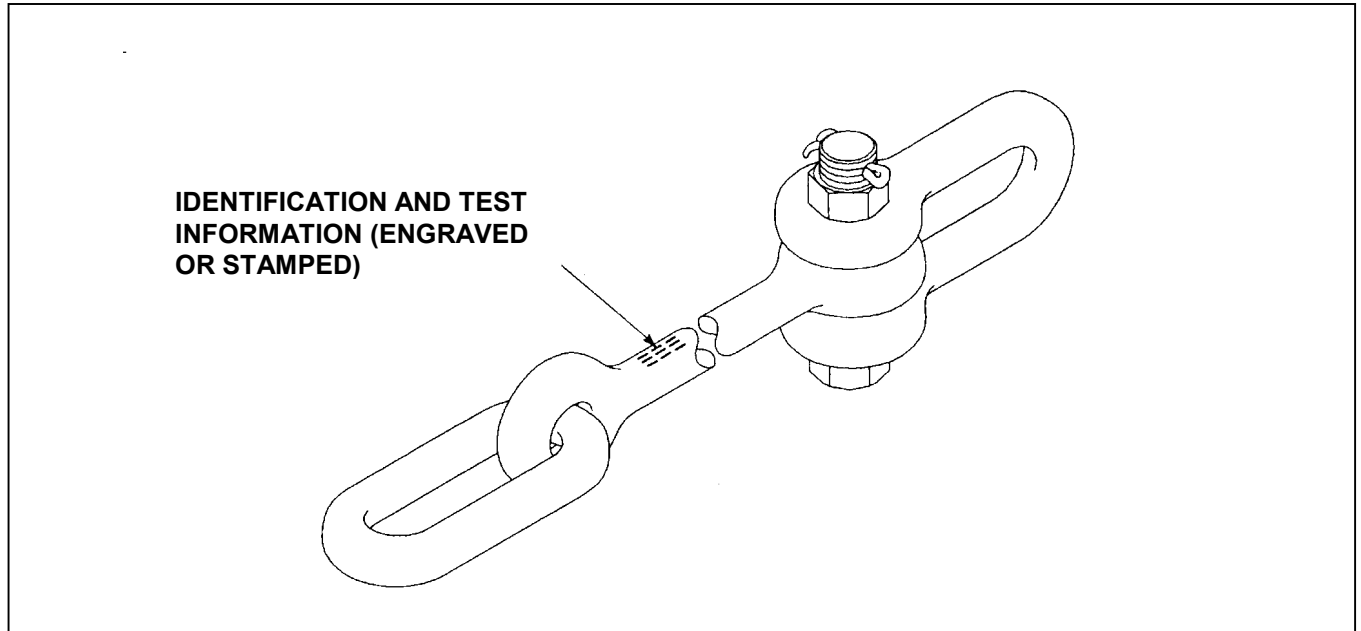
REFERENCE

Underway Replenishment (NWP 4-01.4)
 Sockets, Turnbuckles and Turnbuckle Assemblies,
 Wire Rope, Wedge and Threaded Lock Sleeve
 (MIL-S-21433)

NATIONAL STOCK NUMBER

<u>Size</u>	<u>NSN</u>
Complete end fitting (including split plugs)	
1/2-inch	4030-00-104-9084
3/4-inch	4030-00-104-9085
Split plugs only	
1/2-inch	4030-01-308-4255
3/4-inch	4030-00-032-2831

EXTENDER, UNREP



**IDENTIFICATION AND TEST
INFORMATION (ENGRAVED
OR STAMPED)**

DESCRIPTION

The UNREP Extender consists of a 1-3/4-inch square cross section steel bar with a 1-3/8-inch long link attached through an eye on one end and a 1-3/8-inch safety chain shackle attached through a drilled hole in the opposite end. The UNREP Extender is galvanized.

FUNCTION

UNREP Extenders are used on CG 47 Class midship stations to position VLS canister loads being transferred at a point further outboard than normal to avoid interference with bulkhead obstructions. Extenders are also used on DDG 51 Class UNREP station number 2 to land loads outboard of a deck obstruction. The extender is shackled to the long link on the sliding padeye. The pelican hook from

the UNREP ship STREAM rig is attached to the long link of the extender. This arrangement moves the traveling SURF (which determines the load landing area) out to the desired position.

There are two different extenders in use. The DDG 51 Class extender is about 31 inches long. The CG 52 Class extender is about 43 inches long.

DRAWING NUMBER

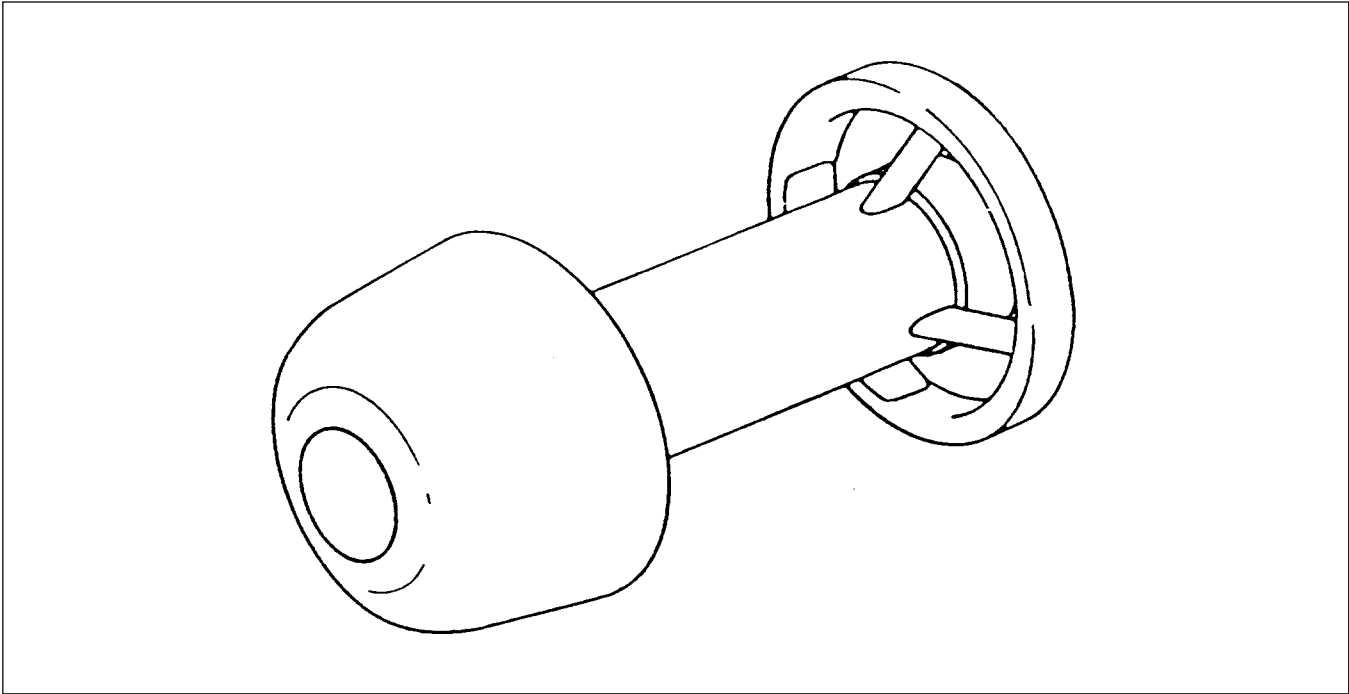
CG 47 Class Midship Stations
NAVSEA 6352111

DDG 51 Class Station Number 2
NAVSEA 6788151

NATIONAL STOCK NUMBER

No NSN assigned.

FITTING, STAR PROBE

**DESCRIPTION**

The STAR Probe Fitting consists of probe head, a tube with end cap and fin-mounted guide ring. The highline with end fitting slides through the probe tube with the end fitting shoulder bearing against the probe end cap. A 7/8-inch shackle or a shear pin adapter is connected to the part of the highline end fitting that protrudes through the probe end cap.

FUNCTION

The STAR Probe slides over the highline end fitting.

It provides a securing point for the STAR latch assembly when using the STAR rig.

NATIONAL STOCK NUMBER

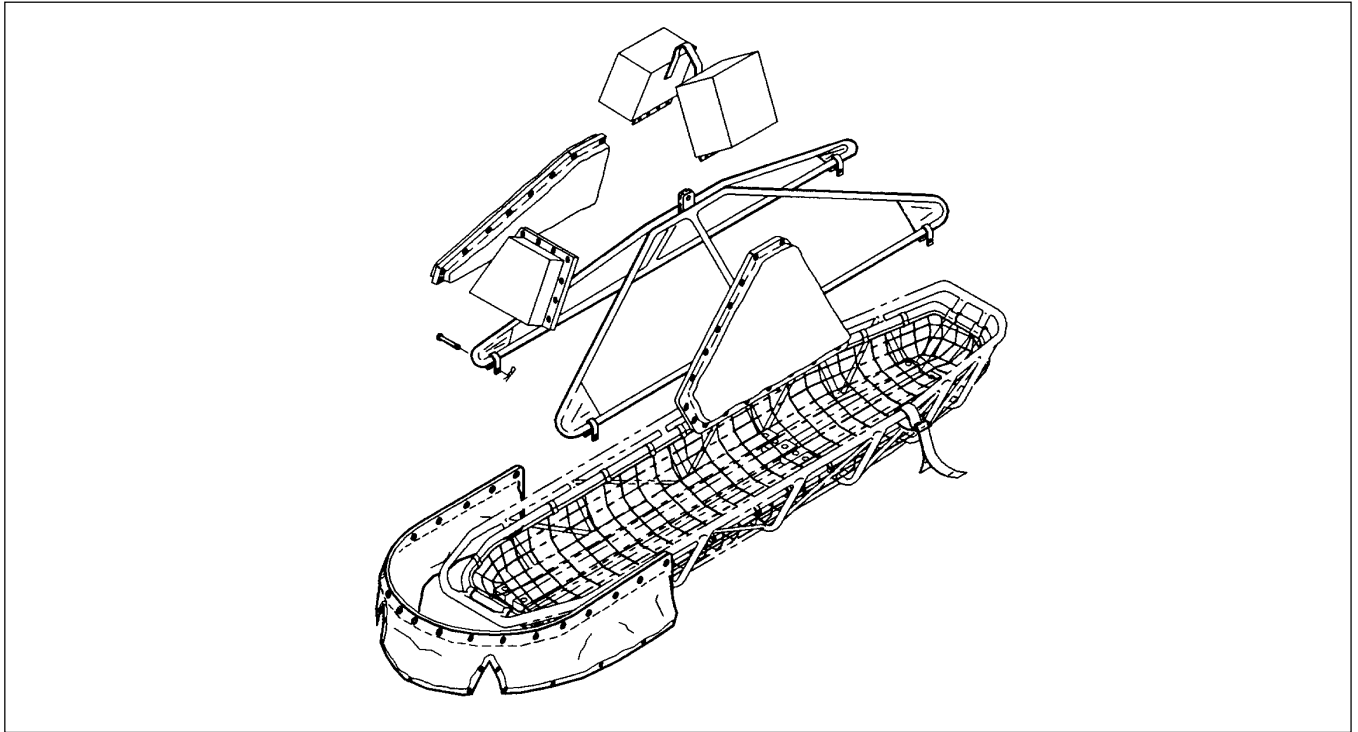
4030-01-006-6284

DRAWING NUMBER

80064-4629259

REFERENCE

Underway Replenishment (NWP 4-01.4)

FRAME, PROTECTIVE, WITH FLOTATION BAGS**DESCRIPTION**

The Protective Frame with Flotation Bags is for the Stokes litter. It is constructed of a braced, stainless steel framework (older units are made of aluminum). Four U-shaped bracket assemblies are provided to attach the frame to the Stokes litter. These bracket assemblies, also known as flat iron shackles, must be constructed of steel or stainless steel. Aluminum bracket assemblies are not authorized for use with this frame.

Flotation bags are provided that are secured to the protective frame, to the highline trolley block, and to the Stokes litter.

FUNCTION

The Protective Frame with Flotation Bags is used

with the Stokes litter to transfer injured or immobilized personnel at sea by the personnel STREAM rig or the synthetic highline rig. The litter with the patient is secured to the Protective Frame using the four U-shaped brackets.

DRAWING NUMBER

NAVSHIPS 805-2555038

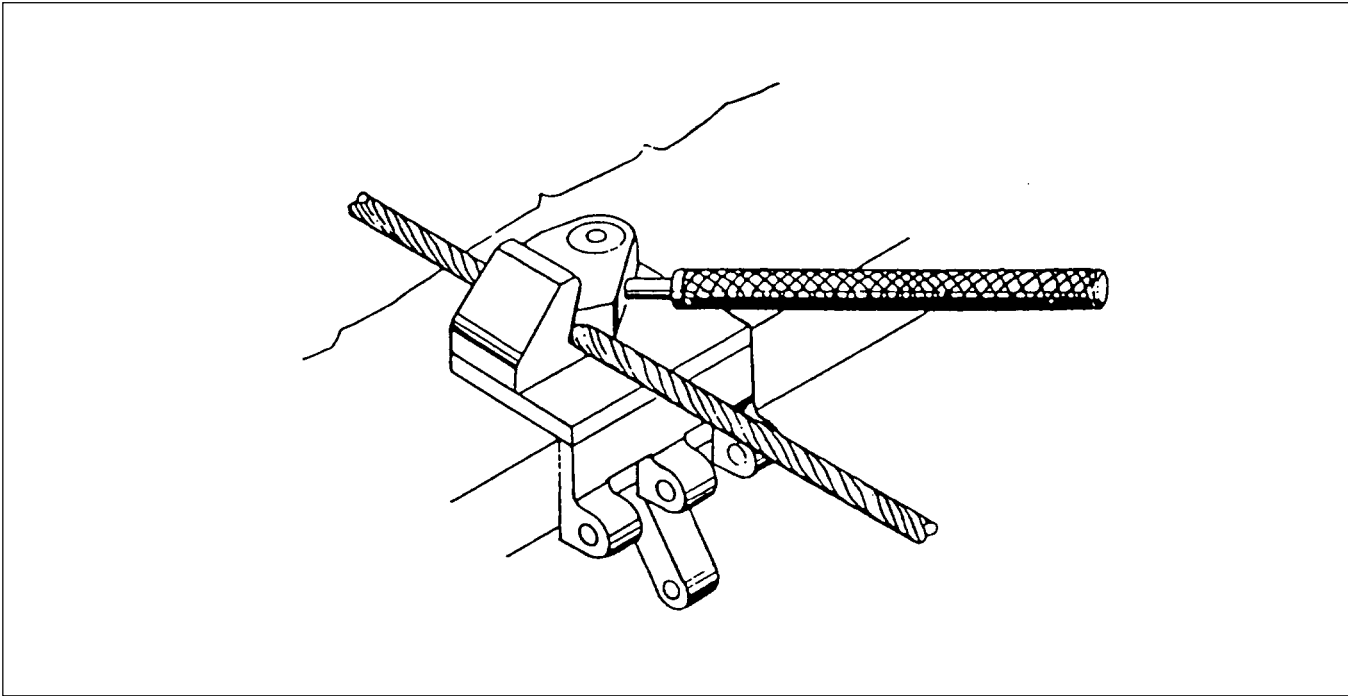
NATIONAL STOCK NUMBER

(Protective) Litter Frame

2090-01-026-3915

U-Bracket Assembly

5340-01-309-7371

GRIPPER, BULWARK**DESCRIPTION**

The Wire Rope Bulwark Gripper is a manually operated device consisting of an anchor bracket welded to the ship's bulwark, an anvil mounted on the frame, a wire rope clamp, and a handle. The gripper is configured for port or starboard use, and is installed on the bulwark outboard and slightly forward of the athwartship centerline of the transfer station.

FUNCTION

The gripper is used to temporarily secure or hold the

wire lines by means of a pinch gripper during rigging operations.

