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# Astern Fueling At Sea (AFAS) Procedures Manual







5. ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS.

- a. Environmental considerations were examined in the development of this Manual. Under Sections B and C of Enclosure 7 to COMDTINST M5215.6E. The Coast Guard Directives System, environmental considerations are applicable to this Manual. New or revised policy, such as this Manual, triggers the requirements of the National Environmental Policy Act (NEPA) per NEPA Regulations at 40 CFR Part 1508.18.
- b. Because this Manual assigns environmental responsibilities to ensure environmental compliance and is otherwise administrative in content, this Manual is categorically excluded under Coast Guard categorical exclusion #1 as found in Figure 2-1 of USCG NEPA policy, COMDTINST M16475.1D, from the requirement to prepare an Environmental Assessment or Environmental Impact Statement under NEPA.

6. FORMS/REPORTS. None.

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Acting, Assistant Commandant for Capability



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- (1) Astern Fueling at Sea Cutter Agreement Checklist
- (2) Astern Fueling at Sea Operations Checklist
- (3) Delivery Cutter Astern Fueling at Sea Equipment Checklist
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- (5) Astern Fueling at Sea Paddle / Signal Wand Communications
- (6) Astern Fueling at Sea Fuel Hose End Fittings
- (7) Miscellaneous Equipment

## Acronyms List

Acronym / Term	Definition
1LT	First Lieutenant (Deck Department Head)
ABS	American Bureau of Shipping
AEL	Allowance Equipage List
AFAS	Astern Fueling At Sea
ANSI	American National Standards Institute
CO	Commanding Officer
DBN	Double Braided Nylon
DC	Delivery Cutter
EOW	Engineering Officer of the Watch
FOWK	Fuel, Oil and Water King
GAR	Green, Amber, Red (Risk Assessment Tool)
IAW	In Accordance With
LT	Line Tender
MDE	Main Diesel Engine
MIL Spec	Military Specification
MOB	Man Overboard
NVR	Naval Vessel Rules
NWP	Naval Warfare Publication
OIC	Officer in Charge
OOD	Officer of the Deck
OPTEMPO	Operational Tempo
OPAREA	Operational Area
ORM	Operational Risk Management
PFD	Personal Flotation Device
POIC	Petty Officer in Charge
PPE	Personal Protective Equipment
PQS	Personal Qualification Standard
RC	Receiving Cutter
SO	Safety Observer
SPE	Severity, Probability, Exposure (Risk Assessment Tool)
STBD	Starboard
TCT	Team Coordination Training
TLI	Tank Level Indicator
TP	Technical Publications
USNS	United States Naval Ship
WLB	Coast Guard Buoy Tender (225')
WLL	Working Load Limit
WO	Winch Operator
WPB	Coast Guard Patrol Boat (110' or 87' cutter)
WPC	Coast Guard Patrol Craft (179' cutter)
WQSB	Watch, Quarter and Station Bill

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# Chapter 1

## General Guidelines for Astern Fueling at Sea Operations

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### Introduction

This Manual provides requirements and standardizes procedures for Coast Guard Astern Fueling at Sea (AFAS). This Manual represents an overview of AFAS between United States Coast Guard cutters. When conducting astern fueling operations with USNS or Industry-Owned U.S. Flag Tankers, reference (a) shall take precedence over this Manual. During Coast Guard fueling operations, the delivery cutter is the Tactical Commander from commencement of approach until completion of the AFAS evolution. These guidelines may be modified to conduct training evolutions such as towing. The safety rules covered in this Manual and other applicable publications, standard evolution procedures, hand signals, communications, engineering and sound seamanship practices shall be followed whenever conducting fueling operations at sea.

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### In this chapter

This chapter contains the following sections:

Section	Title	See Page
A	Planning, Communications, and Briefings	1-3
B	Operational Risk Management	1-5
C	Personnel Protective Equipment	1-7
D	Fuel Oil Spill Prevention	1-9
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F	Safety Requirements for all Cutters	1-11

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## Section A. Planning, Communications, and Briefings

- Introduction** Proper communications prior to and during the AFAS are critical to the safe and expeditious completion of AFAS. The timelines below should be followed to allow ample preparation time for both cutters conducting fueling operations. The required AFAS Cutter Agreement is found as Enclosure (1).
- A.1 Planning and Preparation** Prior to deployment cutters shall verify which operational units will be in their operations area and determine fueling at sea capabilities. All necessary actions shall be taken to improve the likelihood of successful fueling at sea.
- A.2 24 Hours till Evolution** Approximately 24 hours before, or soon as possible, prior to fueling operations an information exchange shall be conducted between delivery and receiving cutters. The receiving cutter shall initiate communications. Initial communications shall include the proposed location, time, forecasted weather, and type and amount of fuel requested. Cutters involved shall use the AFAS Cutter Agreement, Enclosure (1), to eliminate confusion.
- A.3 One Hour till Evolution** Approximately one hour prior to arriving before fueling the receiving cutter shall contact the delivery cutter to finalize the:
- a. Approach
  - b. Communications
  - c. On scene weather conditions
  - d. Current fuel requested
  - e. Length/size of tow
  - f. Length of fuel hose per this instruction
  - g. Emergency breakaway procedures
- A.4 Taking Station** Prior to the approach the receiving cutter shall request permission to take station off the delivery cutter in preparation for being towed. Both cutters shall be operating under their Restricted Maneuvering Bill.
- A.5 Nav Lights** Navigation lights and day-shapes shall be displayed per reference (b).
- A.6 Cutter to Cutter Communications** Cutter to cutter communications shall be bridge to bridge, station to station or safety observer to safety observer (if adequately manned). Bridge to bridge communications are the minimum requirement, shall be secure or clear voice communications, and/or flag hoists as the situation warrants as per enclosure (1). Station to station communications may be conducted via paddles, signal wands and/or voice communications per this Manual. Safety observer to safety observer may be via radio communications. Optional cutter to cutter paddle and wand signals are found in enclosure (5). In cases

warranting emergency breakaway or man overboard at least six short blasts shall be sounded by either cutter.

**A.7 Delivery Cutter Comms** Delivery cutter internal communications will be at a minimum: bridge to stern, stern to pump room and pump room to bridge.

**A.8 Receiving Cutter Comms** Receiving cutter internal communications will be at a minimum bridge to forecastle, forecastle to fueling station and fueling station to sounding takers.

**A.9 Evolution Briefings** Internal cutter briefings are integral to the successful outcome of fueling operations. Briefings shall be conducted immediately prior to and immediately after every AFAS evolution. Key members of the AFAS and Towing/Be Towed Details shall attend. Lessons learned and best practices shall be forwarded up the chain of command for future manual revisions. Briefings shall discuss risk assessment, a clear sequence of events and mission specific safety procedures. Briefs should also create a climate for learning and encourage feedback by constructive critique. Commanding officers/officers in charge shall determine personnel attendance. Enclosure (2) is the required AFAS Internal Brief format for delivery and receiving cutters

**A.10 Participation** Safety briefings must empower subordinates to monitor circumstances and report situations that differ from planned evolutions, hazardous conditions, or are unclear. By discussing risk, personnel will be better aware of potential hazards and how to control them. It is extremely important for a system of notification to be in place and known by every team member.

