ries a midship-mounted 500-gpm (1892-liter per minute) pump, a booster water tank, hose body, and all standard firefighting tools and equipment.

(2) The centrifugal pump, driven by a transfer unit from the main engine, can supply two 2½-inch (6.35centimeter) hose lines within its limits of capacity. It uses a 150-gallon (568-liter) booster tank, 750 to 1,000 feet (229 to 305 meters) of 2½-inch (6.35-centimeter) hose, and a 150-foot (46-meter) l-inch (2.54-centimeters) booster line hose.

c. Class *530B Fire Truck* The 530B pumper truck (fig. 2-6) is a 6 x 6, 2½-ton (2.2%metric ton) truck equipped to combat all classes of fires. It has a 500-gpm (1892-liter per minute) midship-mounted pump, a 400-gallon (1514-liter) booster water tank, and 40-gallon (152-liter) liquid foam tank. It can carry 800 feet (244 meters) of 1½-inch (3.8-centimeter) hose and 1,200 feet (366 meters) of 2½-inch (6.35-centimeter) hose. Two hose reels each containing 150 feet (46 meters) of l-inch (2.54-centimeter) hose are located behind the cab. This truck, like all other fire trucks discussed in this section, has a foam proportioning system for introducing foam into the water discharge. As a self-contained general purpose firefighting vehicle, this truck is completely equipped with portable extinguishers, ladders, floodlights, flashlights, tools, and other accessories commonly knows as "removable firefighting equipment," The equipment on this truck, like the equipment on the class 500, is in the open and visible. The pump controls are external and the hosemen ride on the tailboard. See paragraph 1-6 for the different units that may be used with the 530B.

d. Class 530C Fire Truck. The 530C (fig. 2-7) is the same as the 530B fire truck, except that the 530C has a turret extinguisher (pump) which permits extinguishment while the truck is moving. The 530C also has a 750-gpm (2839-liter per minute) pump instead of the 500-gpm (1892-liter per minute) pump on the 530B.

e. Trailer-Mounted Pumping Unit. The trailer-mounted pumping unit consists of a two-wheel trailer carrying a self-contained 500-gpm (1892 liter per minute) centrifugal pump directly connected to a 90- to 110-hp engine, 300 feet (92 meters) of 1½-inch (3.8-centimeter) hose and 500 to 700 feet (152 to 214 meters) of 2½-inch (6.35-centimeter) hose, and the standard firefighting equipment. The pump does not have a perma-