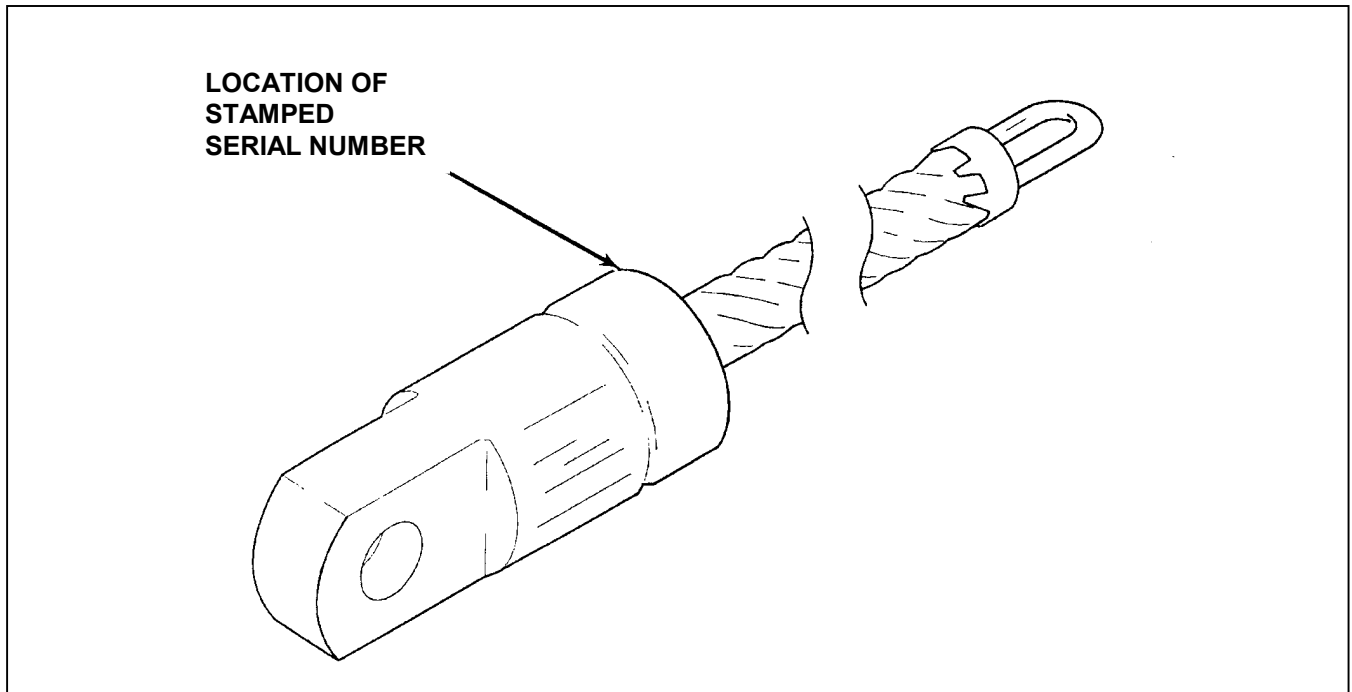
NATIONAL STOCK NUMBER

Port	1450-00-106-0148
Stbd	1450-00-106-0149

DRAWING NUMBER

Port	NAVSHIPS 805-2580327
Stbd	NAVSHIPS 805-2580326

HIGHLINE ASSEMBLY

**DESCRIPTION**

The Highline Assembly is a certified 1-inch wire rope assembly with a poured socket and drilled eye end fitting adapter on one end. On the opposite end a U-shaped bracket is welded.

The 1-inch wire rope is made of extra improved plow steel in 6 X 37 construction with an independent wire rope core (IWRC). The poured socket and welded end fitting are tested to 40,000 pounds following installation on the wire rope.

Only certified highline assemblies are authorized for use as cargo STREAM highlines. Certification is indicated by the presence of a serial number stamped on the poured socket end fitting. Serial number includes year and last four digits of contract or purchase order number plus a serial number (e.g., the third highline produced under Contract N001 0489-C-9876 would be: 89-9876-3).

FUNCTION

The Highline Assembly provides support for transfer of cargo between ships while underway. Cargo items include weapons, aircraft engines, dry goods, and personnel.

The Highline Assembly is wound on a winch drum, reeved through a ram tensioner, anti-slack device, fairlead through the cargo STREAM sliding block transfer head and dead-ended at the receiving station of the other ship. The highline normally operates under approximately 20,000 pounds of tension and provides a taut, stable support for loads as they are transferred from one ship to another.

For safety, the Highline Assembly is replaced every 18 to 24 months.

DRAWING NUMBER

NAVSEA 6574325

REFERENCE

NAVSEA letter 9571 OPR: 56W24 Ser 56W2/038
of 14 April 1992

NATIONAL STOCK NUMBER

4010-01-309-7439

HOISTING ASSEMBLY, MK 20 MOD 0**DESCRIPTION**

The MK 20 MOD 0 Hoisting Assembly consists of a rigging plate, three MK 1 MOD 0 cargo safety hook swivels, and a MK 2 MOD 0 cargo safety hook.

FUNCTION

The Hoisting Assembly is used in the conventional Burton transfer method.

NATIONAL STOCK NUMBER

Assembly

4030-01-373-5083

Rigging Plate

4030-00-395-4304

MK 1 MOD 0 Cargo Safety Hook Swivel

4030-00-384-8894

MK 2 MOD 0 Cargo Safety Hook

4030-00-362-2175

DRAWING NUMBER

Assembly

NAVORD 563891

Rigging Plate

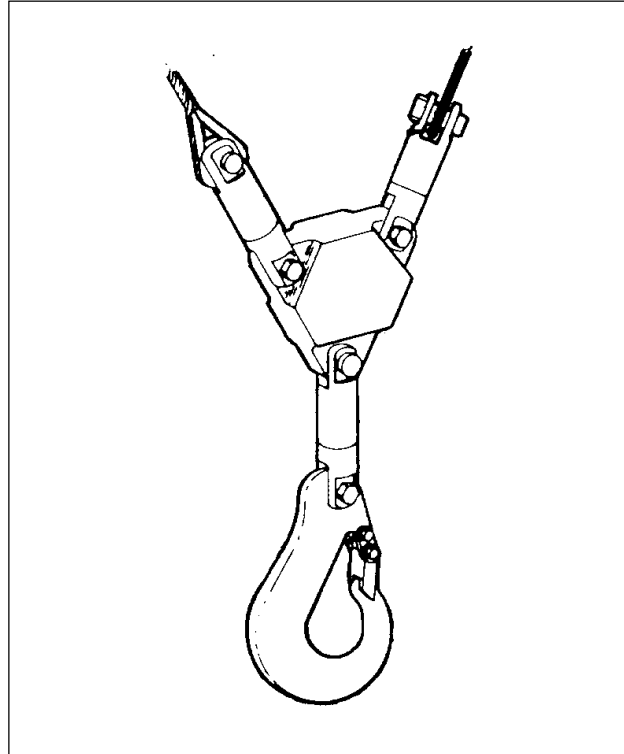
NAVORD 593163

MK 1 MOD 0 Cargo Safety Hook Swivel

NAVORD 593164

MK 2 MOD 0 Cargo Safety Hook

NAVORD 563869

**REFERENCE**

Approved Handling Equipment for Weapons and Explosives, NAVORD OP 2173.

HOOK, CARGO SAFETY, MK 2 MOD 0**DESCRIPTION**

The MK 2 MOD 0 Cargo Safety Hook (the Earle Hook) is made of mild steel and heavily constructed. It has a swallow or throat opening of 2-1/8 inches with a spring loaded safety latch and a locking pawl to secure the latch in an open or closed position. The hook will accommodate four loops of 3-1/2-inch manila rope. The hook is drilled to permit attachment to other components.

FUNCTION

The hook is used in operations where heavy loads are handled. Although the hook can be procured separately, it is also used as part of the MK 20 MOD 0 Hoisting Assembly, Trolley Adapter Assembly, and the Wire Highline Trolley assemblies.

NATIONAL STOCK NUMBER

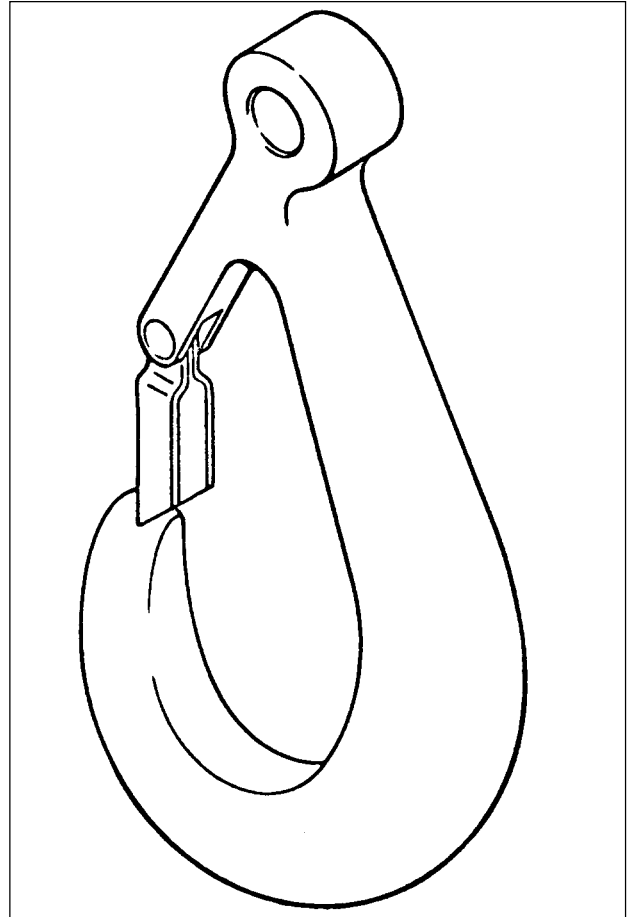
4030-00-362-2175

DRAWING NUMBER

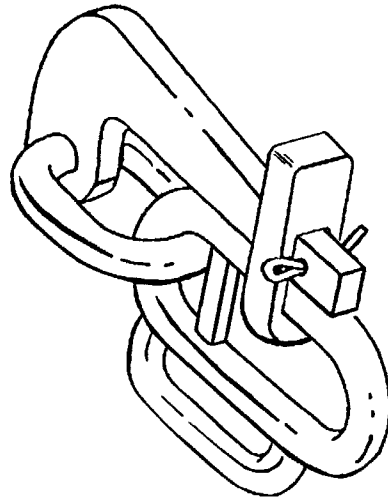
NAVORD 563869

REFERENCE

Approved Handling Equipment for Weapons and Explosives (NAVORD OP 2173).



HOOK, PELICAN, STREAM



STREAM PELICAN HOOK

DESCRIPTION

The STREAM Pelican Hook is constructed of galvanized forged steel and consists of a bill, releasing link, cotter pin, short link, long link and a 1-inch diameter steel bail welded to the underside of the long link. The cotter pin is used to secure the releasing link when the hook is closed. The size of the Pelican Hook can be determined by measuring the diameter of the short or long link. The long link and bail are tested separately to 50,000 and 30,000 pounds, respectively.

FUNCTION

The STREAM Pelican Hook is used to secure the transfer rig to the long link on the receiving ship's fixed padeye, sliding padeye, extender or pendant. It

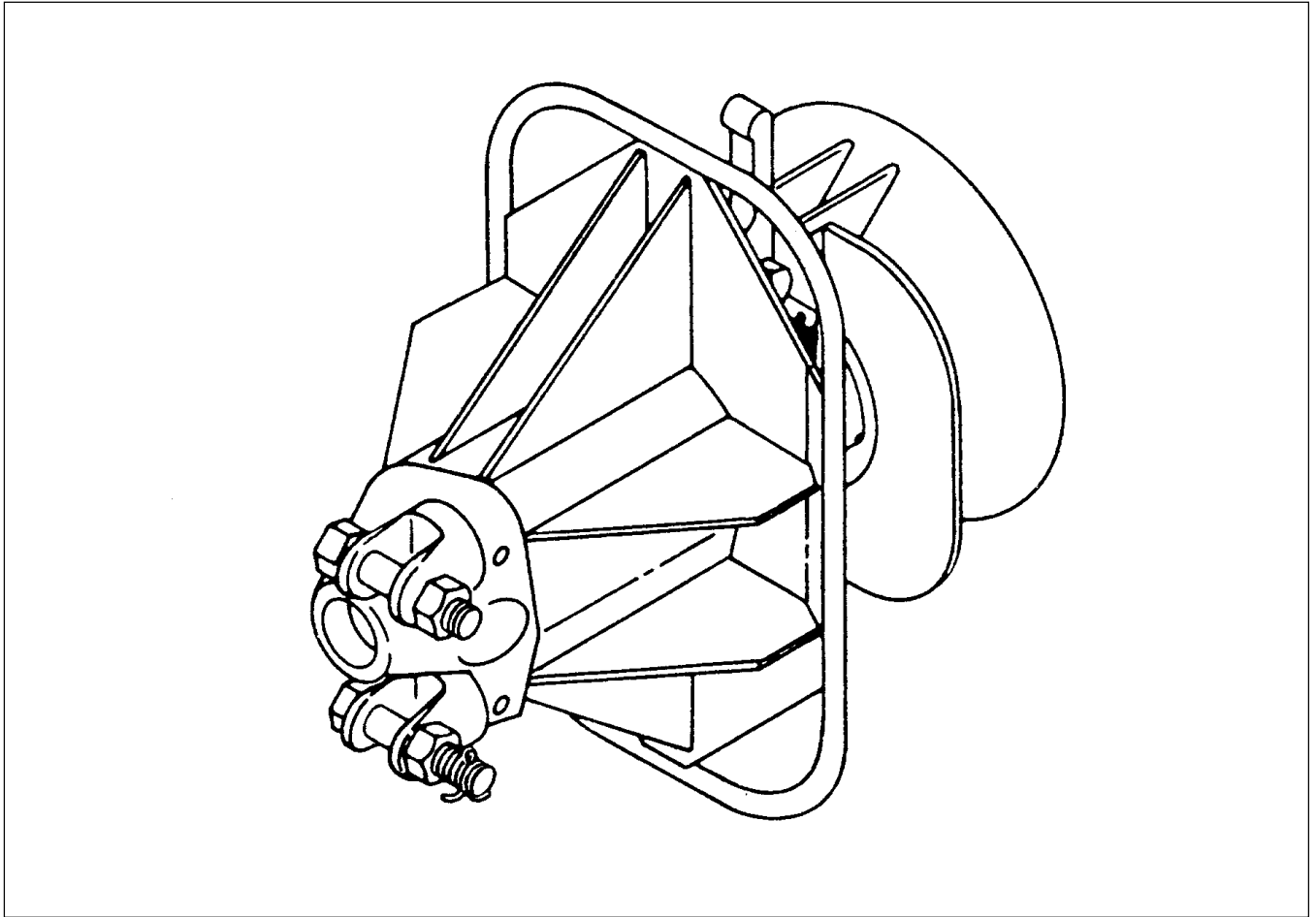
provides a quick release attachment for all STREAM rigs. The STREAM Pelican Hook must be used with both the STAR and Traveling SURF rigs. When the STREAM Pelican Hook is used with the Traveling SURF rig, the SURF hook is attached to the Pelican Hook bail.

NATIONAL STOCK NUMBER

STREAM Pelican Hook
1-3/8-inch for 1-inch wire rope
4030-00-784-3064

DRAWING NUMBER

STREAM Pelican Hook
805-2580284, stamped "REV C" or later

LATCH ASSEMBLY, STAR (SURF, TRAVELING ACTUATED REMOTELY)**DESCRIPTION**

The STAR Latch Assembly consists of a housing weldment, two spring-loaded latches and two SURF pad clevises.

FUNCTION

The STAR Latch Assembly provides an automatic hook-up of the traveling SURF at the receiving ship without the necessity of a rigger going aloft. When ready to return the rig at the completion of transfer,

the STAR latch assembly is disconnected remotely from deck level.