**Note** 

**Briefs may be combined at the Commanding Officer's discretion depending upon the complexity of the mission or numbers of personnel involved.**

## Section B. Operational Risk Management

**Introduction** The use of Operational Risk Management (ORM) models and Team Coordination principles found in reference (c) are crucial to reducing the possibility of human error. While technical skills are imperative to all evolutions these alone will not ensure safety. Risk mitigation and coordinated teamwork are absolutely critical to operational success and safety

**B.2 Risk Management / Mitigation** Both cutters shall complete ORM models found in reference (c) and share ORM findings during the 'one hour plus' briefing. If either Commanding Officer/Officer in Charge has reservations about the results of the ORM model, fueling operations may be delayed and/or further risk mitigation may be necessary. Risk mitigation shall be a part of evolution planning and shall be included during the required briefings. All members attending a briefing shall have input on risk assessment models. Risks shall be re-assessed as situations change.

**B.3 Environmental Condition Risk Management Assessment** Commanding Officers and Officers in Charge shall also consider the specific operating characteristics of their cutter in relation to the prevailing weather/sea conditions when making risk assessment decisions. The environmental conditions and factors listed below shall be considered in determining go or no go for the AFAS operation:

- a. Winds: AFAS should not be completed in winds greater than 30 kts.
- b. Seas: AFAS operations should not be completed in wind driven seas greater than four to six feet.
- c. Darkness: AFAS operations should not normally be conducted during hours of darkness.
- d. Pitch/roll
- e. Visibility
- f. Sea spray
- g. Precipitation
- h. Icing

**B.4 Error Trapping**

Safety briefings must empower subordinates to monitor circumstances and report situations that differ from planned evolutions, hazardous conditions, or are unclear. By discussing risk, personnel will be better aware of potential hazards and how to control them. It is extremely important for a system of notification to be in place and known by every team member.

**B.5 TCT Requirements**

Reference (c) describes applicable Team Coordination Training (TCT) requirements.

**B.6 Proper Watch Atmosphere**

All hands must ensure, with the Safety Observer and Petty Officer in Charge's oversight, that the team observes proper TCT practices and should ensure the absence of frivolity and/or loud, boisterous behavior from the team. There should be no excitement or confusion when operations are being carried out. If confusion does exist by any member of the team, that member must be empowered to question what needs to be done.

## Section C. Personal Protective Equipment

**Introduction** Cutter deck evolutions are inherently risky. The use of Personnel Protective Equipment (PPE) by all personnel on deck is the first line of defense against injury.

**C.1 Personal Flotation Devices** Only U.S. Coast Guard approved personal flotation devices shall be worn during all fueling at sea operations. Inflatable personal flotation devices shall **NOT** be worn by personnel conducting AFAS evolutions. Proper configuration, maintenance, and wear procedures may be found in reference (d).

**C.2 Hardhats** A hardhat provides impact protection to a wearer's head. Some models protect the back of the neck from falling debris as well. Hardhats shall be worn at all times when conducting lifting or overhead operations. Hardhats shall meet American National Standards Institute (ANSI) standard Z89.1-2003 or newer.

In addition, hardhats shall:

- a. Be outfitted with a chin strap that is worn at all times.
- b. Be kept clean and free of unauthorized paint and stickers to allow for inspection for cracks and other deformities. Only wearer's name or rank on the back of the shell is authorized.
- c. Hardhats shall be color coded to quickly identify the wearer's assignment on deck:
  - (1) White: Safety Supervisor (SO)
  - (2) Yellow: Petty Officer in Charge (POIC)
  - (3) Purple: Fuelers, Fuel Oil and Water King (FOWK)
  - (4) Red: Line Throwing Gun/Bolo Heavers
  - (5) Blue: Line Handler / Deck Rigger
  - (6) Green: Signalman

**C.3 Safety Footwear** The wearing of safety footwear (steel/safety toed) is mandatory when conducting fueling operations. Footwear should be comfortable and well fitting with non-skid soles. It is recommended that boots be worn for better ankle support. Like gloves, different styles of boots may be necessary to meet operational and climate requirements.

**C.4 Gloves** The wearing of gloves during deck evolutions is highly discouraged. When environmental conditions make it prudent, personnel may wear leather palm work gloves or gloves made of synthetic materials. Gloves shall fit snugly to help reduce the possibility of becoming fouled and have no loose appendages.

**C.5 Knife** A straight blade is preferred for single handed use.

**C.6 Additional Gear** In addition to the PPE already mentioned, the following gear should be considered for issue:

- a. Coveralls (Regular and/or insulated)
- b. Hard hat liner and/or balaclava
- c. Foul weather work coat
- d. Knife
- e. Rain gear
- f. Thermal socks

**NOTE** 

**For more information on the operational policy, configuration, maintenance, procurement, and equipment standards for PPE, see reference (d).**

**C.7 Lighting for Night Operations** In the event AFAS operations are conducted at night, all personnel on deck shall have an activated green chemical light on their PFD. When water temperatures are below 50 degrees, strobe lights shall be on each PFD in lieu of chemical lights.

## Section D. Fuel Spill Prevention

### Introduction

It is imperative that all precautions be taken to prevent pollution of the sea. At a minimum, the following safeguards shall be taken into account during fueling operations.

1. Ensure that standard dockside transfer procedures are in effect. This includes scupper plugs being in place, drip pans, oil absorbent rags, proper tools at fueling stations, and so forth.
2. Do not exceed the receiving cutter's fuel transfer rate.
3. Do not overfill fuel tanks. Allow room for the fuel in the hose for draining
4. Fuel hose lengths shall be adhered to as per this instruction.
5. Fuel hose end fittings shall be double bagged and taped.
6. The receiving cutter shall steer behind the delivery cutter on the course agreed or as modified during AFAS operations to limit the yaw of the receiving cutter affecting fuel hose tension.
7. Commanding Officers should take any additional precautionary measures they deem necessary. Further information is found in reference (e), Pollution Response / Spilled Oil Recovery Bill.

## **Section E. Administration**

- Introduction** A DD-1149 shall be completed prior to the evolution with all necessary accounting data except the fuel quantity. This will be wrapped in a watertight bag and sent over with the fueling rig.
- E.1 DD 1149** Upon completion of fueling, delivery cutter shall pass the amount of fuel transferred. The receiving cutter shall enter the amount of fuel received on the DD-1149, sign it, remove their copy and send the delivery cutter a copy back in the bag attached to the fuel rig.
- E.2 Cutter Log Requirements** Cutters shall log all key steps/points in the Deck Log. In addition to noteworthy points in the evolution, cutters shall log any spills or other abnormal events.

## Section F. Safety Requirements for All Cutters

**Introduction** Personnel assigned to transfer stations shall be thoroughly instructed in safety precautions. Safety precautions shall be reviewed during the pre-brief of the AFAS evolution.