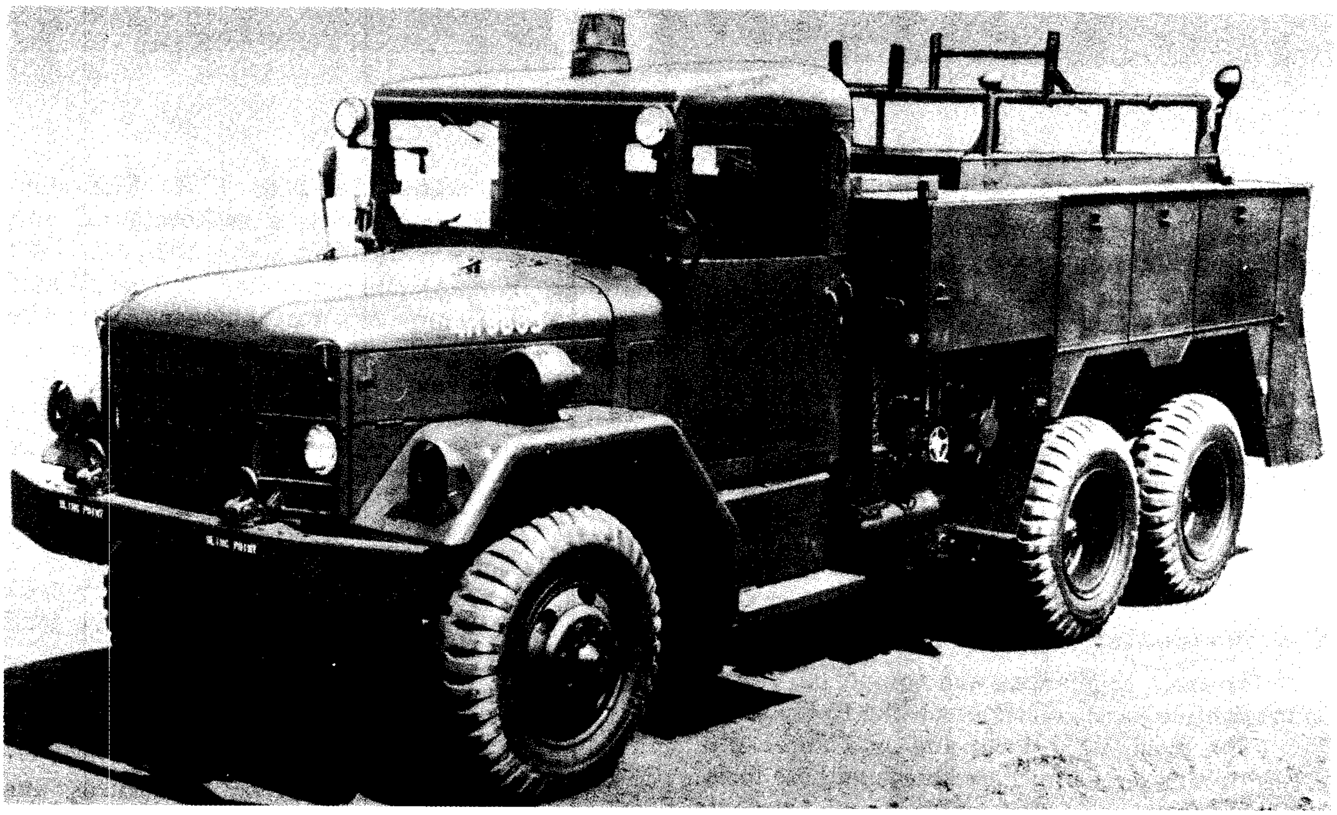


Figure 2-6. 530B fire truck.

Figure 2-7. 530C fire truck.

nently installed pressure regulator or pressure-relief valve. The pump operator must meet changing firefighting requirements by manually adjusting the controls. The pump can supply 2½-inch (6.35-centimeter) hose lines at 500 gpm (1892 liters per minute) at 120 pounds (54 kilograms) net pump pressure, 250 gpm (946 liters per minute) at 200 pounds (91 kilograms) net pump pressure, and 167 gpm (632 liters per minute) at 250 pounds (113 kilograms) net pump pressure.

f. Skid-Mounted **Pumping Unit.** The skid-mounted pumping unit is a self-contained unit consisting of a powerplant and a 500-gpm (1892 liter per (minute) pump mounted on a single-skid base. Fire departments may augment the water supply and pressure on such systems by pumping from the hydrant through one or two 2½-inch (6.35-centimeter) hose lines connected to the fire department (Siamese) connection of the sprinkler system.

Section III. TOOLS, APPLIANCES, AND KNOTS

2-6. Introduction

a. The tools, appliances, and eqnipmcnt needed in firefighting vary greatly according to the situation. The firefighting tools and appliances discussed in this section include hoses and hose tools, ladders, special tools such as axes and pry-bars, ropes, wrenches, couplings and connections, salvage equipment, and lights. It is most important that the firefighter be familiar with all the tools and appliances he may use.

b. In addition to itemizing, identifying, and describing the types of equipment used, this section also explains operation, safety procedures, and preventive maintenance as they apply to each type of tool and appliance.

2-7. Hoses

Hose layouts subjected to any degree of high pressure are always a potential source of danger and may contribute to the failure of an operation. Accidents and failures caused by discharge lines can be prevented if firefighters are well trained in the proper use of hose lines and if complete tests and inspections of hoses and related equipment are made periodically.

a. *Types.* Five types of hose are currently being used by the Army, some much more widely than others. The most widely used type is the cotton-jacket, rubber-lined hose in 2½-inch (6.35-centimeter) and 1½-inch (3.8-centimeter) sizes. Another type used is the rubber-covered, rubber-lined hose, usually in comparatively smaller dimensions, used for finishing lines, booster lines, and high-pressure hoses. A third type is the rubber-lined, wire-reinforced hose, used in operations where rigidity is essential. A fourth type is the unlined linen hose, which is light and pliable but not immediately watertight. The ‘fifth type is the polyester hose. This hose is made of light weight dacron with pin or rocker plug couplings. It comes in standard 50-foot (15-meter) lengths in 1½-inch (3.8-centimeter) and 2½-inch (6.35-centimeter) diameters.

b. Care *of Hose.* Hose is so vital to firefighting operations: that its care must be the responsibility of every firefighter. The following are some of the causes of lhose damage and general precautions in handling hose.

(1) Dragging the hose along the ground frequently results in cuts, abrasions, punctures, and damaged couplings, threads, or lugs.

(2) Pulsations in the pump cause the suction and discharge hose sections to vibrate which chafes the hose jackets where the hose touches. Serious hose injury results when these surfaces are rough or have sharp edges. Hose damage is most pronounced near the engine. Farther away, the vibration is absorbed by the elasticity of the hose.

(3) Vibration may be almost unnoticed, yet it may weaken the hose so much that it fails in a relatively short time. To prevent this, chafing boots must be inserted between the hose and the ground at the affected points. If chafing boots are not available, burlap, rope cushions, or any suitable substitute may be used. The chafing boot consists of a pad, usually a portion of salvaged hose, which is strapped or clamped to the hard or soft suction hose during pumping operations.

(4) Hose may be damaged by improper operation at the shutoff nozzle. Closing the nozzle quickly causes a sudden increase in pressure which may rupture the hose. If the nozzle is opened quickly, back pressure will increase 50 percent, and the operator may lose control of the hose, which may injure personnel in addition to damaging the hose.

(5) One of the most common causes of hose injury is the result of vehicles being driven over hose layouts. Serious damage is less likely when the hose is charged with pressure. When the hose is empty or under insufficient pressure, the jacket may be separated from the lining or the hose may be ruptured or torn from the coupling. This type of damage can be prevented by hose bridges (fig. 2-8). Two of them should be built and carried on the truck at all times. After the hose lines are laid, the bridges are placed over them at the desired spacing, generally about 4 feet (1.2 meters) apart. If standard bridges are not available, a suitable bridge may be set up with materials found at the scene of the fire. A simple bridge consists of planks, laid on each side of the hose, thick enough to keep the wheels from striking the hose.