NATIONAL STOCK NUMBER

Latch Assembly only 5340-01-212-4901

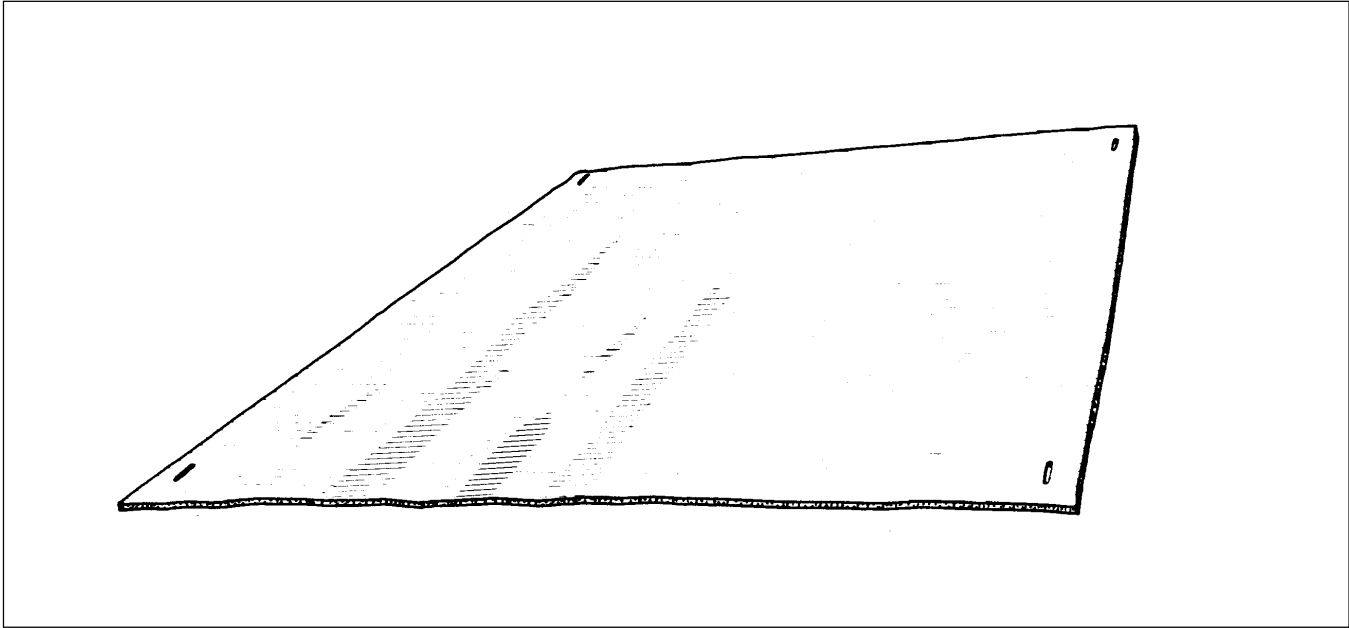
DRAWING NUMBER

NAVSHIPS 4629270

REFERENCE

Underway Replenishment (NWP 4-01.4)

MATS, RUBBER



DESCRIPTION

Rubber Mats are made of 4-ply nylon cord reinforcement, bonded with 1/16-inch thick neoprene non-conductive fabric-impressioned top and bottom cover. All edges of the mats are beveled 45 degrees and covered with neoprene. Each corner has a 1-inch by 4-inch securing slot, sealed with neoprene cement, for use in lashing down the mats if necessary.

FUNCTION

Rubber Mats are portable and are used to provide a

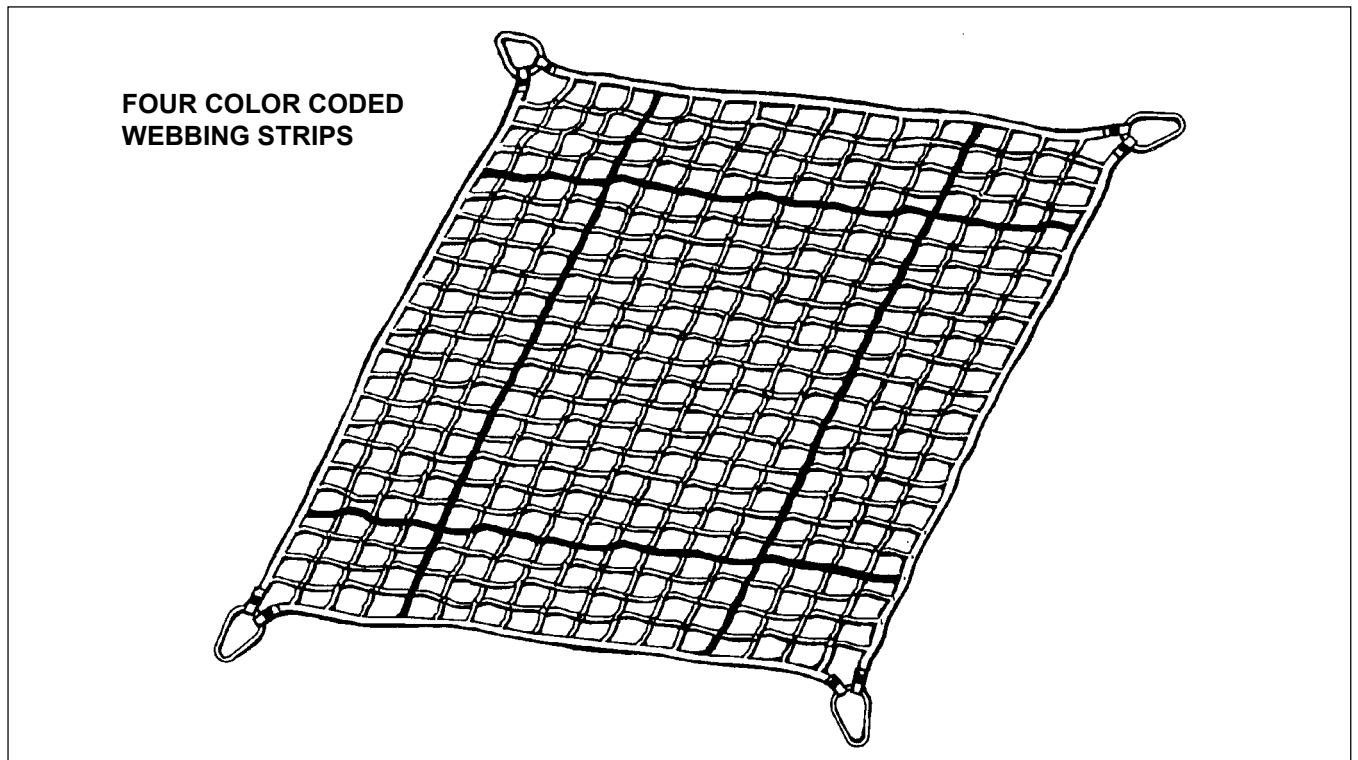
cushion to prevent damage or deformation when landing ammunition and other sensitive cargo aboard ship at a receiving station. The thickness, beveled edges and non-skid surfaces of the Mats assure easy on-off maneuvering for forklift trucks and dollies.

NATIONAL STOCK NUMBER

Mats, Rubber:

6 x 6 feet	2040-01-338-7757
8 x 12 feet	2040-01-374-8550

NET SLING, CARGO, NYLON

**DESCRIPTION**

The Nylon Cargo Net Sling consists of a nylon web frame around a center section of interwoven nylon webbing with a square mesh pattern. The corners of the net are provided with either pear shaped steel links or nylon loops. The net sling is available in two classes of webbing: Class A, antistatic treated; and Class B, standard impregnation. The Net Sling is available in five sizes ranging from 10 feet x 10 feet to 14 feet 2 inches x 14 feet 2 inches. There are also three types of slings: Type I has a load capacity of 4500 lbs and is color coded orange; Type II has a load capacity of 3500 lbs and is color coded yellow; Type III has a load capacity of 2500 lbs and is color coded white. Types I and III, in accordance with the attached table, (facing page) are used in UNREP.

FUNCTION

The Net Sling is used to transfer cargo, retrograde cargo, or broken pallets during underway

replenishment. The four corner links or loops of the net are attached to the hook of a MK 92 hoisting ling for VERTREP and to a cargo hook or MK II cargo drop reel for CONREP. The Class A, anti-static treated net is used primarily for VERTREP and to transfer explosives and flammable material.

SPECIFICATION

MIL-S-18313

REFERENCE

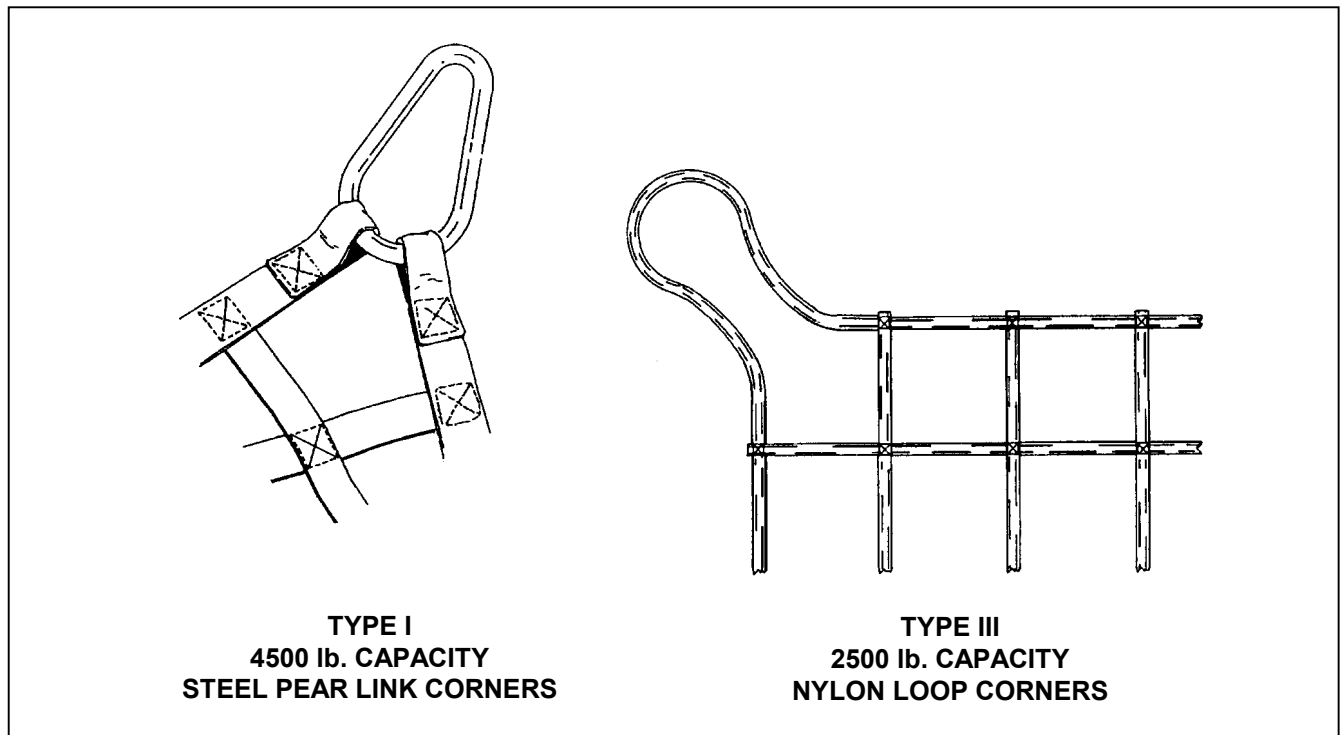
Underway Replenishment (NWP 4-01.4)

Approved Handling Equipment for Weapons and Explosives NAVORD OP 2173

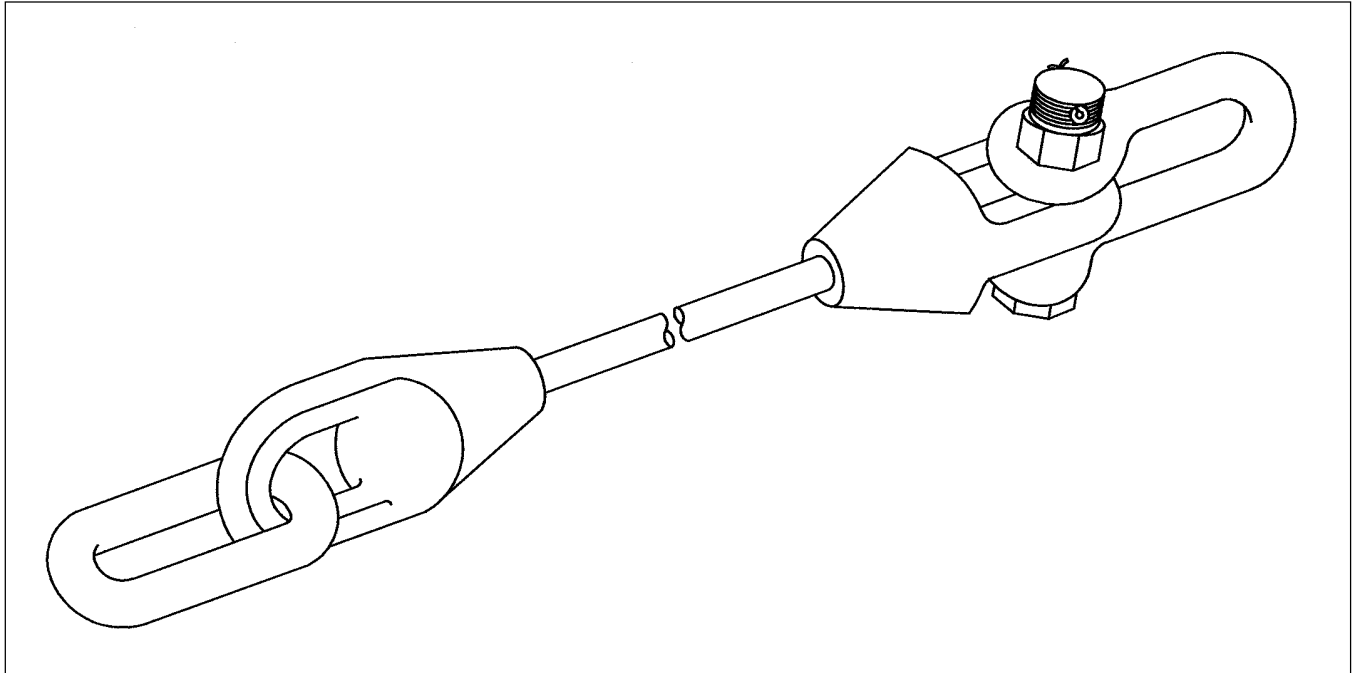
Handling and Stowage of Guided Missiles Aboard Ammunition Ships NAVORD OP 3206

Underway Weapon Replenishment Ordnance Handling Equipment and Transfer Units S9571-AA-MMA-010

NATIONAL STOCK NUMBER	SIZE (feet/inches)	WEIGHT (lbs)	TYPE	COLOR CODE/ CAPACITY (lbs)	CLASS
3940-00-892-4372	10' x 10'	29	I	Orange/4500	A - anti-static
3940-00-892-4373	12' x 12'	47	I	Orange/4500	A - anti-static
3940-00-892-4374	14' x 14'	50	I	Orange/4500	A - anti-static
3940-00-892-4375	12' x 12'	36	I	Orange/4500	B - standard
3940-00-892-4379	11' 8" x 11' 8"	15	III	White/2500	A - anti-static
3940-00-892-4380	14' 2" x 14' 2"	20	III	White/2500	A - anti-static



PENDANT, 1-1/4-INCH

**DESCRIPTION**

The 1-1/4-inch Pendant consists of a 1-1/4-inch diameter wire rope with a closed socket on each end. One end has a 1-3/8 inch diameter long link installed. The other end has a 1-1/2 inch safety chain shackle installed. The assembly is approximately 8 feet, 9-1/2 inches long.

FUNCTION

The 1-1/4-inch Pendant allows a load to be landed outboard and clear of the DD 963 Class false deck. It also allows a load to be landed outboard and clear of the DD 963 Class, and CG 52 through CG 73, Vertical Launch System foundation. The pendant is

shackled to the long link on the forward or aft sliding padeye. The pelican hook from the UNREP ship STREAM rig is attached to the long link of the pendant. This arrangement moves the traveling SURF (which determines the load landing area) out to the desired position.