1. All personnel on deck shall be provided with Personal Protective Equipment in accordance with this instruction.
2. Both cutters shall operate under their restricted maneuvering bill.
3. Both cutters shall test backing bells at all stations prior to commencement of AFAS.
4. Both cutters shall test steering prior to commencement of AFAS.
5. The delivery cutter shall have the cutter boat at the rail with the boat launch and recovery detail, boat crew and cutter surface swimmer in immediate standby.
6. Appropriate PPE shall be worn in accordance with Section 1.C of this instruction.
7. Personnel assigned to transfer stations should remove rings, jewelry, watches, key chains, and other items that maybe be caught in the rig. Loose fitting clothing shall not be worn during fueling operations.
8. Only essential personnel shall be allowed at each transfer station during replenishment.
9. Only essential personnel shall be allowed on the working deck during AFAS evolutions.
10. Any safety hazards observed will be immediately brought to the attention of the Petty Officer In-Charge or Safety Observer. If necessary, the evolution will be halted until the safety violation is corrected.
11. Risk Assessment (GAR or SPE) models shall be completed.
12. Safety briefings and debriefings shall be completed in accordance with this instruction.
13. Towing precautions shall be adhered to at all times. At no time shall personnel be closer than six feet to any rig with tension unless actually operating the piece of gear.
14. Lifelines should only be lowered as a last resort. If lowered, temporary lifelines shall be rigged.

15. For night operations attach chemical lights to critical components as appropriate.
16. The smoking lamp is extinguished during fueling operations.
17. Fuel hoses shall be constructed and in accordance with reference (f).
18. Personnel must remain alert and never turn their backs on a pressurized hose or fittings.
19. If used, standard flag hoists, paddles and wand signals shall be in accordance with reference (g) and / or Enclosure (5).
20. AFAS operations should be conducted on the best available course and speed to minimize pitch and roll. Cutters should seek a lee from the wind and seas to optimize safety of personnel on deck.
21. Personnel at fueling stations shall have the appropriate fuel spill PPE at the pumping station in the event of a spill in accordance with reference (e) Pollution Response / Spilled Oil Recovery Bill.
22. Deck spaces in the vicinity of transfer stations must be covered with non-skid / anti-slip material.
23. Personnel shall stay out of the bights of lines and hoses.
24. Personnel shall stay inboard of all fuel hoses and towing hawsers.
25. Both the delivery and receiving cutters should have a life buoy watch. Manpower requirements on deck may preclude stationing a lifebuoy watch.
26. Necessary protective and firefighting equipment shall be readily accessible and ready for instant use. Personnel must be thoroughly trained in the use of firefighting equipment.
27. Cigarette lighters and matches are not permitted on deck.
28. No unnecessary talking.
29. All involved hands must be thoroughly indoctrinated in the requirements for emergency breakaway.

## Chapter 2

# Equipment and Manning Guidelines

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**Introduction** This chapter describes general equipment, manning and personnel responsibilities for AFAS evolutions.

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**In this chapter** This chapter contains the following sections:

<b>Section</b>	<b>Title</b>	<b>See Page</b>
A	Equipment Guidelines for AFAS	2-3
B	Cutter Manning Guidelines	2-5
C	Personnel Responsibilities (Both Cutters)	2-6

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## Section A. Equipment Guidelines for AFAS

**Introduction** The towing equipment used on deck will be comparable to the Towing Bill found in the Cutter Organization and Regulations Manual. The equipment used in AFAS shall be as per the Delivery Cutters drawings and Ships Information Book.

**A.1 Tow Hawser Size** The short scope of towing hawsers utilized during AFAS evolutions, light ship tonnage versus a full load tonnage ship, and elasticity of hawser versus fixed length of the fuel hose causes tow hawser selection to be critical. At a minimum, five inch DBN tow hawsers shall be utilized for AFAS evolutions for cutters 110 feet and smaller. For cutters greater than 110' at least six inch DBN hawsers shall be used. The receiving cutter may require a wire pendant because of its deck configuration.

**NOTE** 

In cases where the delivery cutter uses an Aramid type towing hawser the available fuel hose shall be at least 120% of the tow hawser plus the distances necessary on deck for both the delivery and receiving cutter.

**A.2 Scope of Tow** The scope of tow (from the stern of the delivery vessel to the bow of the receiving cutter) should be approximately 100-200 feet for all AFAS evolutions. Adjusting the scope of the tow to ensure the cutters are in step is important to minimize shock loads in both the hawser and the fuel hose. During night operations the tow hawser may be marked with white chemical marker lights.

**CAUTION!**

Double Braid Nylon Line (DBN) can stretch as much as 50 percent. A 100 foot tow hawser could stretch to 150 feet. A 200 foot tow hawser could stretch to 300 feet placing undue strain on the fuel hose. Several fuel hoses have been damaged due to this strain causing fuel spills

**A.3 Chafing Gear** Both cutters shall provide and monitor chafing gear for all sharp edges on which the hawser or fuel hose may ride during fueling.

**A.4 Fuel Hose Type** Hose meeting ABS NVR CG Appendix 5.6.1.3 shall be used for AFAS operations. Fuel hose selection shall be in accordance with ship's plans and reference (f). All flexible hoses shall meet USCG Flexible Hose Standards. A partial list of acceptable hose is found in enclosure (7).

**NOTE** 

It is preferable to have a minimum of 400 feet of buoyant hose. Marathon Transfer hose, found in Enclosure (7), is buoyant when full of fuel and is available in lengths of up to 400 feet eliminating the need for waterborne couplings.

**A.5 Fuel Hose Length** At least 400 feet of fueling hose shall be available on board the delivery cutter. Available fuel hose length for AFAS shall be the sum of 150% of the scope of tow and the hose necessary on deck for both the delivery and receiving cutters. Minimal hose shall be waterborne. Excess hose shall be tended by the delivery cutter's crew. The fuel hose may be stopped off on either cutter with a belaying line. For night operations the fuel hose shall be marked every 50 feet with chemical marker lights or illuminated by the receiving cutter's spotlight so as not to jeopardize the night-vision of the delivery cutter's crew.

**A.6 End Fittings** See Enclosure 6 for a complete listing of approved fittings. The basic fitting requirements are:

- a. Delivery cutters shall provide a 2.5" female cam lock coupler with dust plug as the end fitting.
- b. Receiving cutters shall provide a 2.5" male groove lock coupler with dust cap as the end fitting which is adaptable / reducible to their fill pipe.
- c. All fuel hose end fittings shall be in accordance with MIL-C-27487 and shall be 316 Stainless Steel.

**A.7 Fuel Hose Messenger** The fuel hose messenger shall consist of a 6"x25" (minimum size) commercial grade twin eye fender with 300 feet of 5/8" diameter polypropylene line spliced to one end. A white chemical light shall be attached to the other end for night operations. A watertight bag may be taped to the fender for transfer of any necessary paperwork. The hose messenger shall be retrieved by the receiving cutter either by a boat hook or grapnel as necessary forward of amidships. The fuel hose messenger shall be bent to the fuel hose with a rolling hitch followed by half hitches and then duct taped at the end.

**A.8 Water Borne Fittings** Water borne fuel couplings or fittings shall be taped securely to ensure against the inadvertent release of the coupling.

**A.9 Misc. Deck Gear** Deck equipment requirements for both the delivery cutter and receiving cutter are described below.