(6) When possible, the hose lines should be stretched on the same side of the road as the fire. The lines should be laid parallel to the curb, but not so close to the curb that acid or oil floating down the gutter may come in contact with the hose. When a street or areaway must be crossed, the hose should be laid on the same side of the street as the hydrant, parallel to the curb and up to a point opposite the fire, then across the street. Thus, fire equipment that follows need not travel

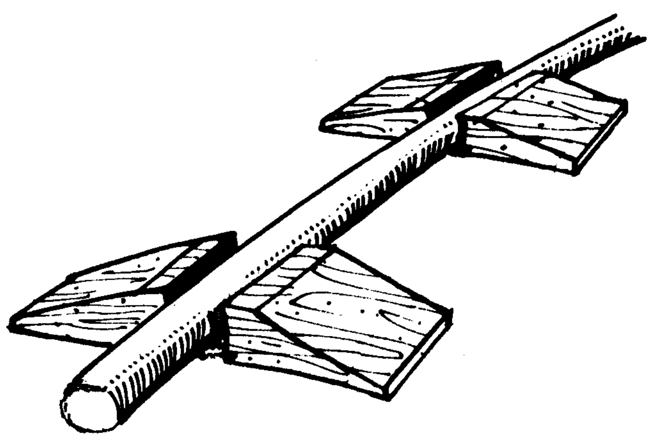


Figure 2-8. Hose bridges.

over the hose unless it is necessary to pass to the far side of the fire.

(7) Where freezing temperatures are common, hose is frequently damaged by rough handling during the winter. When the hose is frozen, the fibers are weakened and the threads which run lengthwise in the hose are warped. A break in the hose will be caused if it is not handled carefully. If the hose is frozen to the ground or street, remove it by carefully chopping away the ice beneath it. Do *not* remove the ice which remains stuck to the hose. Place the hose in the truck with the least possible bending and forcing and take it back to the station. After the frozen hose thaws out, it should be stretched out, washed, and left to dry.

(8) Firehose should not be dropped because this may damage the couplings. When possible, the hose should be carried at the couplings. When hose is carelessly handled, the exposed threads of the male coupling may be damaged so much that efficient connection to the female coupling is impossible. The female coupling is easily knocked out of round, thus making the entire 50-foot (15-meter) length of hose useless in a layout.

(9) Firehose is frequently and unavoidably burned at fires, All hose which has been exposed to fire should be turned in to salvage if extensive damage is found at a considerable distance from either of the couplings. When the damage is close to the coupling, the damaged portion may be cut off and the coupling replaced.

(10) If hot liquids penetrate the cover of the hose, the lining is loosened seriously which weakens the hose. Chemical injury cannot always be prevented, especially at fires at chemical depots and warehouses. In addition, it is almost impossible to detect the presence of injurious chemicals in water that may be flowing from a burning structure. Many acids, even when diluted, can stain and destroy the hose jackets. When acid damage is suspected, each length should be carefully examined for brown or powdery spots. The exposed portions should be washed immediately and thoroughly with baking soda solution and then given a pressure test.

(11) Petroleum products such as gasoline, oils, and greases, upon coming in contact with hose, cause rapid deterioration of the rubber lining by dissolving the cement and loosening the lining from the jacket. When a single hose length is used after having been exposed to lubrication products, the lining tears apart and piles up in one end of the hose. This causes considerable loss or complete stoppage of waterflow.

(12) Paint and paint thinner are equally harmful to firehose. Consequently, paint should not be used to mark the hose. A thin application of indelible ink with the aid of a stencil should be used. Hose should be cleaned with mild soap and water solution, followed by a thorough rinse in clean water and a complete drying process to prevent mildew. Damp or dirty hose should never be stored. Hose such as the dacron type will not mildew and may be stored wet in warm weather.

c. *Maintenance.* Improper or incomplete maintenance shortens the life of the hose and may result in hose failure at a critical time. Hose maintenance is somewhat complicated because hose components present entirely dissimilar problems. The jacket and rubber lining deteriorate with age regardless of whether or not the hose is used. Rubber deterioration can be delayed if the lining is not allowed to dry rot. If the jacket is kept wet, it is subject to mildew and fungus which destroys the fiber. Keeping the rubber moist and the cotton clean and dry requires frequent handling of the hose, which makes the couplings more liable to damage.

d. Inspections and Tests. Fabric-jacket, rubber-lined hose must be inspected daily and after each use.

(1) The after-use inspection includes the removal and inspection of all hose which is wet. After the fabric jacket is cleaned and visually inspected, the couplings should be examined for proper operation and the hose placed on the drying rack. If there is dirt or dampness in the hose bed, the remaining hose should be removed from the truck and replaced with clean, dry hose.