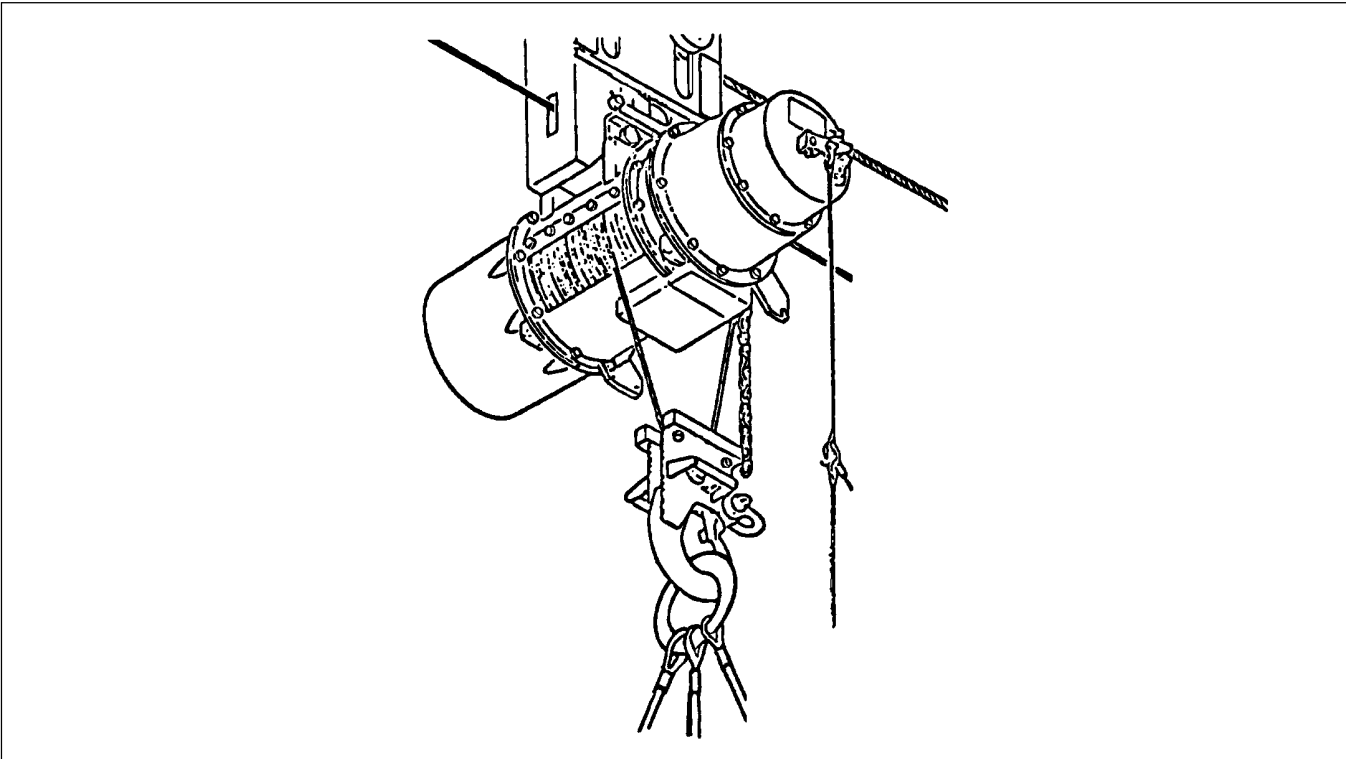
NATIONAL STOCK NUMBER

No NSN assigned

DRAWING NUMBER

805-5192628

REEL, CARGO DROP, MK II

**DESCRIPTION**

The MKII Cargo Drop Reel is a self-contained, spring-driven mechanical device. The reel consists of seven major assemblies: cable drum rewind mechanism, cable drum and cable assembly, gear cage assembly, centrifugal brake mechanism, static brake mechanism, cover and housing, and drop hook assembly. The Cargo Drop Reel is bolted to a STREAM Trolley. In addition, a positive lock device is provided.

FUNCTION

The reel is used to lower a cargo load, at a controlled rate of descent, to the deck of a receiving ship not equipped with a sliding padeye.

NATIONAL STOCK NUMBER

2030-01-018-0727

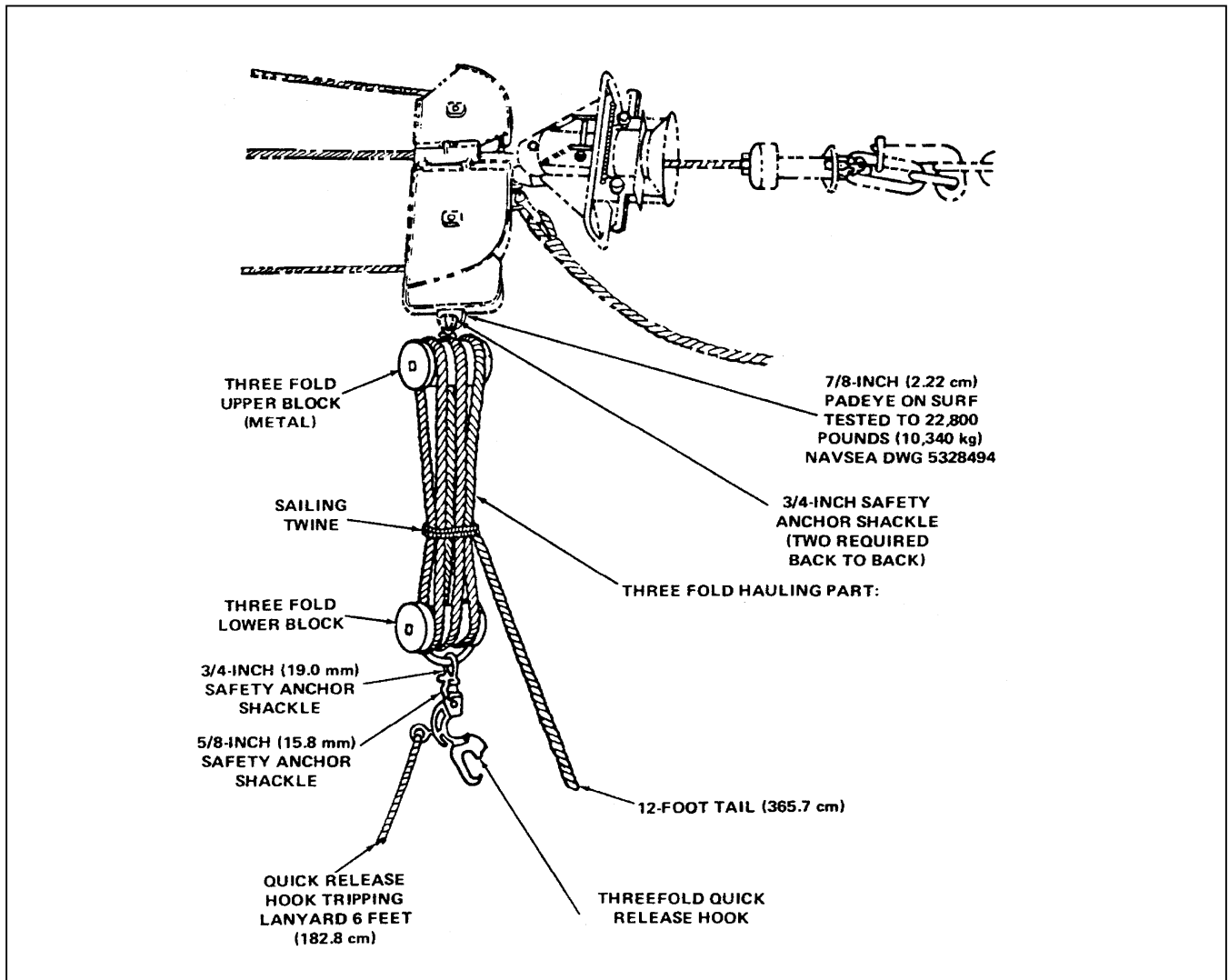
DRAWING NUMBER

80064-2580100

REFERENCE

Underway Replenishment (NWP 4-01.4)
Technical Manual MK II Cargo Drop Reel
NAVSEA 0920-LP-098-9010

REEL, CARGO DROP, THREEFOLD RETROGRADE SYSTEM

**DESCRIPTION**

The Threefold Retrograde System Cargo Drop Reel consists of a threefold hauling part with upper block connected to traveling SURF by two 3/4-inch safety anchor shackles back to back. Quick release hook is connected to lower block by 3/4-inch and 5/8-inch safety anchor shackles.

FUNCTION

Loads in excess of 150 pounds (78 kg) can be returned by use of a threefold tackle provided by the delivery ship. The threefold is sent to the receiving

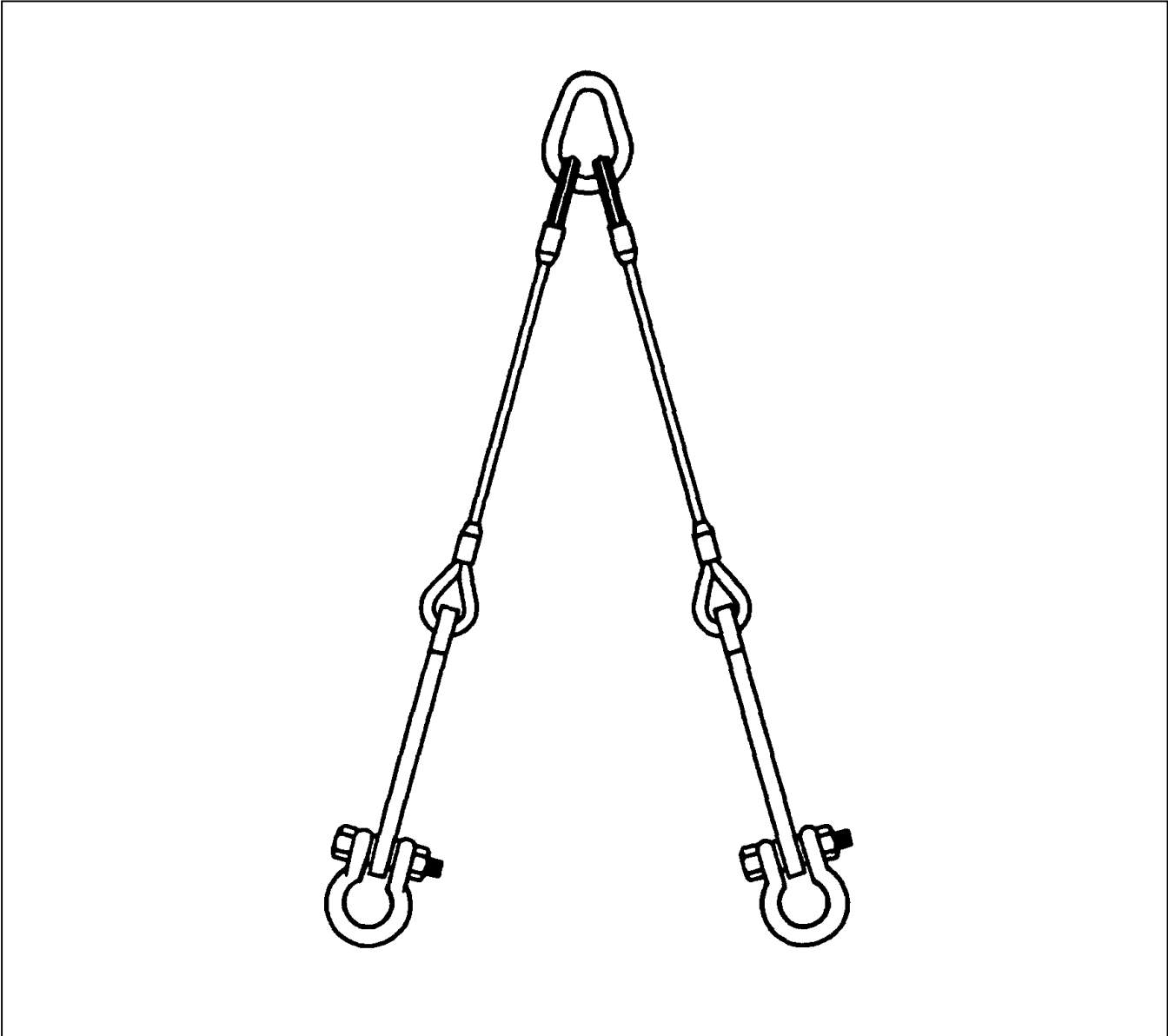
ship shackled to a padeye on the SURF. Cargo Drop Reel is sent to receiving ship with hook extended. Cargo Drop Reel hook is attached to load. Threefold is attached to Cargo Drop Reel hook. Line handlers in the receiving ship haul in on the threefold to lift the load while the Cargo Drop Reel reels in the cargo drop reel hook.

NATIONAL STOCK NUMBER

Quick Release Hook 4030-00-877-5805

DRAWING NUMBER

NAVSEA 53711-5328494

SLING ASSEMBLY, STREAM AIRCRAFT ENGINE TRANSFER**DESCRIPTION**

The STREAM Aircraft Engine Transfer Sling Assembly consists of a 3/4-inch dia. pear link with two 1/2-inch wire rope cable assemblies. Each cable assembly is connected to an adjustable link. The adjustable link has a 7/8-inch safety shackle for use in attachment of the Sling to an aircraft engine container.

FUNCTION

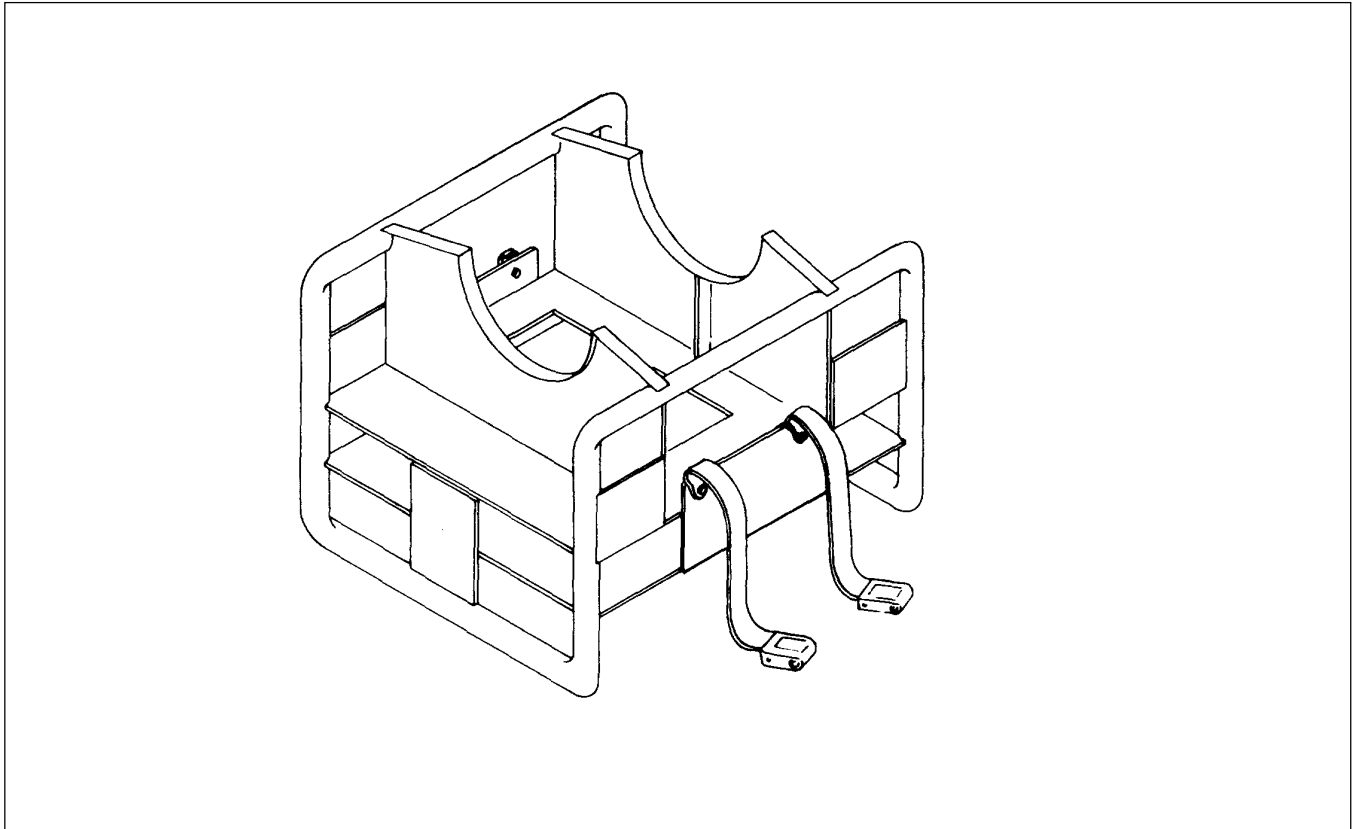
STREAM Aircraft Engine Transfer Slings are to be used with the MK 5 STREAM Cargo Heavy Lift Strongback for underway replenishment of aircraft engines.