## **Section B. Cutter Manning Guidelines**

### **B.1. Receiving Cutter**

Receiving cutter manpower requirements may be modified by the Commanding Officer or Officer in Charge on an as needed basis. However, under no circumstance shall the Safety Observer or Petty Officer in Charge act in any other capacity during one evolution. Each cutter shall promulgate an Astern Fueling at Sea bill to be included in the Individual Cutter Organization Manual. Billets shall be assigned in the Ship's Watch, Quarter and Station Bill (WQSB).

The following personnel are the minimum required AFAS personnel:

- a. Safety Observer
- b. Petty Officer in Charge
- c. Fuel Oil and Water King
- d. Line and Hose Handlers (Quantity determined by CO/OIC)

### **B.2 Delivery Cutter**

The delivery cutter manpower requirements may be modified by the Commanding Officer or Officer in Charge on an as needed basis. However, under no circumstance shall the safety observer or petty Officer in Charge act in any other capacity during one evolution. Each cutter shall promulgate an Astern Fueling at Sea bill to be included in the Cutter Organization Manual. Billets shall be assigned in the Ship's WQSB.

The following personnel are the minimum required AFAS personnel:

- a. Safety Observer
- b. Petty Officer in Charge
- c. Technical Supervisor
- d. Fuel Oil and Water King
- e. Line and Hose Handlers (Quantity determined by CO/OIC)
- f. Towing detail as per Cutter Organization Manual
- g. Cutter Swimmer, Boat Crew, and launch and recovery personnel.

## **Section C. Personnel Responsibilities (Both Cutters)**

**Introduction** This section describes general responsibilities for various positions on both the delivery and receiving cutters.

**C.1 Commanding Officer** The Commanding Officer or Officer in Charge of either cutter shall:

- a. Ensure that an operational risk management model and safety brief/debrief are completed.
- b. Choose suitable tow connection procedures for current weather conditions.
- c. Choose a suitable course and speed for approach of tow and fueling.
- d. Operate under the Restricted Maneuvering Doctrine.
- e. Ensure full compliance with this Instruction.

**C.2 Operations Officer** The Operations Officer or Operations Petty Officer of either cutter shall:

- a. Ensure communications are established with the receiving/delivery cutter.
- b. Ensure that both cutters agree on the procedures for rigging the tow, streaming the fuel hose, fueling, breaking the tow communications and emergency breakaways.
- c. Ensure all stations report manned and ready prior to passing the tow.
- d. Ensure the smoking lamp is secured for the duration of the evolution.

**C.3 Engineer Officer** The Engineer Officer or Engineering Petty Officer of either cutter shall:

- a. Ensure the fueling rig is properly prepared for transfer.
- b. Ensure fueling station, pump room and sounding takers communications check complete.
- c. Provide the bridge with the rate of fuel transferred during the fueling and an approximate quantity at the end.
- d. Ensure compliance with Fuel Oil Spill Prevention, Section 1-D.
- e. Ensure all AFAS fueling gear is maintained in accordance with reference (f).
- f. Ensure all engineering personnel receive brief/debrief.
- g. Ensure proper blow down procedures are completed in accordance with ship's instructions.

**C.4 First Lieutenant** The First Lieutenant of either cutter shall ensure:

- a. The deck is properly prepared, manned and rigged for AFAS.
- b. Safety briefs/debriefs are completed.

- c. Deck communications checks are complete with other cutter.
- d. The cutter boat is ready for launch with the cutter surface swimmer.  
(delivery cutter)
- e. All deck personnel receive a brief on the evolution.
- f. The Life buoy watch is manned. (optional for receiving cutter)
- g. Provide required PPE

**C.5 Supply  
Officer**

The supply officer on the delivery cutter shall ensure that proper documentation of the fuel transfer (i.e. DD-1149) is completed and transferred to the receiving cutter.

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# Chapter 3

## Cutter Rigging Procedures

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**Introduction**

This chapter describes general rigging procedures for both delivery and receiving cutters.

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**In this chapter**

This chapter contains the following sections:

Section	Title	See Page
A	Rigging the Delivery Cutter	3 – 3
B	Rigging the Receiving Cutter	3 – 5

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## Section A. Rigging the Delivery Cutter

- Introduction** The steps outlined in this section pertain to setting up the delivery cutter for Astern Fueling at Sea (AFAS).
- A.1 General Steps** The below general steps shall be completed as soon as practical:
- a. Ensure personnel are manned in accordance with Chapter 2-B of this Manual.
  - b. Ensure all personnel are dressed in accordance with Chapter 1-C of this Manual.
  - c. Launch cutter boat or place at the rail with boat crew standing by.
  - d. Brief the AFAS deck detail.
  - e. Ensure emergency repair and working tools are at delivery station.
  - f. Make manned and ready reports.
- A.2 Towing Hawser** The following steps pertain to the towing hawser and related towing requirements:
- a. Ensure the tow hawser length and size is appropriate in accordance with Chapter 2-A.
  - b. Ensure the towing rig is inspected prior to use.
    - (1) Fake out the appropriate tow hawser and ensure no evidence of breaks, chafing or deformation is present.
    - (2) Prepare a heaving line and a short (approx 100') lead line messenger
    - (3) Ensure bridle or pendant is free of breaks, chafing or deformation.
    - (4) Ensure applicable jewelry is in working order and is not corroded.
    - (5) Ensure all shackles are moused properly.
  - c. Ensure sufficient cooling water is available to cool the tow hawser.
  - d. Ensure a fire axe is broken out and is on station.
- A.3 Fuel Hose and Messenger** The below steps shall be followed while rigging the fuel hose:
- a. Check the fuel hose for cracks, breaks, and the hose couplings to ensure they are not damaged.
  - b. Ensure water borne fuel hose couplings are taped to ensure they do not work free.

- c. Ensure the end fitting is double bagged and taped in accordance with Section 1.D.
- d. Inspect the Fuel Hose Messenger, float and attachment points and ensure they are in good working order.
- e. Tie small stuff approximately every five feet around fuel hose. Run a two-inch three-strand tending line inside the small stuff along the length of the hose. Attach the tending line to the messenger and float. This way a catenary in the fuel hose can be maintained and the fuel hose is not strained.
- f. During night operations ensure an activated chemical light is attached to the messenger.
- g. Fake down the fuel hose messenger on deck.
- h. Pass the outboard end of the fuel hose through the roller chocks and bring it back on deck. (if equipped).
- i. Place hose in the rig position fitted on the outboard with the appropriate fitting for the cutter to be fueled.
- j. Stop off messenger float assembly to the fuel hose.
- k. Test capstan if equipped.

**A.4 Engineering** The following steps are to be completed by the engineering department as directed by the CO/OIC and EO/EPO:

- a. Operate under the Restricted Maneuvering Bill.
- b. Ensure fuel hose is maintained and inspected IAW references (f and h).
- c. Ensure only properly tested hoses are used in the rig.
- d. Ensure tools/parts are on station as per ships AEL and cutter checklist.
- e. Test all pumps and circulate to ensure pumps are not air bound.
- f. Lay-out and test necessary firefighting equipment.

**A.5 Communications** The following three steps are critical to successful AFAS evolutions:

- a. Ensure communications gear is on station.
- b. Obtain communications checks.
- c. Ensure signalman is familiar with the correct signals.