(2) All discharge and suction hoses should be hydrostatically tested seminannually to determine whether each section can withstand operating pressures. Up to six lengths (300 feet (92 meters)) of discharge hose may be tested at one time. One-inch (2.54-centimeter) rubber-covered hose and 1½ (3.8) and 2½-inch (6.35centimeter) double, cotton-jacket, rubber-lined hose should be tested at 150 pounds (68 kilograms) of pressure, Fabric-jacket, rubber-lined 1½- (3.8) and 2½-inch (6.35-centimeter) hose should be hydrostatically tested at 250 pounds (113 kilograms) pressure for 5 minutes. The hard and soft suction hoses should be tested at 100 pounds (45 kilograms) of pressure. The hard suction hose should be vacuum

tested to an ll-pound (5-kilogram) vacuum on the pump and the lining examined for detects. All previously mentioned hose inspection procedures are repeated together with the hydrostatic tests on the semiannual inspection.

e. ***Drying.*** All hose must be dried before being stored. The interior of each length must be drained of all water. Water that remains in the hose for any length of time tends to remove the sulfur from the rubber, as shown by a sulfuric acid solution which can be drained from carelessly stored hose. Hose-drying racks may be of any size or general arrangement as long as they have a reasonable slope to encourage drainage.

f. Storage. Proper storage of unused hose is a vital part of hose maintenance. To prevent rapid deterioration, hose should be stored in a clean, dry, well-ventilated location out of direct sunlight and away from heating pipes and radiators. Heat and sunlight cause rubber covers and linings to become hard and brittle.

g. Replacing Damaged Couplings and Salvaging Hose. Fire-department personnel are responsible for replacing damaged hose couplings and for salvaging damaged hose. Damaged hose may be salvaged by cutting out defective portions and recoupling the remaining portions. Not less than two-thirds of a section should be recoupled, although short lengths may be used occasionally for purposes other than layouts to fires. Couplings should be removed and replaced as follows:

(1) Place the coupling in a vise and cut through the expansion ring with a chisel or some other tool.

(2) Remove the expansion ring, hose, and rubber gasket.

(3) Cut off the damaged portion of the hose with a sharp knife and make sure that the end of the hose is square and smooth.

(4) Place the expansion ring in the coupling.

(5) Fit the expansion ring inside the hose flush with the hose end.

(6) Insert the hose in the coupling tailpiece.

(7) Make sure the hose is flush with the gasket and the shoulder of the coupling.

(8) Using an expansion tool, expand the ring until it locks firmly inside the coupling. Several types of expansion tools are manufactured. The directions for use and specifications for pressure are published by each manufacturer. Follow these directions and specifications exactly.

h. Hose Records. Complete records of performance, maintenance, and testing are a basic part of any maintenance program. The minimum records required for firehose are kept by fire-department administrative personnel.

(1) As each length of hose is received, an identifying number is stamped on its coupling. At the same time, a record (DA Form 5-78) is set up indicating the hose number, type of hose, date received, and manufacturer (fig. 2-19). Thereafter, operating and maintenance data are entered regularly on this form.

(2) Entries include the date the hose was tested, test pressures, and remarks on the test; explanation of any hose failure, the cause and the date; date of any recoupling; and details of other unusual maintenance. Firehose records are kept in the fire station where they are available for immediate reference. In addition, copies of test reports may be kept in the daily department records.

2-8. Hose Couplings

a. Use. Hoses are issued in sections fitted with a female-threaded coupling at one end and a male-threaded coupling at the other. Hard-suction hoses are usually in 10 to 14-foot (3 to 3.8-meter) lengths. Hose lines may be made any desired length by coupling individual sections together. For fire service use, hose couplings must-

(1) Be easily and quickly made up and broken (connected and disconnected).

(2) Form a watertight connection when handtight.

(3) Hold securely when hose is dragged or hoisted.

(4) Withstand damage from dragging and dropping ***when coupled.***

(5) Be reusable so that damaged portions of hose, if close enough to an end, can be cut off and the remaining portion recoupled.

b. ***Types.*** Several types are available, the screw type having a male coupling with external threads and a swiveling female coupling with internal threads being most widely used. Couplings should conform to the National Standard Fire Hose Thread (NST) for the particular size hose. This enables hose to be used interchangeably when different departments work together on the fire ground. The following are some of the couplings and connections.

(1) ***Double male couplings*** or connections

HOSE NUMBER	SIZE	TYPE	LENGTH	MANUFACTURER
6440	2½"	Double Jacket	50'	Lewis Products
DATE MANUFACTURED	**BRAND**	**DATE RECEIVED**	**GUARANTEED PRESSURE**	**NAME OF INSTALLATION**
2-69	Polyester Fiber	10-69	400	A1BB

DATE IN SERVICE	LOCATION OR COMPANY NO.	TESTED		DATE OUT OF SERVICE	TYPE COUPLING	REMARKS (OK or failure of test, reason out of svc. etc.)
		DATE	PRESSURE			
12 Oct '69	Co. 3	9 Oct '69	250		Brass Rocker Lug	O.K. (Test)
4 Nov. '69	Co. 3			4 Nov. '69		Coupling, Male—Out of round.
10 Nov. '69	Co. 3	10 Nov. '69	250			Repair & Test.
6 Aug. '70	Co. 3			6 Aug. '70		Ruptured.
10 Aug. '70						Salvaged.