NATIONAL STOCK NUMBER

4010-01-309-7465

DRAWING NUMBER

NAVSEA 53711-5177045

STAND, STOWAGE, MK II CARGO DROP REEL**DESCRIPTION**

The MK II Cargo Drop Reel Stowage Stand consists of a steel plate and pipe frame with two nylon securing straps equipped with quick release safety buckles. The frame is constructed so as to provide 4 fork lift pockets permitting it to be lifted from any side.

FUNCTION

The MK II Cargo Drop Reel Stowage Stand provides for stowage, handling and maintenance for the MK II Cargo Drop Reel when not in use.

NATIONAL STOCK NUMBER

2030-01-093-5588

DRAWING NUMBER

80064-2580150

REFERENCE

Underway Replenishment (NWP 4-01.4)

STOPPER, TROLLEY**DESCRIPTION**

The Trolley Stopper consists of a steel weldment cut into two parts. Each part has two bolting brackets (ears) welded to a drilled steel tube and end plate. The brackets are drilled for two bolts. The tube and end plate provide a seat for the conventional highline end fitting.

FUNCTION

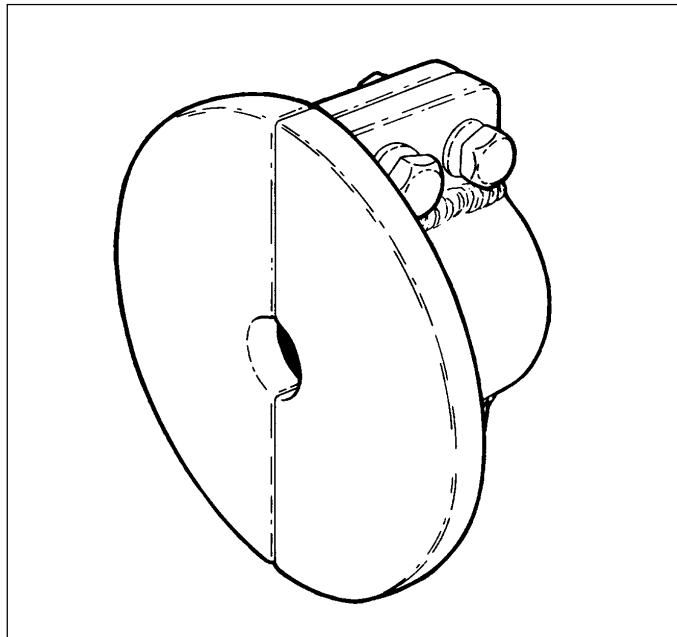
The stopper is used to stop a trolley at the end of a 7/8-inch or 1-inch wire highline for cargo STREAM rigs.

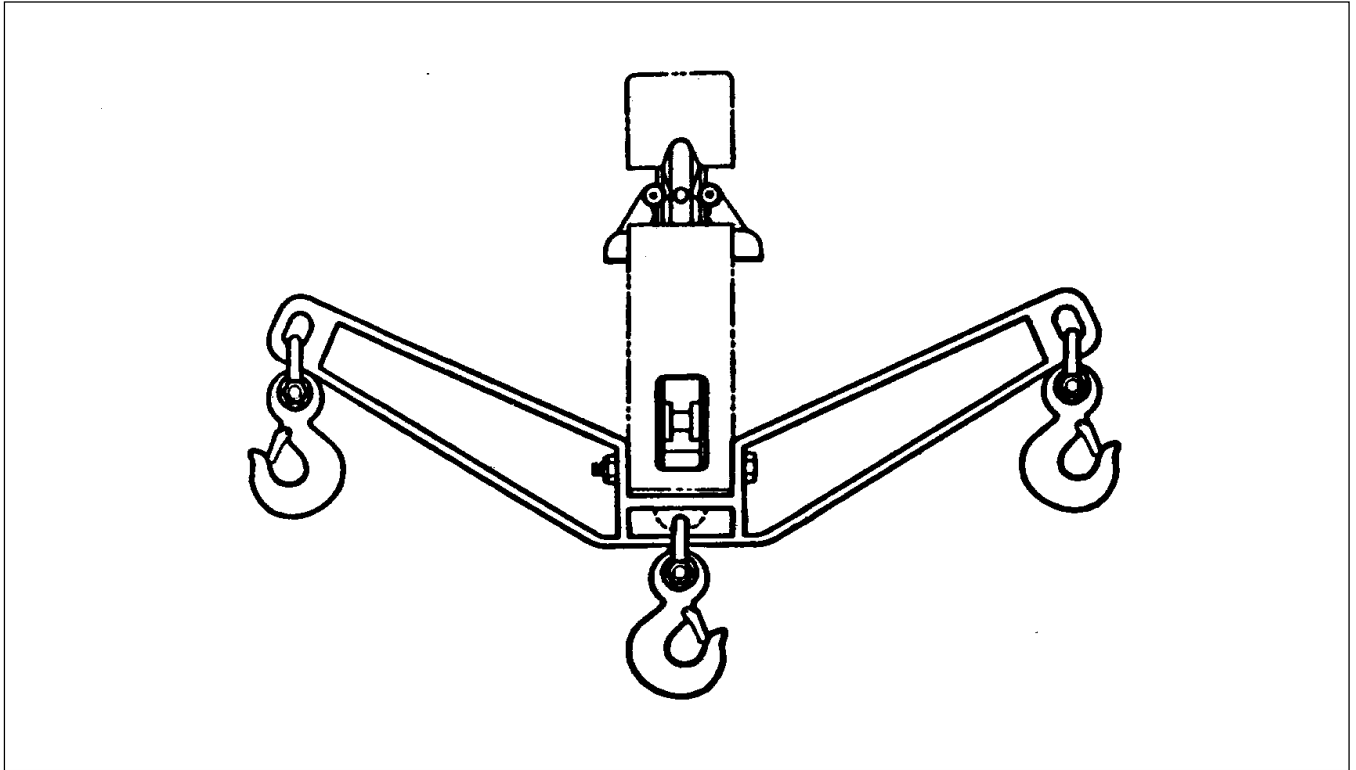
NATIONAL STOCK NUMBER

3950-00-784-2909

DRAWING NUMBER

NAVSHIPS 6085366



MK 5 STRONGBACK, CARGO STREAM (HEAVY LIFT)**DESCRIPTION**

The Cargo STREAM MK 5 Strongback consists of a weldment that bolts to the bottom of the stream trolley. The strongback has two outboard lifting padeyes and one center padeye with 3/4-inch safety anchor shackle and 7-ton safety hook. Working load is 5,000 lbs on each outboard pad and 10,000 lbs on center pad.

FUNCTION

The Cargo STREAM MK 5 Strongback is used with the heavy lift slings (DWG 5177045) for transfer of

aircraft engine containers. The strongback is also used for single or double pallet cargo loads, or ordnance.

NOTE

The MK 5 Strongback is also referred to as the "Gull-Wing" Strongback.

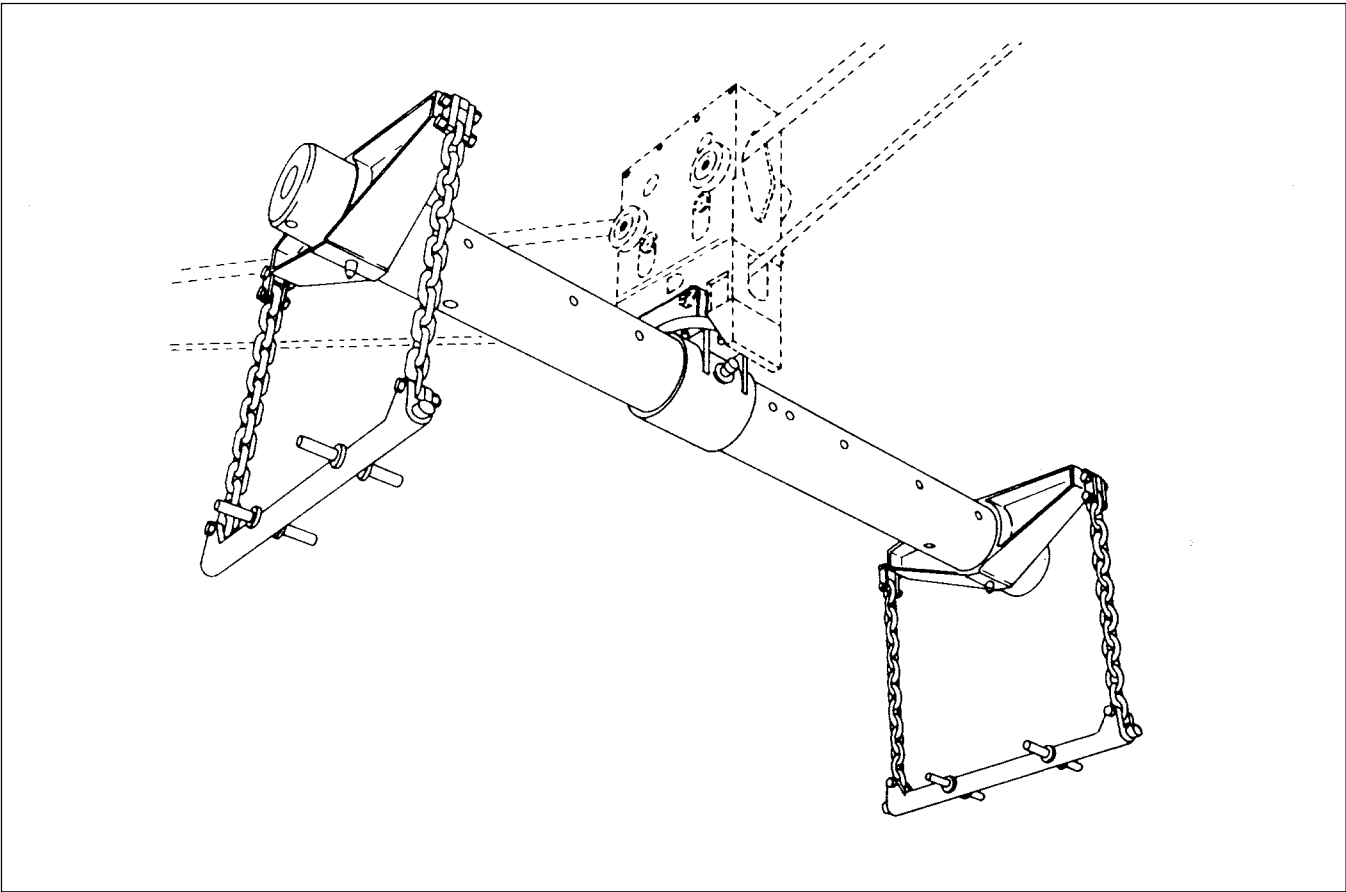
NATIONAL STOCK NUMBER

1450-01-352-7030

DRAWING NUMBER

5177023

STRONGBACK, STREAM (MISSILE)

**DESCRIPTION**

The STREAM Strongback consists of a rotating trolley adapter made of two aluminum weldments, an aluminum main beam, two short and two long cross beams. Attached to each cross beam are two 5/8-inch chain pendants that support a spring loaded latch assembly. A series of numbered holes on the main beam permits attachment of the main beam to the trolley adapter and cross beams at various locations for proper load balance.

FUNCTION

The STREAM Strongback is used to transfer TARTAR/STANDARD missiles/boosters

in MK 30 dollies, ASROC in the MK 183 container or multiple loads of cargo on hooks, to a sliding padeye receiving station.

NATIONAL STOCK NUMBER

MK 1 MOD 1 4921-01-287-9395

DRAWING NUMBER

NAVSEA 6212544

REFERENCE

Underway Replenishment (NWP 4-01.4)

SURF, TRAVELING (STREAM)**DESCRIPTION**

The Traveling SURF (Standard UNREP Receiving Fixture) is a block of steel construction with two high speed roller bearing sheaves, one above the other. The block has two padeyes that provide the attachment points for the SURF hook pendant assembly or a STAR latch assembly. A padeye on the bottom of the SURF provides for attachment of threefold retrograde rig.

FUNCTION

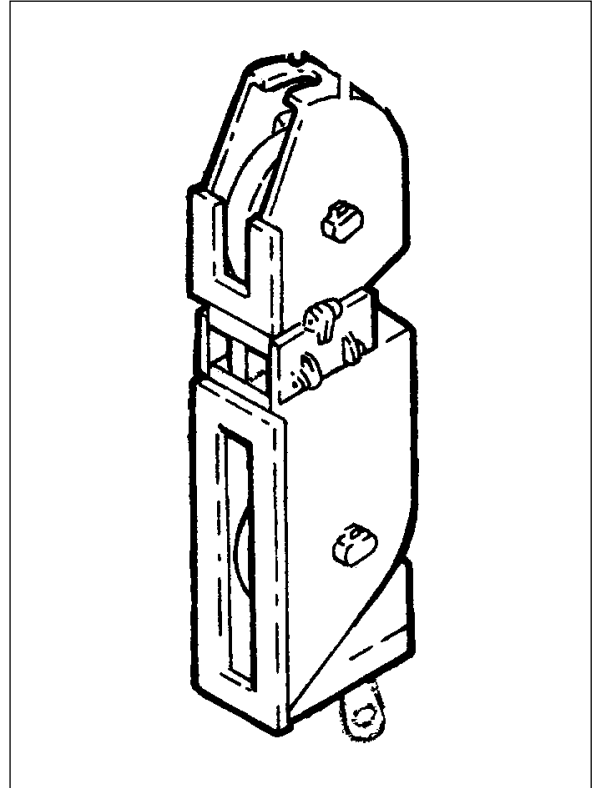
The Traveling SURF provides a return fairlead for the delivery ship's outhaul whip at the receiving ship. It is used with a STAR latch assembly for the Messenger Rigged STAR rig. It is used without the STAR latch assembly for the Traveling SURF rig.