**A.6 Man  
Overboard**

In the event of a Man Overboard, the delivery cutter shall:

- a. Ready boat and crew.
- b. Post a life buoy watch.
- c. Dress out / prepare cutter surface swimmer.

## **Section B. Rigging the Receiving Cutter**

**Introduction** The steps outlined in this section pertain to setting up the receiving cutter for AFAS.

**B.1 General Steps** The below general steps shall be completed as soon as practical:

- a. Ensure personnel are manned in accordance with Chapter 2-B.
- b. Ensure all personnel are outfitted in accordance with Chapter 1-C.
- c. Brief the AFAS deck detail.
- d. Manned and ready reports made.
- e. Ensure emergency repair and working tools are at receiving station.

**B.2 Deck Gear** The following gear shall be broken out and on deck prior to beginning the evolution:

- a. Grapnel
- b. Boat hook
- c. Belaying line
- d. Test capstan (if equipped)
- e. Fire axe
- f. Drip pans and/or scupper bags
- g. Oil absorbent rags or dams
- h. Chafing gear
- i. Signal wands / paddles (if used)

**B.3 Communications** The following three steps are critical to successful AFAS evolutions:

- a. Ensure communications gear is on station.
- b. Obtain communications checks as required.
- c. Ensure signalman is familiar with the correct signals if utilized.

**B.4 Engineering** The following steps are to be completed by the engineering department as directed by the CO/OIC and EO/EPO:

- a. Operate under the Restricted Maneuvering Doctrine.
- b. Ensure tools/parts are on station as per ships AEL and cutter checklist.

- c. Lay out and test necessary firefighting equipment.
- d. Clear and bright equipment.

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# Chapter 4

## Fueling at Sea Operations

### Introduction

This chapter describes procedures for AFAS operations. The method below shall be used unless otherwise agreed upon by both the delivery and receiving cutters. If an alternative method is used the delivery cutter shall forward those procedures via message traffic or memorandum to Headquarters (CG-751) and FORCECOM (FC-5)/(FC-7) for possible updates to this Manual.

### In this chapter

This chapter contains the following sections:

Section	Title	See Page
A	Towing Approach	4-3
B	Streaming the Fuel Rig	4-7
C	Transferring Fuel	4-9
D	Blow Down Procedures	4-12
E	Recovering the Fuel Rig	4-13
F	Dropping the Tow	4-14
G	Emergency Breakaway	4-15

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## Section A. Towing Approach

**Introduction** There are several methods of passing the towline from the delivery cutter to the receiving cutter. The preference is to have minimal gear in the water at all times and complete the towing hook up prior to passing the fuel rig. Commanding Officers shall take environmental conditions into account when determining course and speed for the AFAS evolution. Both Commanding Officers shall be in agreement regarding approach, course, and speed prior to commencing the evolution. The following course and speed information are recommended values but are left to CO/OIC discretion.

**A.1 Recommended Course and Speed** The delivery cutter maintains a course and speed of approximately 5 knots with the relative winds and seas approximately 30 degrees off of the bow. The receiving cutter approaches from the leeward side of the delivery cutter and maintains station of approximately 30 to 50 feet off of the delivery cutter's quarter. The delivery cutter then passes the tow hawser to the receiving cutter. Once the tow is hooked up the receiving cutter falls back on the tow hawser. Once the receiving cutter is under tow the delivery cutter should head directly into the seas to aid in streaming the fuel hose, provide a lee for the fuel hose and to minimize the affect beam seas will have on the fuel hose and the cutters' crews. The distance between the taffrail of the delivery cutter to the receiving cutter's bow should be 100 – 200 feet.

**A.2 Close Quarters Maneuvering** Good cutter to cutter communications during close quarter situations is critical. Course and/or speed changes by the delivery cutter should not be attempted during the approach of the receiving cutter. However, if necessary, the delivery cutter shall ensure that timely instructions are passed to the receiving cutter for all course and speed changes. If major course and / or speed changes are necessary to avoid collision, hazard to navigation or a major casualty occurs the receiving cutter shall abort and make another approach when the situation has passed.

**NOTE** 

Both cutters will be working lines in the water while underway at a slow bell. The possibility of fouling propellers exists but with the short scope of line being utilized and the maneuverability of the receiving cutter the risk should be minimized.

AFAS Towing Procedures		
Step	Delivery Cutter (DC) Actions	Receiving Cutter (RC) Actions
1.	Set Restricted Maneuvering Doctrine.	Set the Restricted Maneuvering Doctrine.
2.	Energize Lights/Rig Day Shapes in accordance with reference (b).	Energize Lights/Rig Day Shapes in accordance with reference (b).
3.	Take heading with the winds and seas approximately 30 degrees off of the bow.	
4.	Maintain course and speed as agreed in AFAS checklist.	Approach DC in the lee of the DC. Match DC course / speed. Take station as agreed per AFAS checklist. (30-50 ft) (Figure 4-1.) Once on station, communicate via radio communications.
5.	Grant permission for the RC to make approach.	
6.		
7.		
8.		



**Figure 4-1**  
**179' WPC Making the Approach off Delivery Cutter's Quarter**

Step	Delivery Cutter (DC) Actions	Receiving Cutter (RC) Actions
1.	Tow hawser passed IAW unit towing bill.	Maintain station relative to DC that is optimum for safe tending and handling of the tow rig.
2.		Attach hawser ensure it is secured.
3.		Gradually take way off and ease back on hawser and maintain station directly astern of DC. (Figure 4-2.)
4.		Rig chafing gear.
5.		Both MDEs all stop. No turns.



**Figure 4 - 2**  
**110' WPB Securing Hawser off Delivery Cutter's Quarter**

1.	Head into the seas.	Maintain station astern of DC. No turns.
2.	Limit pitch, roll and sea spray affecting RC.	
3.	Avoid navigational hazards or collision.	
4.	Advise RC if course changes are necessary.	
5.	Adjust scope as necessary to ensure cutters are in step.	



**Figure 4 - 3**  
**110' WPB in Tow Prior to Fuel Hose Messenger Streamed**

6.		Maintain station astern of DC. (Figure 4-3.)
7.	Set the tow watch. (Figure 4.)	No turns.
8.		



**Figure 4 - 4**  
**225' WLB (Delivery Cutter) H-Bitt Made Up & Tow Watch**

## Section B. Streaming the Fuel Rig

**Introduction** Streaming the rig requires close bridge/deck coordination. The two ships are operating in close proximity and the hose is being transferred from one ship to the other.

**B.1 Fuel Hose Messenger Rig** The Fuel Hose Messenger Rig shall be constructed in accordance with Chapter 2.A.7.

**B.2 Fueling Course and Speed** The fueling course and speed are critical to this evolution. Too little speed may allow for the hose to sink while excessive speed may cause undue strain on the fuel hose. The recommended speed for AFAS operations is not more than 5 kts. Course changes should be made in minimal increments to minimize the side forces on the fuel hose. The base fueling course should be directly into the seas thus proving a lee for the hose and the receiving cutter. It is imperative that the conning officer have the helmsman on the receiving cutter steer directly behind the delivery cutter or as directed by the delivery cutter. Yawing will increase unnecessary strain on the fuel hose.