DA FORM 1 JUN 56 5-78 **FIRE HOSE RECORD** (TM 5-687)

Figure 2–9. Sample *firehose record.*

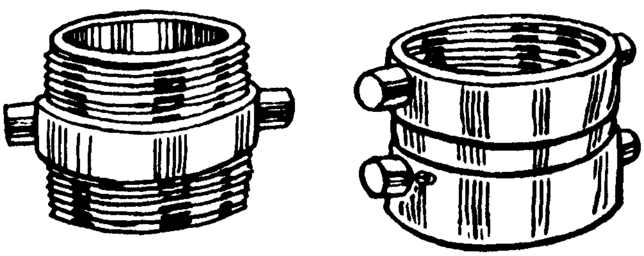


Figure 2–10. Double male and double female couplings.

consist of a single piece of metal hose coupling containing two sets of exposed male threads (fig. 2-10). The purpose of the double male connection is to enable the joining of two female connections which could not otherwise be united.

(2) *Double female couplings* consist of two or three pieces of metal hose coupling containing two sets of female threads (fig. 2-10). When double female couplings have only one swivel, the connection frequently contains only two pieces of metal, and the solid portion should be connected first. Double female couplings which have two swivels consist of three metal parts, and it is optional as to which female should be connected first. The purpose of the double female connection is to connect two male couplings to complete a hose layout.

(3) Other types of coupling include *snap, quarter turn,* and *reducing couplings (fig.* 2-11). The snap coupling has spring loaded clips or lugs on the female coupling which clamp over a ring on the male coupling. Couplings are broken by disengaging the clips. The quarter turn coupling has beveled lugs on the couplings at each end of the hose. They are made up by twisting a quarter turn, which causes the beveled lugs to interlock. While both types can be made up and broken quickly, the advantage of being able to couple with a neighboring fire department's hose may be lost. Reducing or five part couplings are often used on 3-inch (7.6-centimeter) hose so it can be used interchangeably with 2½-inch (6.35-centimeter) hose. The smaller waterway caused by the reduction does not affect performance much because the length of small waterway is very short and a jet or venturi effect is created. Except for the reducing feature and construction, they are the same as the NST screw type.

c. *Features of Screw Type Couplings.* The NST standards specify the number of threads per inch

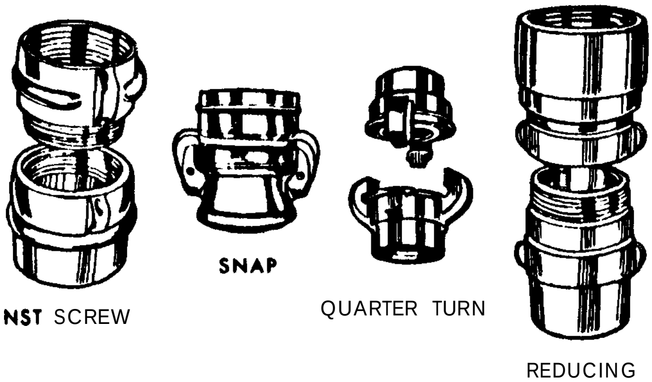


Figure 2-11. ***Couplings.***

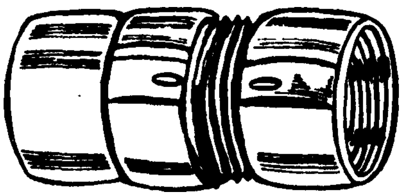


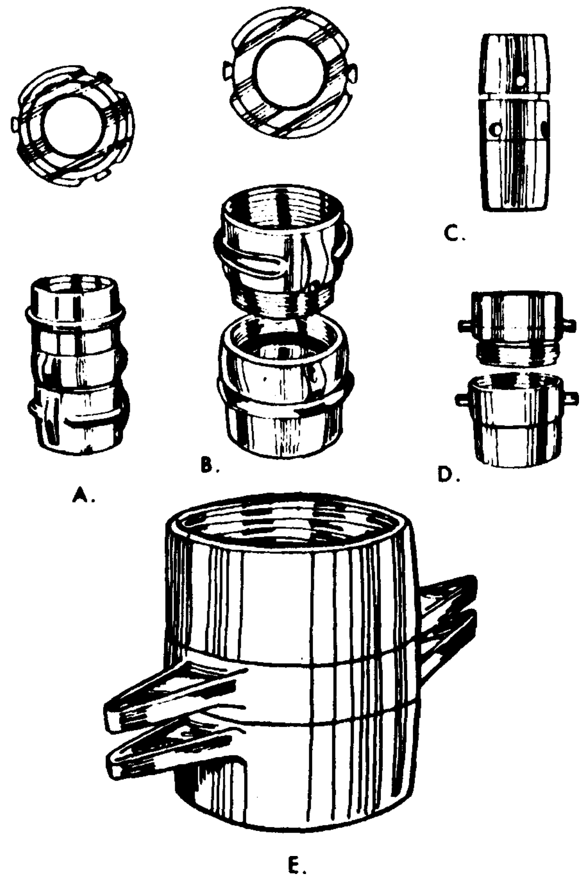
Figure* 2-12. *Higbee thread indicator.