NATIONAL STOCK NUMBER

3950-00-784-2912

DRAWING NUMBER

NAVSHIPS 805-2580257



TOOLS, PALLETIZING AND BANDING MATERIAL

DESCRIPTION

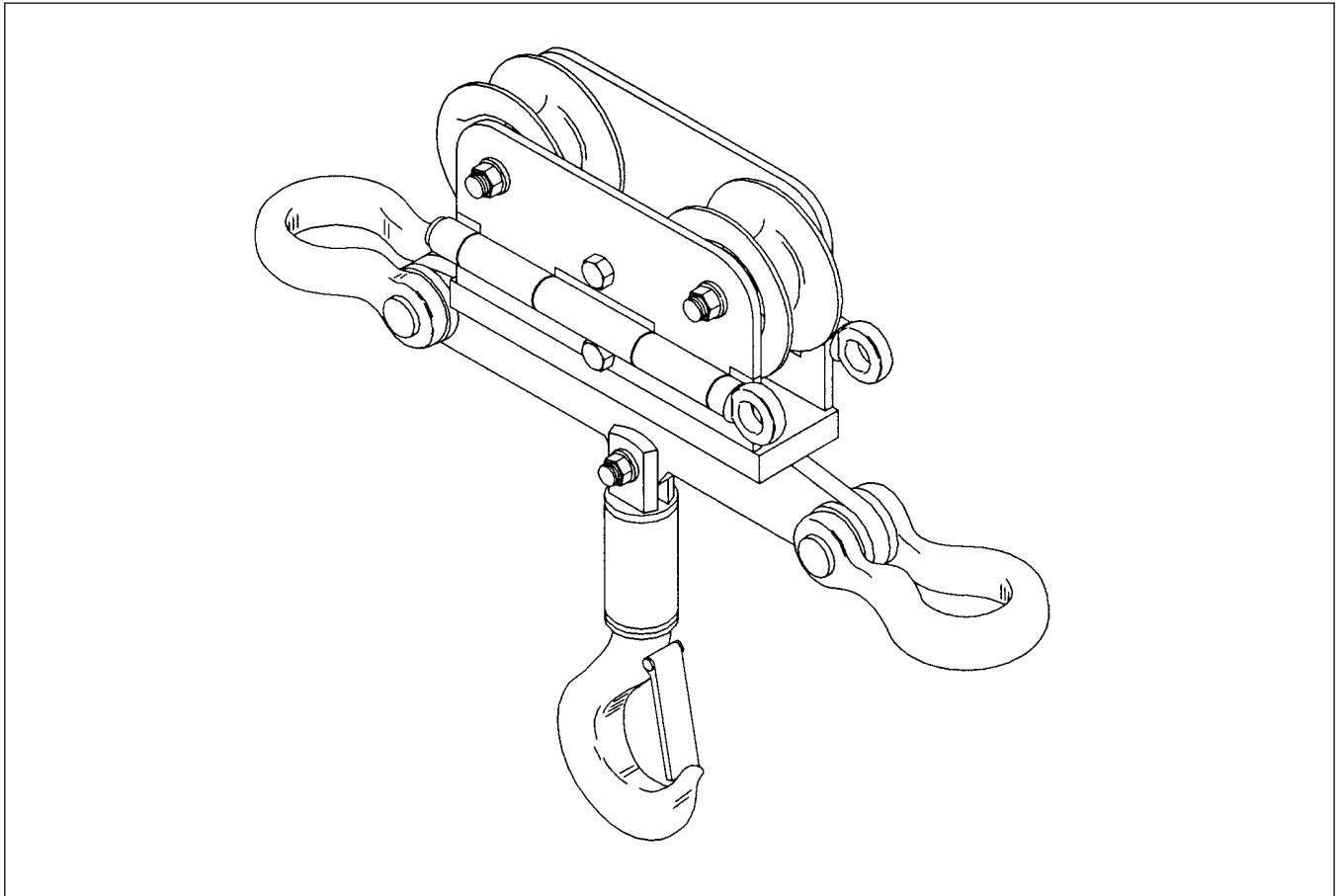
Palletizing Tools consist of stretchers, sealers, cutters and hand trucks. The Banding Material consists of flat steel strapping and seals.

FUNCTION

These tools and materials are used to palletize loose cargo for transfer by CONREP or VERTREP methods.

LIST OF TOOLS, MATERIAL AND NATIONAL STOCK NUMBERS

Tools	NSN
Stretcher, Steel Strapping Hand, for 3/4-inch and 1-1/4-inch Flat Steel Strap	3540-00-278-1251
Sealer, Steel Strapping for 3/4-inch x 0.035-inch Flat Steel Strap	3540-00-223-8589
Sealer, Steel Strapping Hand, for 1-1/4-inch x 0.035-inch Flat Steel Strap	3540-00-223-8592
Cutter, Steel Strapping Heavy Duty, for Strap Size up to 2-inch x 0.050-inch	5110-00-223-6281
Truck, Steel Strapping Coil, Hand	3540-00-273-8821
Seal, Steel Strapping Close (Tread On); 0.8075-inch Width x 1.7812-inch, Length x 0.030-inch Thickness	8135-00-239-5293
Seal Steel Strapping Close (Tread On); 1.3325 inch Width x 2-1/4 inch, Length x 0.030-inch Thickness	8135-00-239-5294
Strapping, Flat Steel, 3/4-inch x 0.035-inch (560 ft. equals one 50 lb. Coil)	8135-00-283-0670
Strapping, Flat Steel, 1-1/4-inch x 0.035-inch (335 ft. equals one 50 lb. Coil)	8135-00-283-0671

TROLLEY, MANILA HIGHLINE**DESCRIPTION**

The Manila Highline Trolley is a zinc-coated welded steel tandem snatch block. It consists of two 6-inch diameter brass sheaves with rollers, upper and lower hinge side plates, a base plate and a bottom hauling plate. A 3/4-inch or 7/8-inch safety screw pin anchor shackle is attached at each end of the hauling plate to provide attachment points for 3-inch circumference manila/synthetic inhaul/outhaul lines. A swivel type three-ton safety hook is attached at the bottom of the hauling plate. This trolley block is designed for a maximum fiber rope circumference of 5 inches.

FUNCTION

The Manila Highline Trolley is used in transferring personnel at sea via transfer at sea chair or the Stokes litter, and for transferring light cargo.

NATIONAL STOCK NUMBER

3940-00-291-1161

DRAWING NUMBER

NAVSHIPS 805-2555040

TROLLEY, STREAM UNREP

DESCRIPTION

The STREAM UNREP Trolley is a steel weldment assembly, consisting of an upper and lower assembly, inhaul and outhaul attachment points and adapter bolt bosses.

Carriage sheaves are contained in the upper assembly and stabilizing sheaves in the lower.

FUNCTION

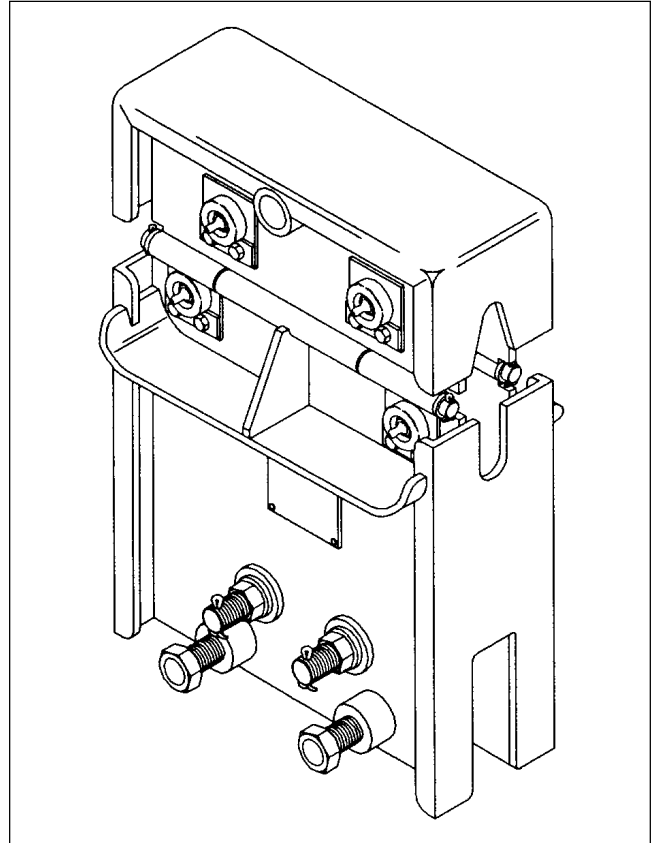
The STREAM UNREP Trolley is used for the transfer of missiles or general cargo from a STREAM station. It is used with the cargo hook adapter assembly, the cargo drop reel, the MK 5 cargo STREAM heavy lift strongback or the MK 1 strongback.

NATIONAL STOCK NUMBER

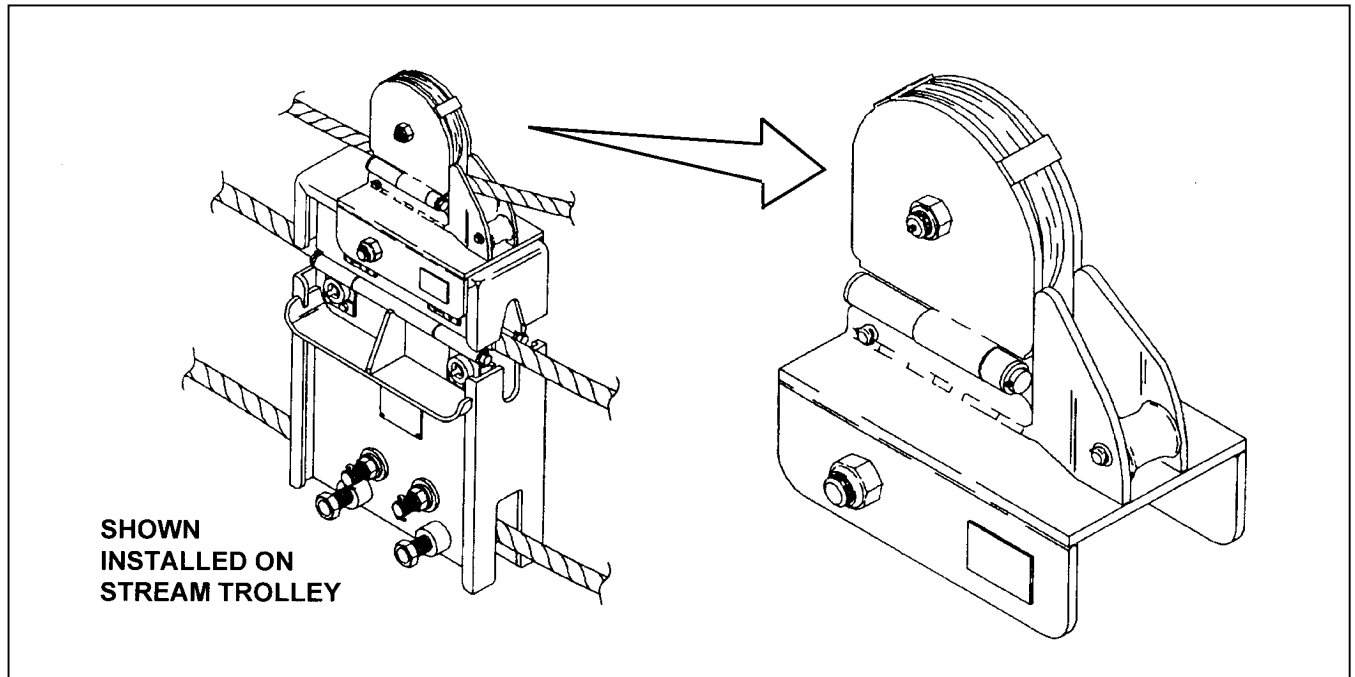
1450-01-130-5717

DRAWING NUMBER

NAVSEA 803-5184095



TROLLEY SHEAVE ASSEMBLY

**DESCRIPTION**

The Trolley-Rigged Outhaul System (T-ROS) is a STREAM cargo rigging arrangement that leads the outhaul wire rope to run parallel to the highline during at-sea cargo transfers. The single component common to all T-ROS arrangements is the Trolley Sheave Assembly.

The Trolley Sheave Assembly mounts atop the STREAM trolley. The Trolley Sheave Assembly has a sheave and two rollers between which the outhaul runs. The sheave is mounted inside the upper trolley sheave bracket which is hinged to allow the outhaul wire rope to be removed from, or installed in, the sheave and roller path. The Trolley Sheave Assembly is fastened to the STREAM trolley with a single attachment bolt secured at the existing through hole at the top of the STREAM Trolley.

FUNCTION

The T-ROS arrangement reduces the highline catenary imposed by heavy loads and eliminates outhaul wire rope chafing on aircraft carrier elevator hitch girders.

NOTE

Only ships that have been outfitted with the complete Trolley-Rigged Outhaul System require this Trolley Sheave Assembly.

NATIONAL STOCK NUMBER

3950-01-424-6171

DRAWING NUMBER

NAVSEA 6665643

**PART 4 — VERTICAL REPLENISHMENT (VERTREP)
SECTION A — INTRODUCTION**

GENERAL

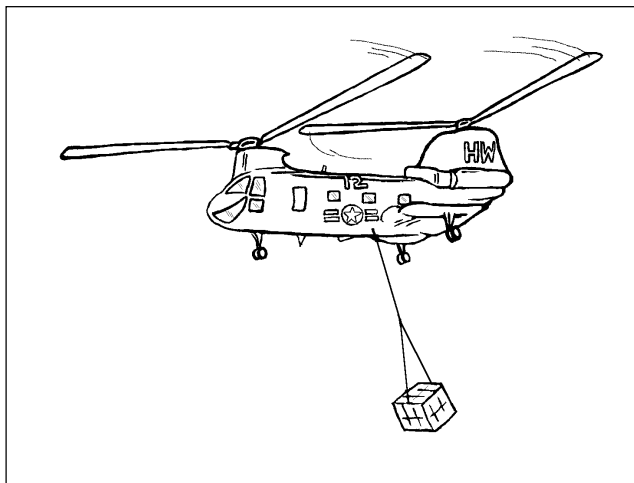
Vertical Replenishment (VERTREP) employs a helicopter to transfer solid cargo from an UNREP delivery ship to a receiving ship. Normal VERTREP operations are conducted with the receiving ship within 100 yards to 1000 yards from the UNREP ship or in conjunction with connected replenishment.

PURPOSE

The purpose of this part of the manual is to describe the equipment and methods used in VERTREP. Section A, the Introduction, covers the VERTREP helicopter, the helicopter operating facilities aboard the UNREP delivery and receiving ships and a general description of VERTREP procedures. Section B describes the basic equipment used for VERTREP.

THE VERTREP HELICOPTER

The helicopter currently used for the VERTREP mission is the UH-46D Sea Knight. The helicopters are provided and operated by a detachment from a Helicopter Combat Support Squadron embarked aboard the UNREP ship.



UH-46D Sea Knight Helicopter

UH-46D SPECIFICATIONS

POWER

Two-T58-GE-10 Turboshaft engines (1400 HP each)

CREW

3 (Pilot, Copilot and Crewchief)

PERFORMANCE (Sea level, standard day, zero wind)

Maximum Range	206 nm at 113 kt
Maximum Speed	146 kt
Endurance	2 hrs at 70 kt

DIMENSIONS

Flying Configurations

Length	84' 4"
Width	51'
Height	16' 8"

Rotors Folded

Length	45' 8"
Width	14' 9"
Height	16' 8"

MAXIMUM GROSS WEIGHT

23,000 lb

FUEL

JP-5 or JP-4 (380 gal)

CAPABILITIES

Cargo Hook Capacity	10,000 lb
Maximum VERTREP Load (Normal)	6,000 lb
Hoist Capacity	600 lb
Seats	25
Litters	15
Cabin Space	864 cu ft

The tandem rotor configuration on the UH-46D allows maneuverability without the wind restrictions associated with tail rotor helicopters. This permits the UH-46D to fly sideways into a relative wind with a full load, as it delivers cargo to the receiving ship.

SHIPBOARD HELICOPTER FACILITIES

Certification

OPNAV Instruction 3120.28, Certification of Aviation Facilities on Aviation and Non-Aviation Ships and NAVMAT Instruction 3120.1, Aviation Facilities on Non-Aviation Ships; Certification Procedures and Responsibilities establishes and implements a formal inspection and certification program to insure adequate and safe shipboard helicopter facilities. Operating facilities include visual landing aids (markings and lights), obstruction clearances, deck structure, communications, navigational aids, safety equipment, and mooring equipment. Support facilities include all equipment and facilities required to logistically support, service and maintain helicopters aboard ship.

Aircraft carriers being aviation ships, have the required facilities to operate and support helicopter operations. Naval Air Systems Command, Helicopter Operating and Support Facilities Bulletin Number 1B of 22 August 1973 contains the detailed certification requirements for helicopter operating and support facilities aboard non-aviation ships. The certification program is supported by a rigid inspection procedure to insure compliance.

Depending on the facilities available, certification is granted for one of three levels and one of seven classes for each type of helicopter to be operated. The three levels of certification are determined by the navigational aids and lighting equipment installed on the ship. The three levels are:

Level I — Day and Night IFR (Instrument Flight Rules) (all weather) operations.

Level II — Day and Night VFR (Visual Flight Rules) (fair weather) operations.

Level III — Day only VFR operations.

The seven classes of certification are determined by the facilities' size, function, and support availability. The seven classes are:

Class 1 — Landing area with support (service and maintenance) facilities.

Class 2 — Landing area with service facilities.

Class 2A — Landing area with limited service facilities.

Class 3 — Landing area without support facilities.

Class 4 — VERTREP/hover area.

Class 5 — High Hover VERTREP/hover area.

Class 6 — HIFR (helicopter inflight refueling) area.