**B.3 Environmental Considerations** Course and speed shall be adjusted as necessary for the prevailing weather and sea conditions to minimize pitch and roll and maximize protection from wind and sea spray for the current conditions. Speed selection also shall be at the minimum safe speed to complete the operation. Excessive speed places un-needed strain on the hawser and the fueling rig.

Streaming the Rig		
Step	Delivery Cutter Actions	Receiving Cutter Actions
1.	Take a course directly into the seas.	
2.	Speed should be approximately 5 knots.	
3.	Ease the hose messenger buoy over the quarter clear of the screws	Retrieve the fuel hose messenger buoy.
4.	Pay out the fuel hose messenger rig while tending the line.	Keep tension on the fuel hose messenger rig to keep away from own ship and delivery ship propulsion.
5.	Pay out pay out enough line to allow the RC to retrieve the messenger just aft of the bow.	Retrieve the messenger.



**Figure 4 – 5  
Streaming the Fuel Hose (2.5” Marathon Transfer Buoyant Fuel Hose)**

7.	Pay out the hose. (Figure 4-5.)	Retrieve the fuel hose as far forward as practicable. (Figure 4-6.) Belay the fuel hose to a cleat with belaying line.
8.	Tend the fuel hose to minimize strain and damage.	Hook up the fuel hose to fuel fill pipe. Provide chafing gear.



**Figure 4 – 6  
Receiving Cutter Recovering the Fuel Hose**

## Section C. Transferring Fuel

**Introduction** Upon receiving and hooking up the fueling rig, receiving cutter shall request that fuel be transferred. The delivery cutter shall commence pumping fuel. The receiving cutter shall use soundings, Tank Level Indicators (TLI) or some way to determine the amount of fuel taken on. Fuel flow rate will be regulated in as necessary by the delivery cutter and will be constantly monitored.

**C.1 Fueling Stations** Fueling Stations of receiving cutters are in seen in Figures 4-7 thru 4-10 below. All receiving and delivery cutter connecting fittings shall be in accordance with this Manual.



**Figure 4 – 7**  
**87' WPB Fueling Station**



**Figure 4 – 8**  
**110' WPB Fueling Station**

<b>Fuel Transfer</b>		
<b>Step</b>	<b>Delivery Cutter Actions</b>	<b>Receiving Cutter Actions</b>
1.		Signal/Voice – “Hose connected. Start pumping.”
2.	Signal/Voice – “Pumping started.”	Signal/Voice “Stop Pumping”
3.		Conduct clear and bright test.
4.	Signal/Voice – “Pumping has stopped.”	Signal/Voice “Start Pumping”
5.		Ensure enough tank space remains for blow down of the hose.
6.	Signal/Voice – “Pumping has started.”	Signal/Voice – “Stop Pumping”
7.		
8.	Signal/Voice – “Pumping has stopped.”	

## Section D. Blow Down Procedures

**Introduction** When ready to secure fueling, receiving cutter shall request to secure transfer of fuel. The receiving cutter should request the pump be secured with ample room in the fueled tank to allow for draining of the fuel hose. Upon securing of the pump, the delivery cutter will signal their intentions to clear the fuel hose by draining it by the best means possible. Upon completion of the draining the hose the receiving cutter shall rig the fuel line for transfer back to the delivery cutter.

**D.1 Delivery Cutter Capabilities** If the delivery cutter is capable of safely blowing down the hose and the receiving cutter has ensured the vents for its fuel tanks are free and clear, the delivery cutter may blow down the hose to facilitate draining. Also, if feasible take back suction on the fuel hose prior to retrieving the hose. It is preferable to have the fuel hose pigged in accordance with reference (a).

Blow Down		
Step	Delivery Cutter Actions	Receiving Cutter Actions
1.		Signal/Voice – “Blow down hose.”
2.	Signal – “Blowing down hose.”	
3.	Signal - Blow down complete	



**Figure 4 – 9**  
**600’ Fuel Hose Reel 225’ WLB**

## Section E. Recovering the Fuel Rig

### Introduction

Once the fuel hose has been blown down, the process of returning the fuel hose to the delivery cutter begins. Due to the possibility of fuel being sprayed when the connection is broken, only the minimum number of personnel shall be in the vicinity of the fuel fill pipe during this evolution.

Extreme care shall be taken to minimize the possibility of fuel entering the water. In the event of a fuel spill, the cutter shall recover in accordance with their unit's pollution response bill.

Recovering the Fuel Rig		
Step	Delivery Cutter Actions	Receiving Cutter Actions
1.		Break fuel connection at the fill pipe.
2.		Plug and double bag the end of the fuel hose.
3.		Ensures the Fuel Hose Messenger is properly attached to the fuel hose.
4.		Signal the DC to start taking up slack messenger.
5.	Heave around on slack as the DC pays out the hose.	Slowly lower the fuel hose into the water paying out the polypropylene messenger.
6.		Drop the double eye float into the water.
7.	Recover the float	

## Section F. Dropping Tow

**Introduction** The final step in AFAS is dropping the tow. Like any towing operation, attention to slack in the water shall be a primary concern for both cutters to avoid fouling propellers.

<b>Dropping the Tow</b>		
<b>Step</b>	<b>Delivery Cutter Actions</b>	<b>Receiving Cutter Actions</b>
1.	Take a course approximately 30 degrees of the seas.	
2.	Take slack out of the hawser.	Slowly come ahead on the hawser.
3.	Recover the hawser.	Drop the hawser. (Figure 4-12.)



**Figure 4 – 10**

**110' WPB Coming Ahead After Dropping Tow Hawser**

## **Section G. Emergency Breakaway**

**Introduction**      Either ship may initiate an emergency breakaway.

In the event of an emergency, an expedited standard breakaway shall take place. An emergency signal shall be communicated by sounding 6 or more short blasts of the ship's whistle and over the radio. Once the tow is broken, the receiving cutter shall remain at all-stop and the delivery cutter shall increase speed to increase the distance between cutters unless otherwise agreed.

**Enclosure (1)****Astern Fueling at Sea (AFAS) Cutter Agreement Checklist****PREPARATION: FUELING AT SEA (24 HOURS)**

Delivery Cutter:

Receiving Cutter:

Date:

Time:

Proposed AFAS Location/Position:

Bridge to Bridge Working Frequencies:

Primary:

Secondary:

Visual Communications: (optional)

Weather Forecast:

Winds:

Seas:

Amount of fuel requested:

Type of fuel requested:

Fitting type/size:

Receiving Cutter Tonnage:

Lite:

Full Load:

Notes:

**PREPARATION: ASTERN FUELING AT SEA (1 HOUR)**

Delivery Cutter During the Approach:

Circle 1

Course:

Speed:

Port

Stbd

Notes:

Tow length:

Size:

Bridge to Bridge Communications Check:

Primary:

Secondary:

Safety Observer Communications Check:

Primary:

Secondary:

Station to Station Communications

Radio / Paddles / Signal Wand

Current Fuel Requested

Flow Rate:

Fuel Hose Length:

Fuel Fittings:

Size:

Type:

Discuss Man Overboard procedures:

Discuss Emergency Breakaway Procedures:

This checklist may be discarded after evolution completion

**Receiving Cutter's ORM Score:****Delivery Cutter's ORM Score:**



<b>Enclosure (2)</b>	
<b>Astern Fueling At Sea Operations Checklist</b>	
Delivery Cutter:	Date:
Receiving Cutter:	
<b>Pre-Evolution</b> (all must be completed prior to commencing the evolution)	
(Check Box)	
<input type="checkbox"/>	Muster and conduct the Command Safety Brief
<input type="checkbox"/>	Conduct new pre-evolution risk assessment. SPE/GAR results: _____ IAW ref (c).
<input type="checkbox"/>	Ensure all inspections and PMS are complete and up to date IAW ref (f) and (h).
<input type="checkbox"/>	Operate under Restricted Maneuvering Doctrine.
<input type="checkbox"/>	Ensure compliance with reference (b).
<input type="checkbox"/>	Ensure compliance with Enclosure (1).
<input type="checkbox"/>	Ensure compliance with paragraph 1-F, Fuel Spill Prevention.
<input type="checkbox"/>	Suitable current and forecasted environmental conditions.
<input type="checkbox"/>	Muster forecastle / fantail personnel, conduct team safety brief (if not already done with command brief).
<input type="checkbox"/>	Ensure all personnel involved are wearing proper PPE.
<input type="checkbox"/>	Establish communications between OOD, Safety Observer, Rig Captain, and Pump Room.
<input type="checkbox"/>	Establish communications between cutters
<input type="checkbox"/>	Discuss Emergency Breakaway Procedures
<input type="checkbox"/>	Secure forecastle / fantail to all unnecessary personnel.
<input type="checkbox"/>	Notify OOD when manned and ready.
<input type="checkbox"/>	Obtain permission from the Commanding Officer prior to commencing operations.
<b>Approval</b> (signature / time)	
CO:	
Notes:	
<b>During Evolution</b>	
<input type="checkbox"/>	OOD monitor weather conditions make appropriate reports to the Commanding Officer. Halt evolution if conditions deteriorate.
<input type="checkbox"/>	Log start time in Smooth Log.
<b>Post-Evolution</b>	
<input type="checkbox"/>	Log stop time in Smooth Log.
<input type="checkbox"/>	Conduct debrief with onboard participants. Record lessons learned.
<input type="checkbox"/>	Conduct debrief between delivery and receiving cutters when deemed necessary by either CO/OIC.

This checklist may be disposed of after completion of the operation or laminated and used repeatedly.



<b>Enclosure (3)</b>			
<b>Delivery Cutter Astern Fueling At Sea Equipment Checklist</b>			
The checklists contained in this enclosure are to be used as a guide. Cutters should promulgate checklists that will reflect the individual ship's requirements			
Receiving Cutter:		Date:	
<b>Deck Department Gear Checklist</b>			
<small>(Check Box)</small>			
	Appropriate Tow Hawser and Chafing Gear (in accordance with paragraph (2.A.a-c)) and Ships Plans		
	Fuel Hose Messenger (in accordance with 2.A.g) properly attached to fuel hose.		
	Heaving Line with Lead Line Messenger (approximately 100')		
	Appropriate Towing Shackles, Bridle, Pendant (mouse as necessary)		
	Fire Ax		
	Cooling Water		
	Cutter Boat at rail or launched with boat crew in immediate standby		
	Life Buoy Watch		
	Communications Equipment Checks (internal and external)		
	Belaying Line		
	2" Braided or three strand line approximately the same length of fuel hose.		
	Small stuff		
<b>Engineering Department Gear Checklist</b>			
<small>(Check Box)</small>			
	2.5" Female Cam Lock Fitting		
	2.5" Male Groove Lock Dust Plug		
	300' (minimum) of available Fuel Hose		
	Fire Fighting Gear		
	Tools as per ships AEL		
	Oil absorbent rags		
	Belaying Line		
<b>Bridge Checklist</b>			
<small>(Check Box)</small>			
	Receive readiness reports from:	Deck Dept	Eng Dept
		Sup Div	Other Cutter
	Conduct Steering Check and Backing Bell Test		
	Hoist day shapes/energize nav lights		
	Make readiness report to the Commanding Officer / Officer in Charge		
<b>Notes:</b>			

This checklist may be disposed of after completion of the operation or laminated and used repeatedly.

<b>Enclosure (4)</b>			
<b>Receiving Cutter Astern Fueling At Sea Equipment Checklist</b>			
The checklists contained in this enclosure are to be used as a guide. Cutters should promulgate checklists that will reflect the individual ship's requirements			
Delivery Cutter:		Date:	
<b>Deck Department Gear Checklist</b>			
<small>(Check Box)</small>			
	Grapnel		
	Boat Hook		
	Chafing Gear		
	Fire Ax		
	Communications Equipment Checks (internal and external)		
	Belaying Line		
	Life Buoy Watch (optional if not manned appropriately)		
<b>Engineering Department Gear Checklist</b>			
<small>(Check Box)</small>			
	2.5" Male Groove Lock Fitting		
	2.5" Cam Lock Dust Cover		
	Fire Fighting Gear		
	Tools as per ships AEL		
	Oil absorbent rags		
	Drip Pan		
	Reducers/Adaptors to Fill Pipe Size		
<b>Bridge Checklist</b>			
<small>(Check Box)</small>			
	Receive readiness report from:	Deck Dept	Eng Dept
		Sup Div	Other Cutter
	Conduct Steering Check and Backing Bell Test		
	Hoist day shapes/energize nav lights		
	Make readiness report to the Commanding Officer / Officer in Charge		
<b>Notes:</b>			

This checklist may be disposed of after completion of the operation or laminated and used repeatedly.

**Enclosure (5)**  
**Optional Astern Fueling at Sea Paddle / Signal Wand Communications**

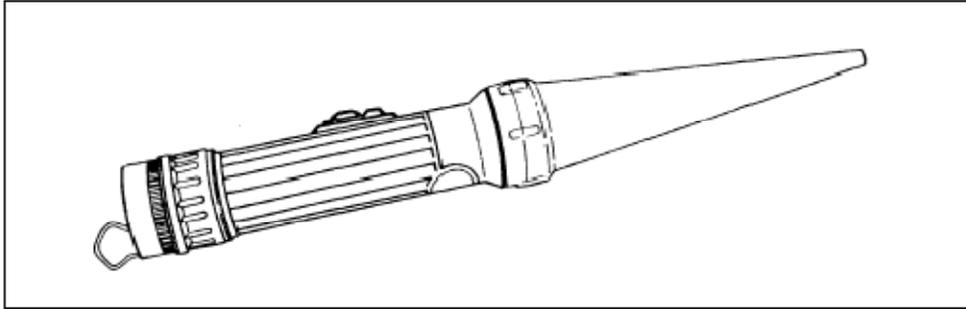
<b>SIGNAL</b>		<b>MEANING</b>	
<b>DAY</b>	<b>NIGHT</b>	<b>RECEIVING CUTTER</b>	<b>DELIVERY CUTTER</b>
Green Paddle	Green Signal Wand	Hose Connected. Start Pumping	Pumping Started
Red Paddle	Red Signal Wand	Stop Pumping or Blow Down Hose	Pumping or Blowing Down Stopped
White Paddle	Amber Signal Wand	Blow Down Hose	Blow Down Started