(or centimeters), the shape and dimensions of threads, and use of the *Higbee cut.* The latter consists of cutting a blunt end on the first thread so that a positive start is made in engaging threads and prevent the crossing of threads. It also results in a short blank end on each coupling that helps to aline the threads and reduces chances of damaging threads if the coupling is dropped. The *Higbee thread indicator (fig. 2-12)* is a notch cut in one lug to show the position of the Higbee cut. By lining up the thread indicators on both couplings, and they are deep enough to be felt with gloves on, threads will engage on the first turn.

d. Material. Brass alloys are commonly used for couplings. They are also made of aluminum alloys, aluminum, and malleable iron. Iron rusts and pure aluminum, while light, is easily damaged. Various aluminum alloys are lighter than brass and hold up well in service, but are more expensive.

e. ***Lugs.*** Lugs (fig. 2-13) are provided on couplings so that a grip can be obtained with wrenches, called spanner wrenches or *spanners, (fig. 2-14)* to assist in breaking couplings. On rubber lined fabric hose the *rocker lug* (either two or three lugs) is normally used. This consists of rounded ears which provide a good gripping surface for wrenches, but tend to slide over obstructions as hose is laid. Couplings with pin ***lugs,*** *dot* or Navy type lugs, and *nut* or forestry type shape are also used. Pin type lugs catch on obstructions and on each other in the hose bed. Slot and nut type couplings are satisfactory but the rocker lug is better suited for use witth different types of spanners and provides a better grip when making handtight connections. Making and breaking couplings is normally unnecessary when using booster hose; therefore, couplings with holes for use with special booster hose spanners are usually used. These have no projections to catch on objects. Hard and soft sleeves, on the other hand, are carried, rather than dragged, and must be made up each time the sleeve is used. They are usually equipped with long handled lugs to facilitate making and breaking of the couplings.

f. *Means of Attaching to Hose.* The most common means of attaching couplings to hose

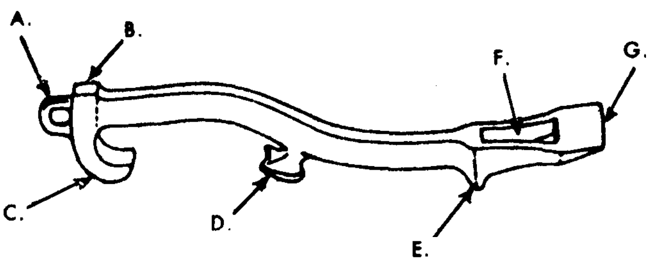


A. THREE ROCKER LUG B. TWO ROCKER LUG

C. BOOSTER TYPE WITH HOLES INSTEAD OF LUGS

D. PIN LUG E. LONG HANDLED TYPE FOR USE WITH SLEEVES

Figure 2-13. *Types of coupling lugs.*

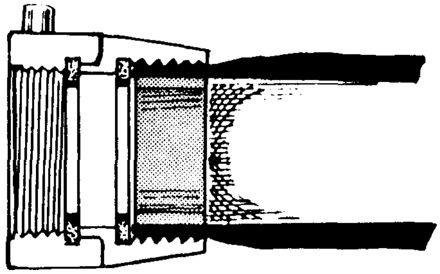


A. BELT HOOK EYELET
B. HAMMER HEAD
C. SPANNER CENTER LUG CLAW
D. UNCOUPLING CENTER LUG CLAW
E. PRY HEEL OR FULCRUM
F. GAS COCK SLOT
G. WINDOW JIMMY

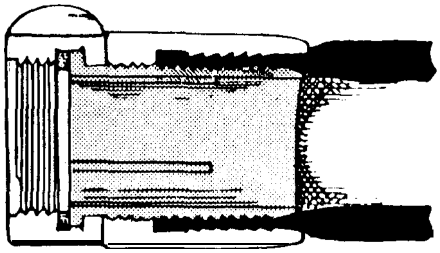
Figure 2-14. The spanner wrench.

(fig. 2-15) is with an *expansion ring.* A ductile brass ring or collar is placed inside the hose. The coupling is placed over the hose and the ring expanded under great pressure to force the hose jacket against the corrugated inner face of the coupling. Couplings can be reused by extracting the expansion ring and using a new one. A means of attaching couplings with a screw sleeve is also used. With this method, the coupling shell slips over the hose jacket. A sleeve containing the male threads or female swivel and threads on one end, and a double threaded section on the other end, is screwed into the hose and forced against the shell. Such couplings withstand greater water pressure and pull on the hose than expansion ring types. They are used most often with booster hose, though available for hose up to 2½-inch (6.35-centimeter) diameter. A special key and wrench are used to attach the couplings, which can be removed for reuse by unscrewing the sleeve. A third means involves slipping a coupling shell, with threads or swivel and threads, over the hose jacket, inserting a tapered sleeve and pulling up on the shell. To reuse, the shell is driven back off the tapered sleeve.