UNREP Ship Facilities. Most UNREP ships have excellent helicopter operating facilities that were included in their design. Some older ships have had limited facilities added to permit them to conduct VERTREP with helicopters furnished by one of the newer UNREP ships. Generally, UNREP ships have the following helicopter operating and support facilities:

Level I, Class 1 — AE 26 Class, all AFS, all AOE's.

Receiving Ship Facilities. Non-aviation receiving ships have varied helicopter facilities depending upon their size. Some have two VERTREP facilities to provide a VERTREP missile delivery capability to all launchers. Additional information may be obtained by consulting Naval Air Engineering Center Helicopter Facility Resume (NAEC-Eng-7576).

VERTREP OPERATIONS

VERTREP is a hover operation with the cargo carried externally, suspended on a sling hooked to the cargo hook installed in a hatch in the cabin floor. Loads weighing up to 6000 pounds are staggered on the UNREP ship's flight deck with hoisting slings attached. When ready to transfer, the helicopter hovers over the load and the hook-up man places the hoisting sling on the cargo hook. At the receiving ship the load is lowered gently to the VERTREP platform, then the cargo hook is tripped to release the sling. Complete details may be obtained by consulting Shipboard Helicopter Operating Procedures (NWP 3-04.1M) or Underway Replenishment (NWP 4-01.4).

PART 4 — VERTICAL REPLENISHMENT (VERTREP)

SECTION B — EQUIPMENT

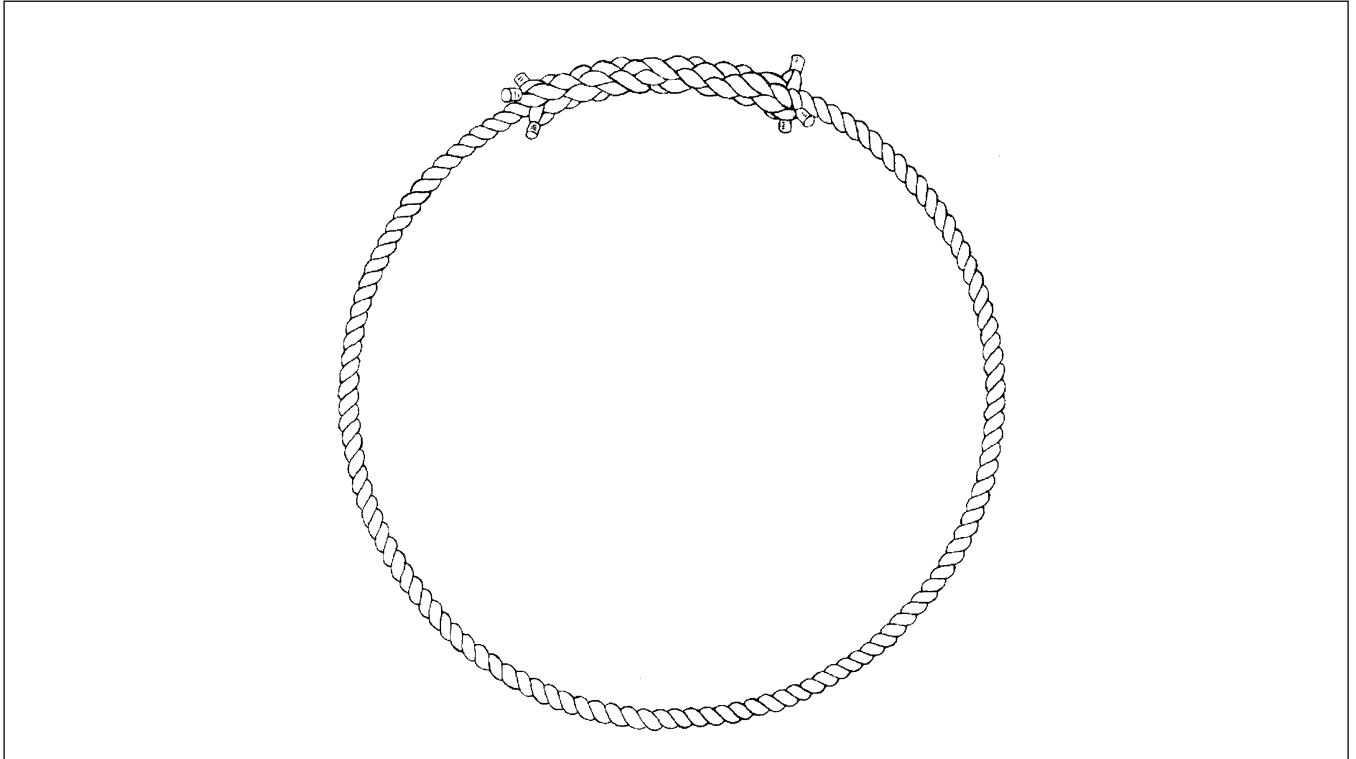
Some items of UNREP equipment are common to both CONREP and VERTREP are listed below. Pertinent information concerning these items is located in Part 1, Section B, and Part 3, Section B of this manual. Note that the ordnance handling equipment listed in Part 3, Section B is a listing only, with the appropriate ordnance publication references. In this section, several items of ordnance handling equipment are addressed in detail because VERTREP is their only application.

Item	Page
Light, Chemical	1-15
Wand, Signal	1-42
Net Sling, Cargo, Nylon	3-23
Tools, Palletizing and Banding Material	3-34

AIDS, TRAINING, VERTREP

Nine audio/visual VERTREP Training Aids have been developed to support shipboard level training on VERTREP operations. These programs are available on a loan basis from Fleet Training Aids Libraries.

TITLE	NUMBER
An Introduction to VERTREP, 23 minutes/80 slides.	W-UNREP-7300001-SS
VERTREP Safety Precautions, 31 minutes/90 slides	W-UNREP-7300002-SS
VERTREP Load Preparation, Program I, General Cargo and Ordnance Load Handling Equipment, 13 minutes/40 slides	W-UNREP-7300003.1-SS
VERTREP Load Preparation, Program II, General Cargo and Ordnance Load Assembly, 16 minutes/60 slides	W-UNREP-7300003.2-SS
VERTREP Load Preparation, Program III, Hoisting Sling Attachment, 10 minutes/25 slides.	W-UNREP-7300003.3-SS
VERTREP Load Preparation, Program IV, VERTREP Equipment Return Procedures, 12 minutes/37 slides	W-UNREP-7300003.4-SS
VERTREP Helicopter Control Signals, 23 minutes/62 slides	W-UNREP-7300004-SS
VERTREP Planning Aboard Receiving Ships, 14 minutes/49 slides	W-UNREP-7300005-SS
Sending and Receiving Missiles by VERTREP, 20 minutes/66 slides	W-UNREP-7300006-SS

BECKET, ROPE**DESCRIPTION**

The Rope Becket is made up from 2-1/4-inch three-strand nylon rope with four tucks spliced into each standing part for a total of 8 tucks. The rope ends of each splice are dog-eared and heat sealed after splicing.

FUNCTION

The Rope Becket provides the means of connecting a nylon cargo net to the hook on a VERTREP hoisting sling.

DRAWING NUMBER

NAVORD 10001-2644458

NATIONAL STOCK NUMBER

3940-01-053-2557

REFERENCE

Underway Replenishment (NWP 4-01.4)

Underway Weapon Replenishment Ordnance
Handling Equipment and Transfer Units
S9571-AA-MMA-010

CARGOTAINER

DESCRIPTION

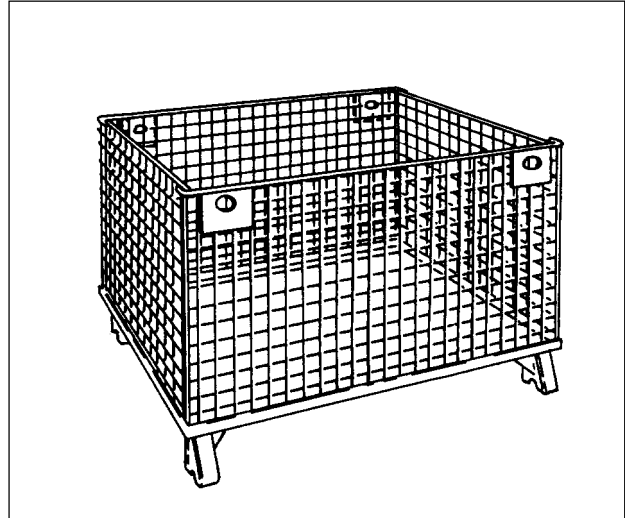
The Cargotainer is a fully collapsible welded steel mesh container. Two opposite sides are equipped with two fittings each, to engage the cargo hooks on each leg of a hoisting sling. The cargotainer is supported on legs at each corner.

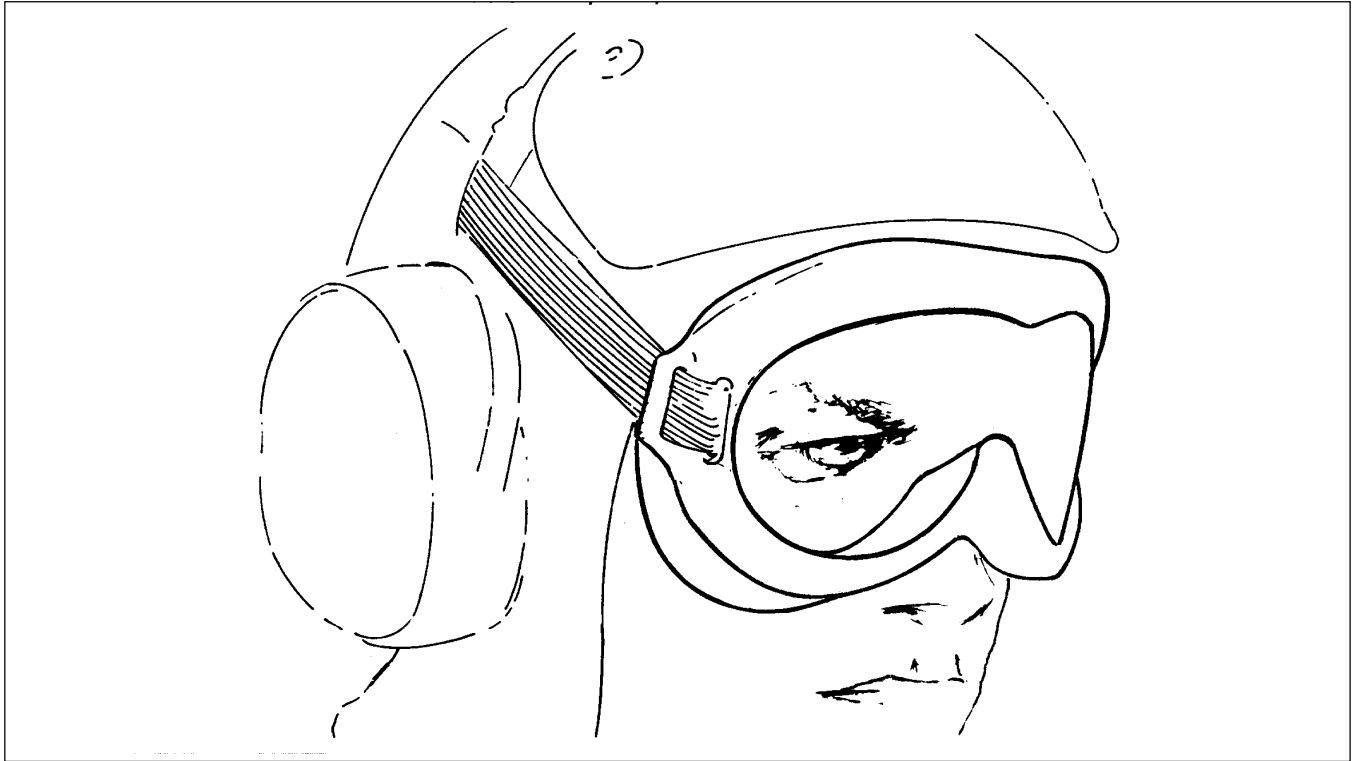
FUNCTION

The Cargotainer is used for the transfer of loose stores and general cargo during VERTREP operations.

REFERENCE

Underway Replenishment (NWP 4-01.4)



GOGGLES, SUN, WIND AND DUST**DESCRIPTION**

The Sun, Wind and Dust Goggles consist of a molded rubber face piece, a removable plastic lens and an adjustable elastic headband.

FUNCTION

Sun, Wind, and Dust Goggles are worn by the VERTREP Hook-up man and Landing Signalman, Enlisted (LSE) while working on or near the

flight deck. They provide eye protection from wind blast, dust and small objects hurled about by the helicopter's rotor downwash.

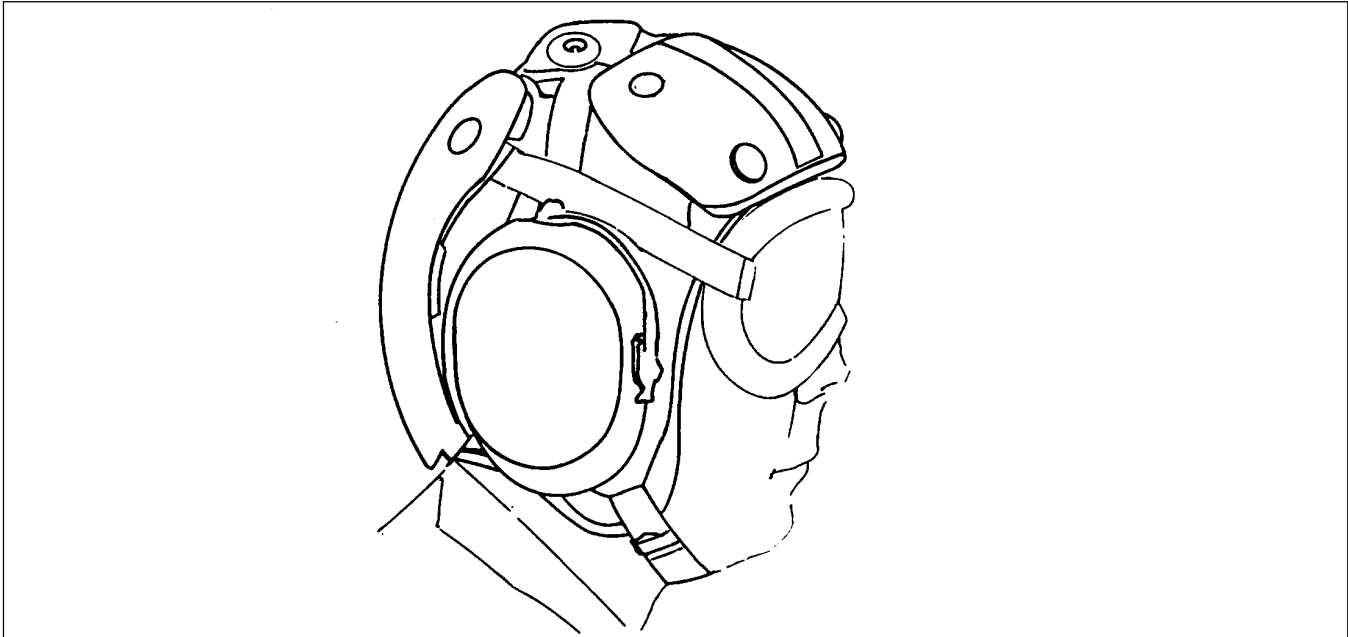
NATIONAL STOCK NUMBER

8465-01-328-8268

REFERENCE

Shipboard Helicopter Procedures for Air Capable Ships NWP 3-04.1M

HELMET, HGU-25/P ASSEMBLY



DESCRIPTION

The HGU-25/P Helmet Assembly consists of a cloth helmet, two cranial impact shell pads, two colored cranial impact shells and an aural protector assembly.

FUNCTION

The HGU-25/P Helmet Assembly is worn by the VERTREP Hook-up man (w/green cranial impact shells) and the LSE (w/yellow cranial impact shells) while working on or near the flight deck. It provides impact protection for the head from objects blown about by the helicopter's rotor downwash. The aural protector assembly protects the ears from the damaging sound of the helicopter's engine. The aural protection assembly, worn without helmet, provides protection from high intensity noise for other personnel required to be in the vicinity of the VERTREP platform.