**Enclosure (6)  
Astern Fueling at Sea Fuel Hose End Fittings**

Delivery Cutter	Receiving Cutter
	
<p align="center"><b>2.5" Female, Cam Lock Fitting, 316 Stainless Steel, MIL-C-27487</b></p>	<p align="center"><b>2.5" Male, Groove Lock Fitting, 316 Stainless Steel, MIL-C-27487</b></p>
	
<p align="center"><b>2.5" Male, Groove Lock Dust Plug, 316 Stainless Steel, MIL-C-27487</b></p>	<p align="center"><b>2.5" Female, Cam Lock Dust Cover, 316 Stainless Steel, MIL-C-27487</b></p>

## Enclosure (7) Miscellaneous Equipment

### 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	6230-00-691-1407
Filters	
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)

### PAN, DRIP

**DESCRIPTION**

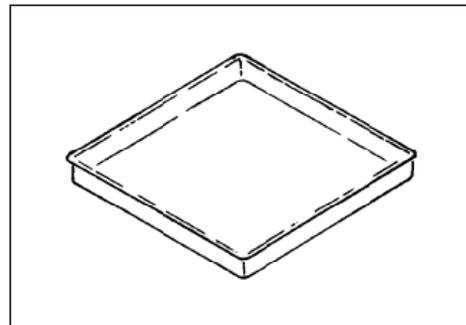
The Drip Pan is fabricated from sheet steel to a size of approximately 24 inches square by about 3 inches deep.

**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



# Enclosure (7) to COMDTINST M3120.8

**PADDLE**

**S9570-AD-CAT-010**

**PADDLES, SIGNAL**

**DESCRIPTION**

UNREP Signal Paddles consist of two similar paddles with a square plastic surface and a polypropylene 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

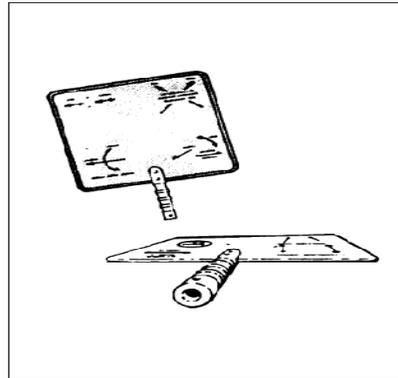
amber/green 6350-01-033-7319

**DRAWING NUMBER**

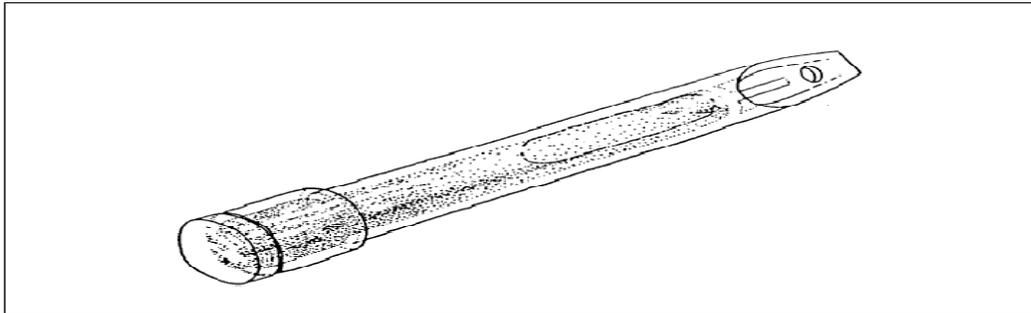
NAVSHIPS 805-2580255

**REFERENCE**

Underway Replenishment (NWP 4-01.4)



## 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

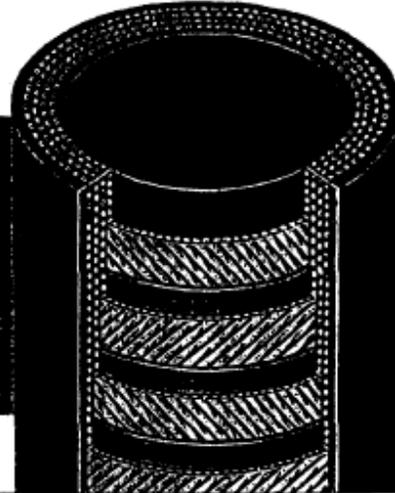
6-inch Green 6260-00-106-7478

4-inch Orange 6260-01-282-7630

**REFERENCE**

Underway Replenishment (NWP 4-01.4)

# MARATHON TRANSFER



Marathon Transfer hose is recommended for the discharge of petroleum base products in marine applications. It is ideal for ship-to-ship or ship-to-shore fueling operations.

**FLOATS.** Marathon Transfer hose is designed with the proper balance of weight and rubber compounds to allow it to float in fresh or salt water when handling liquids with a specific gravity of .90, or less. This floating construction reduces hookup problems and saves time.

**STRENGTH AND DURABILITY.** Marathon Transfer hose has a Chemigum synthetic rubber tube to handle petroleum products with up to 50% aromatic content. Its Chemivic cover is tough, abrasion resistant, and extremely tolerant of oil, ozone and weather. Four ply construction provides the strength to handle normal 150 PSI (1 MPa) pumping loads with a minimum 4:1 safety factor.

**AVAILABLE IN LONG LENGTHS:** Marathon Transfer hose is available in lengths up to 400 ft. Longer lengths mean fewer sections, reduced coupling cost, and fewer potential problems in operation.

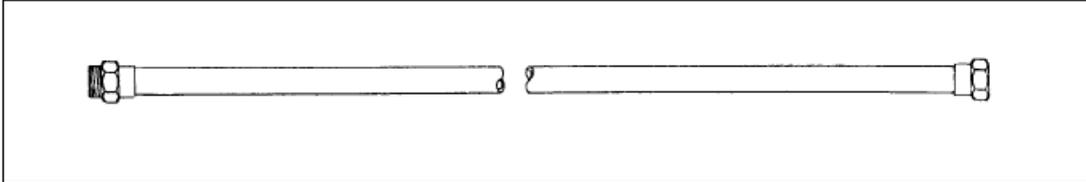
**CONSTRUCTION:**  
 Tube: Chemigum synthetic rubber  
 Reinforcement: Multiple plies of synthetic fabric  
 Cover: Black Chemivic (ORS)

**LENGTHS:** Up to 400 ft.

**FITTINGS:** Special reattachable Dixon fitting

I.D. x O.D.		PLIES	MAX. WP		WEIGHT	
In.	mm		PSI	MPa	lb./ft.	kg./m.
2 x 2½	51.4 x 64.1	4	150	1	.92	1.37
3 x 3¾	76.2 x 89.1	4	150	1	1.33	1.98
4 x 4¾	102 x 115.1	4	150	1	1.74	2.59
6 x 6¾	152.4 x 188.1	4	150	1	2.71	4.03

**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.

**FUNCTION**

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

**NATIONAL STOCK NUMBER**

4720-00-837-7178

**REFERENCE**

Underway Replenishment (NWP 4-01.4)