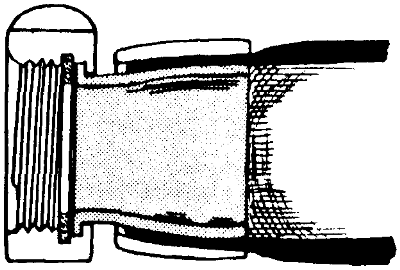
g. Making up Couplings. Couplings, particularly on rubber lined fabric hose, must be made up quickly. Making up or connecting couplings involves two actions: alining the hose and couplings and connecting the threads. If hose is being loaded in a hose bed, the additional step of checking for the presence of a gasket in the female coupling bowl is taken before making up the coupling. The hose is alined so that the flat sides of each length are in approximately the same plane.



COUPLING ATTACHED TO HOSE WITH EXPANSION RING.



COUPLING ATTACHED TO HOSE WITH SCREW SLEEVE.



COUPLING ATTACHED TO HOSE WITH TAPERED SLEEVE.

Figure 2-15. Attaching couplings to hose.

Next, the couplings are alined so that threads will engage. Then the couplings are held steady and the threads engaged by operating the swivel on the female coupling.

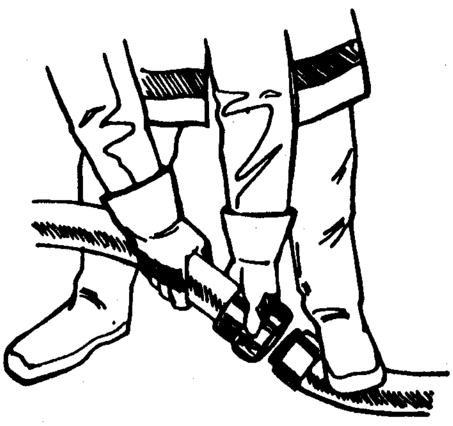
(1) ***One-mm coupling procedure.*** Making up couplings is normally a one man operation (fig. 2-16). The female coupling is picked up with one hand on the swivel. The hose is brought across the right (or left) hip with the feet spread comfortably apart. The hose is held against the hip with the forearm. The male coupling is held with one hand, the female coupling with the other. The couplings are alined by manipulating the swivel on the female coupling to engage the threads. An alternate method is to aline the hose and couplings on the ground. The firefighter faces the couplings, feet spread comfortably, with one foot on the hose directly behind the male coupling (fig. 2-16). This will tilt up the coupling and at the

same time hold it in position. The hose with the female coupling is brought up to the male coupling and the threads are engaged by operating the swivel. This method is not practical in deep snow, mud, or similar conditions. The swivel is rotated counterclockwise until a click is heard, then the threads are engaged by rotating the swivel in the opposite direction. If the couplings contain Higbee thread indicators, line up the notched lugs and rotate in a clockwise direction.

(2) ***Two-man coupling procedure.*** Two men make up couplings (fig. 2-17) by each grasping a coupling and holding the hose against the hip with one forearm. The man with the male coupling holds the coupling so that the other man can aline the female coupling with one hand and operate the swivel with the other, thus engaging the threads. Couplings are made only handtight because the hose is constructed so that when it is charged with water it twists and tightens the couplings. If couplings are tightened with wrenches the gaskets may be flattened until they protrude into the waterway which partially restricts the flow of the water. It also damages the gasket. The last step in making up couplings is to give a sharp twist or snap as the threads seat home. With a good gasket this results in a watertight connection. Gaskets are checked by removing them from the female swivel and flexing them between the thumb and forefinger (fig. 2-18). If they spring back to a flat position they are usable. If not they should be replaced. ***Do not leave couplings without a gasket.*** If the gasket must be replaced, do so as soon as possible. If the female swivel on a hose coupling continues to swivel after the couplings are tightened, the threads have not seated completely and require further adjustment.

h. Breaking Couplings. Couplings usually are

MAKING UP COUPLINGS.



ALTERNATE METHOD OF MAKING UP COUPLINGS.

Figure 2-16. Coupling hoses.

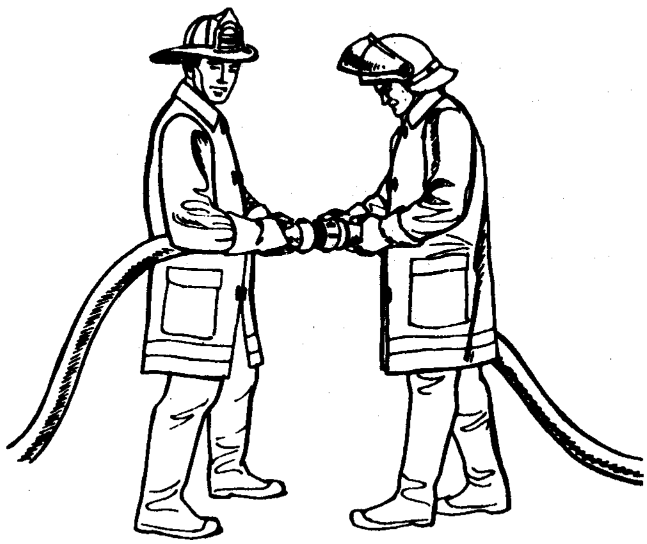


Figure 2-17. Two men making up couplings.