REFERENCE

Shipboard Helicopter Procedures for Air Capable Ships NWP 3-04.1M

NATIONAL STOCK NUMBER

<u>COMPONENT</u>	<u>NSN</u>
Helmet, Cloth	
Size 6-3/4	8415-00-861-3527
Size 7	8415-00-071-8785
Size 7-1/4	8415-00-071-8786
Size 7-1/2	8415-00-071-8787
Pad and Cover	
Back	8415-00-178-6830
Front	8415-00-178-6831
Shell, Impact, Back	
Green	8415-00-608-4216
Yellow	8415-00-610-7171
Shell, Impact, Front	
Green	8415-00-601-6903
Yellow	8415-00-601-6939
Aural Protector Assy.	
	4240-00-759-3290

SLING, HOISTING, MK 92 MOD 0**DESCRIPTION**

The MK 92 Hoisting Sling consists of a braided nylon rope providing a lifting eye at one end for helicopter attachment, and a thimbled safety hook at the other end for load attachment. The upper portion of this pendant-type sling is stiffened with plastic tubing to permit raising the lift eye to the aircraft hook.

FUNCTION

Hoisting Sling MK 92 MOD 0 is used for VERTREP transfer of ammunition/explosives with single point pick-up, loaded/unloaded Missile Transfer Dolly MK 30 MOD 0 and retrograde material. The helicopter crew places the lift eye on the aircraft cargo hook and lowers the free end to the deck crew for load attachment. Because of its overall length, this sling is often used as a recovery pendant.

NATIONAL STOCK NUMBER

4020-00-238-6148

DRAWING NUMBER

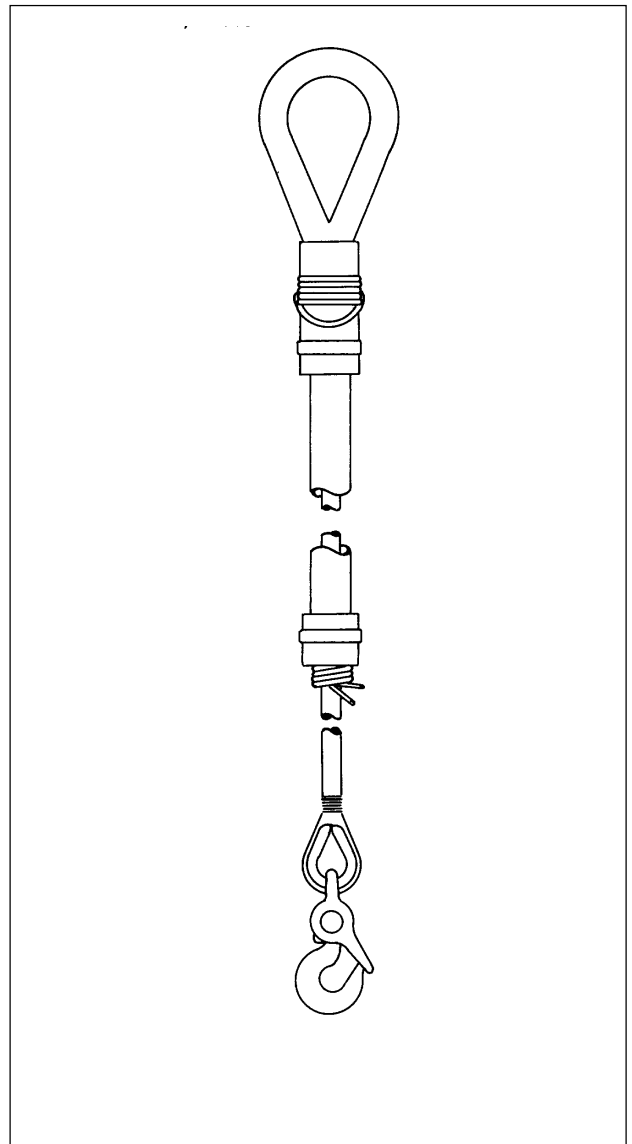
NAVORD DL 2614975

REFERENCE

Approved Handling Equipment for Weapons and Explosives NAVORD OP 2173.

Underway Weapon Replenishment Ordnance Handling Equipment and Transfer Units
S9571-AA-MMA-010

Sling, Hoisting, MK 92 MOD 0
Data Release Sheet 0283



SLING, HOISTING, MK 105 MOD 0**DESCRIPTION**

The MK 105 MOD 0 Hoisting Sling (Multileg Pole Pendant) consists of a pendant assembly and a leg assembly. The pendant assembly has a spliced eye at each end, a stiffening tube and a braided nylon rope. The leg assembly consists of four legs of braided nylon with a spliced eye at one end and a thimble and safety hook at the other end. The safe working load for each leg is 3000 pounds. Up to six legs may be attached to the lower eye by means of choker hitches. The legs are color coded; short legs orange and long legs green.

The sling is used during VERTREP for the transfer of all types of cargo.

NATIONAL STOCK NUMBER

1450-00-414-7172

DRAWING NUMBER

NAVORD DL2643482

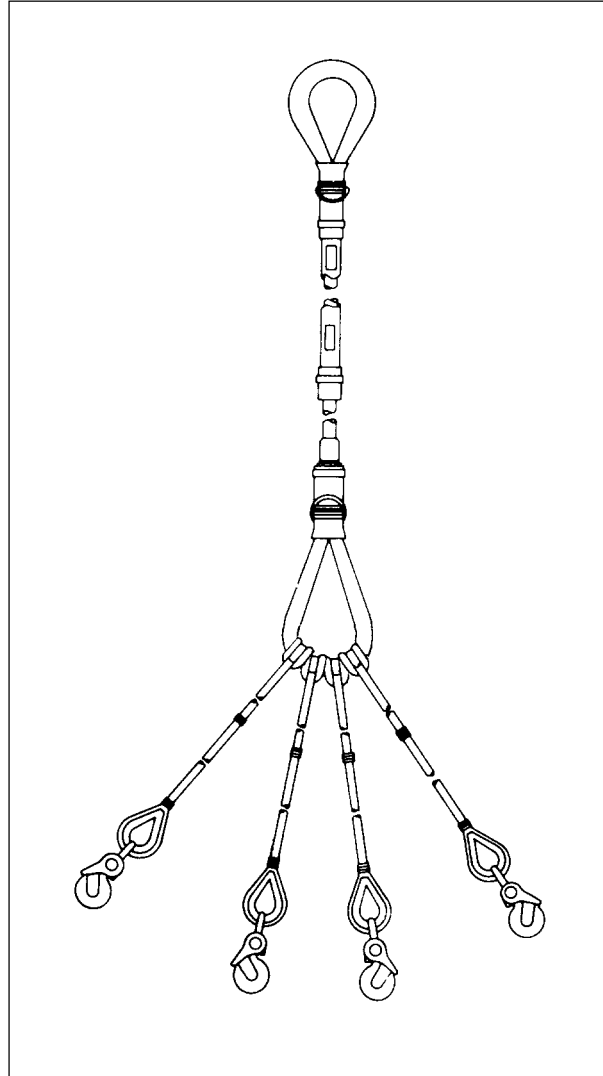
NAVORD 2643482

REFERENCE

Approved Handling Equipment for Weapons and Explosives NAVORD OP 2173.

Underway Weapon Replenishment Ordnance Handling Equipment and Transfer Units S9571-AA-MMA-010

Sling, Hoisting, MK 105 MOD 0
Data Release Sheet OR-4/113



TOOLS, CRASH AND RESCUE**DESCRIPTION**

Crash and Rescue Tools consist of basic hand and special tools. These tools are an integral part of the equipment required at each certified helicopter operating facility. They are stowed in the crash/rescue locker in the vicinity of the helicopter platform.

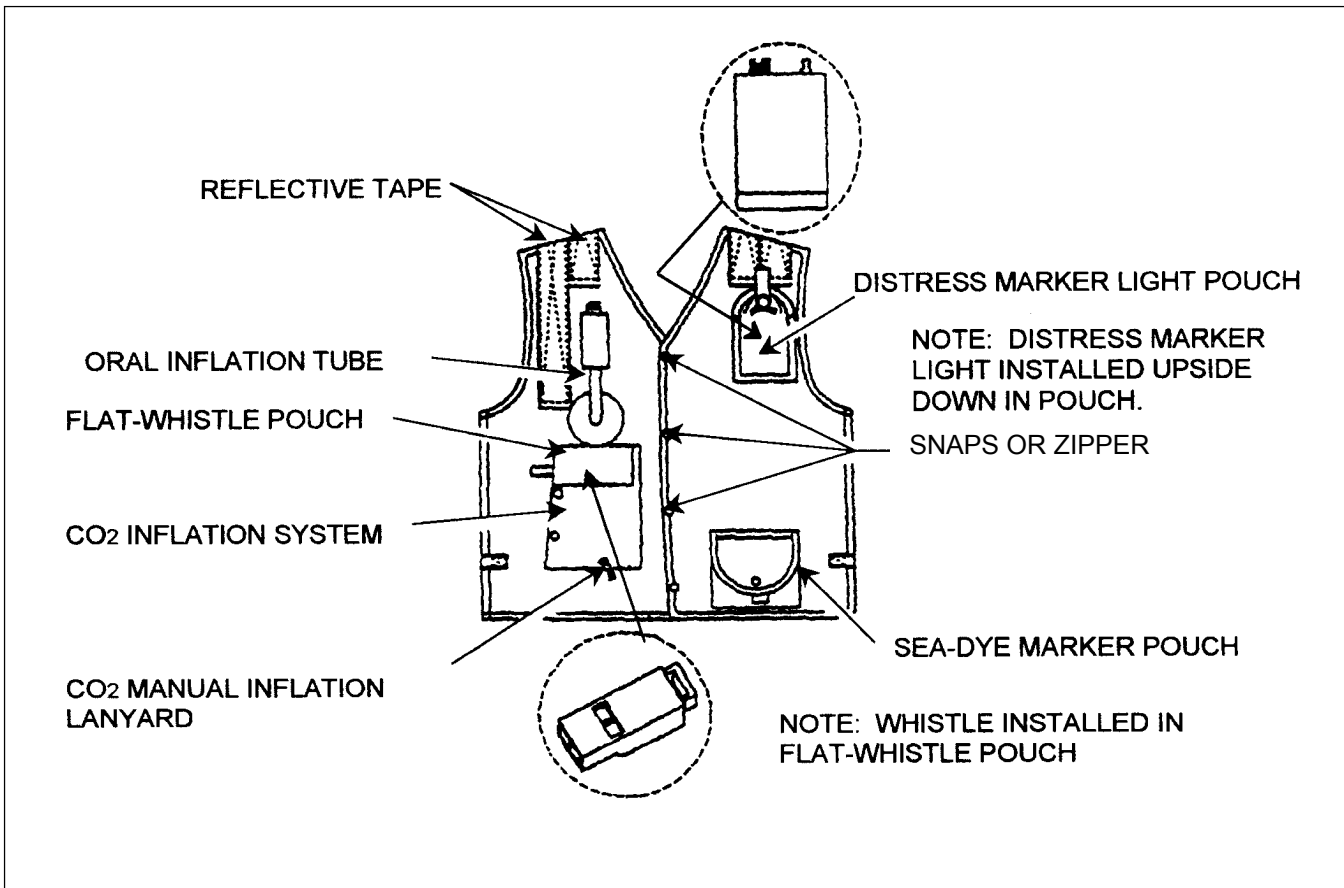
FUNCTION

These tools are used only by the crash crew in the event of a helicopter crash on the ship.

TOOL LIST AND NATIONAL STOCK NUMBER

Item	NSN	Quantity
Axe, Fire	4210-00-142-4949	1
Blade, Hacksaw	5110-00-277-4589	1
Blade, Rescue Knife	5110-00-098-4326	1
Cutter, Cable	5110-00-224-7053	1
Flashlight	6230-00-270-5418	1
Frame, Hacksaw	5110-00-289-9657	1
Knife, "V" Blade Rescue	5110-00-524-6924	1
Pliers, Linemans	5120-00-239-8251	1
Pliers, Rile Joint (Water Pump)	5120-00-059-6711	1
Roll, Canvas Tool	—	1
Saw, Metal Cutting	5110-00-221-0235	1
Screwdriver, Common 4-inch	5120-00-222-8852	1
Screwdriver, Common 8-inch	5120-00-237-6985	1
Screwdriver, Phillips 4-inch	5120-00-234-8913	1
Screwdriver, Phillips 8-inch	5120-00-224-7375	1
Tool, Halligan	5120-00-009-5044	1
Wrench, Open End, Adjustable 12-inch	5120-00-264-3796	1

VEST, LIFE, MK 1

**DESCRIPTION**

The MK 1 Life Vest outfit is worn by flight deck personnel for identification and survival purposes. The combination colored vest with reflective shoulder strip life preserver is inflated by the CO₂ cartridge or by the mouth tube. Included is the inflator assembly, the bladder, a strobe light and whistle. To obtain a complete outfit, order each item separately for desired size and color of protective cover.

FUNCTION

The MK 1 Life Vest should always be worn while working on or near the VERTREP platform or flight deck. It provides identification of the wearer during normal work and flotation in the event of being blown, or must jump, over the side.

REFERENCE

Shipboard Helicopter Procedures for Air Capable Ships NWP 3-04.1M

Life Preserver, Vest Type, U. S. Navy, Mark 1 (MIL-L-24247C)

Afloat Shopping Guide, Class 3940

VEST, LIFE, MK 1

NATIONAL STOCK NUMBER

ITEM	PERSONNEL	SIZE	NSN
Blue Vest	Aircraft handlers	S	4220-00-926-9460
		M	4220-00-926-9474
		L	4220-00-926-9467
Red Vest	Ordnance personnel	S	4220-00-926-9461
		M	4220-00-926-9468
		L	4220-00-926-9475
Brown Vest	Plane captains and mechanics	S	4220-00-926 9463
		M	4220-00-926-9470
		L	4220-00-926-9477
White Vest	Phone talkers and medical personnel	S	4220-00-926-9465
		M	4220-00-926-9472
		L	4220-00-926-9479
Purple Vest	Fuel handlers	S	4220-00-926-9464
		M	4220-00-926-9471
		L	4220-00-926-9478
Green Vest	Catapult and arresting gear personnel	S	4220-00-926-9462
		M	4220-00-926 9469
		L	4220-00-926-9476
Yellow Vest	Flight deck officers and plane directors	S	4220-00-926-9459
		M	4220-00-926-9479
		L	4220-00-926-9473
Inflator Assembly			4220-01-302-2560
CO ₂ Cartridge			4220-00-543-6693
Bladder			4220-00-935-5528
Flat Whistle			8465-01-278-6982
Light, Marker, Distress			6230-01-378-4077
Sea Dye Marker			6850-00-270-9986

(Insert Classification of TMDER Here) CLASSIFICATION:

NAVSEA/SPAWAR TECHNICAL MANUAL DEFICIENCY/EVALUATION REPORT (TMDER)

INSTRUCTION: Continue on 8 1/2" x 11" paper if additional space is needed.

1. USE THIS REPORT TO INDICATE DEFICIENCIES, PROBLEMS, AND RECOMMENDATIONS RELATING TO PUBLICATION.
2. FOR CLASSIFIED TMDERS. SEE OPNAVINST 5510H FOR MAILING CLASSIFIED TMDERS.
3. Submit TMDERS at web site <http://nsdsa.phdnswc.navy.mil> or e-mail tmdr@phdnswc.navy.mil or regular mail

1. PUB NO.	2. VOL/PART	3. REV. NO./DATE OR TM CH. NO./DATE	4. SYSTEM/EQUIPMENT IDENTIFICATION
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5. TITLE	6. REPORT CONTROL NUMBER (UIC-YEAR-XXXX)
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7. RECOMMENDED CHANGES TO PUBLICATION

PAGE NO. A.	PARA-GRAPH B.	C. RECOMMENDED CHANGES AND REASONS

8. ORIGINATOR'S NAME AND WORK CENTER (Please Print)	9. DATE	10. DSN/COMM NO.	11. TRANSMITTED TO; (NSDSA WILL FILL IN)
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12. SHIP HULL NO. AND/OR STATION ADDRESS (Do Not Abbreviate)	13. ORIGINATORS EMAIL ADDRESS
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