Figure 2-18. Checking the condition of a gasket.

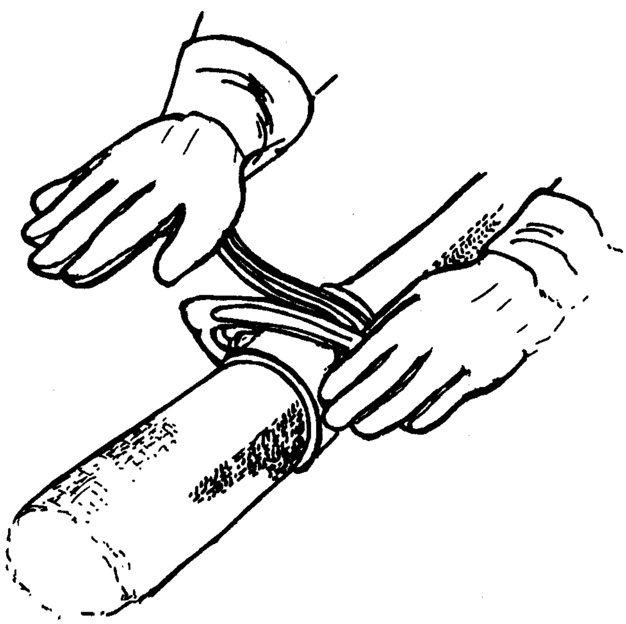


Figure 2-19. Using spanners to break couplings.

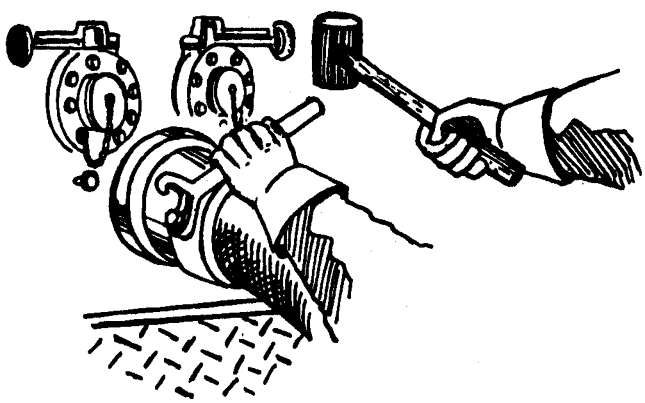


Figure 2-20. Using a rubber mallet to tighten couplings for drafting

broken (released) in the same way they were made-by hand, In the process, the arm and shoulder muscles are used, not the fingers. Spanner wrenches (fig, 2-14) are used as shown in figure 2-19 on couplings that cannot be broken by hand. The fingers are extended as shown in figure 2-19 to prevent injury when the coupling breaks loose or the spanner slips.

i. Coupling Sleeves for Drafting, Hand-tightened connections usually suffice for coupling hose, but connecting sleeves for drafting and booster hose require tightening with a tool, In drafting operations, hard sleeves must be airtight. This is done by using a wooden or rubber mallet as shown on figure 2-20.

j. Avoiding Damage to Couplings. Damage to couplings is usually the result of the following:

(1) Dropping of uncoupled couplings.

(2) Dragging of uncoupled couplings.

(3) Excessive strain or pull, or pressure, on a hose line.

(4) Grit or dirt in the swivel This binds the swivel on female couplings. Dirty couplings must be washed with water that is mildly detergent. Oil or grease only increases the possibility of picking up more dirt.

(6) Crossing of couplings by heavy vehicles.

2-9. Nozzles

Nozzles are devices which regulate the amount velocity, and form of water released from a hose. The following are the different types of nozzles used by firefighters.

a. Fog Node. A fog or spray nozzle (fig. 2-21) normally consists of a fog tip, a controlling shut-off, and, in the larger sizes, a playpipe with handles to make controlling of the nozzle easier, The fog or spray nozzle breaks up the water stream into particles of water which cover a larger area and increase the heat absorbing capability of the

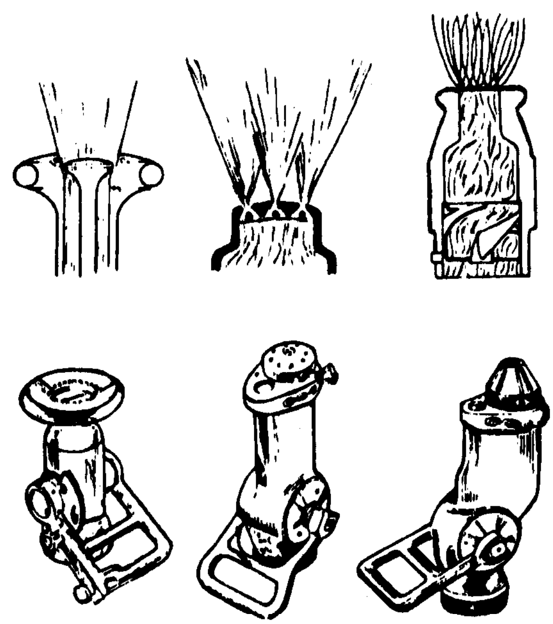


Figure 2-21. Types of high velocity fog