

Summary Report for Individual Task
551-88L-2067
Maintain Piping Systems
Status: Approved

Distribution Restriction: Approved for public release; distribution is unlimited.

Destruction Notice: None

Foreign Disclosure: FD5 - This product/publication has been reviewed by the product developers in coordination with the [installation/activity name] foreign disclosure authority. This product is releasable to students from all requesting foreign countries without restrictions.

Condition: Given an operational piping system aboard a vessel, at sea, at anchor or moored alongside a pier, day or night, under all sea and weather conditions, while wearing appropriate PPE, (i.e. hearing protection, Nitrile gloves, eye protection, etc.), lock out tag out kit and a marine rail tool box.

Standard: The Soldier correctly maintains a piping system aboard an Army vessel, IAW the appropriate Technical Manual and local SOP's without injury to self or others and without damage to equipment. The piping system was fully mission capable at task completion.

Special Condition: None

Safety Risk: High

MOPP 4:

| |
|------------------------|
| Task Statements |
|------------------------|

Cue: None

| |
|---------------|
| DANGER |
| None |

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|----------------|
| WARNING |
| None |

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|----------------|
| CAUTION |
| None |

Remarks: None

Notes: None

Performance Steps

1. Demonstrate basic knowledge of pipe system.

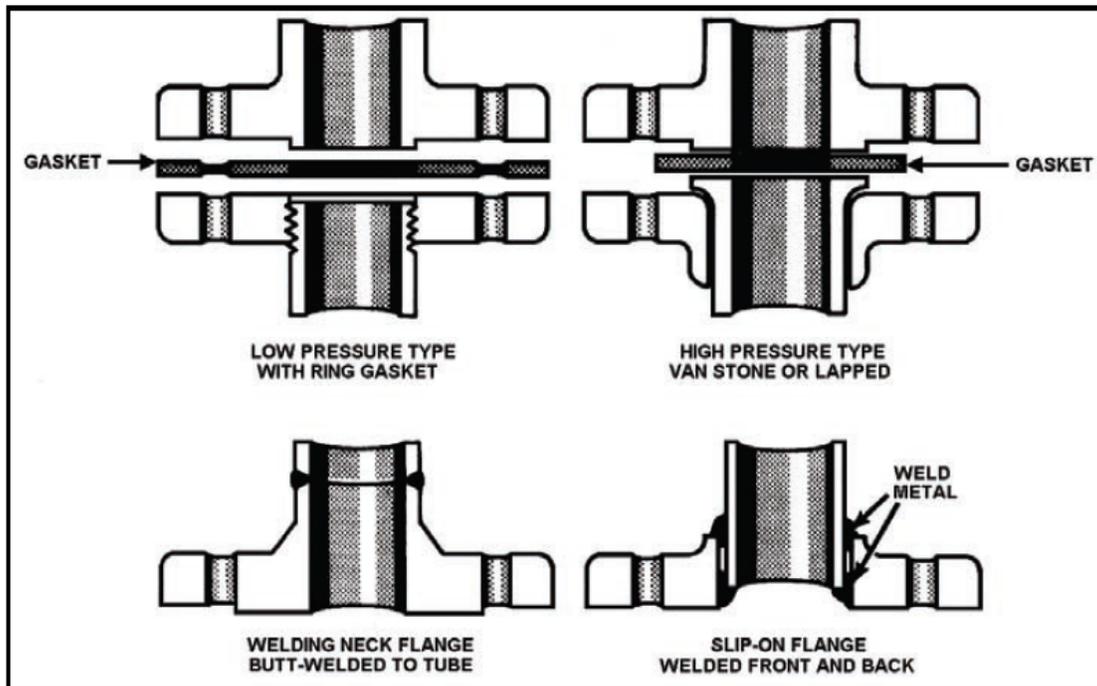
a. Piping is defined as an assembly of pipe or tubing, valves, fittings, and related components forming a whole or a part of a system for transferring fluids (liquids and gases).

b. The machinery of a system cannot work properly unless the piping and valves that make up the system are in good working order.

c. Piping sections of the proper size and material are connected by various standard fittings.

(1) **THREADED JOINTS** - Threaded joints are the simplest type of pipe fittings.

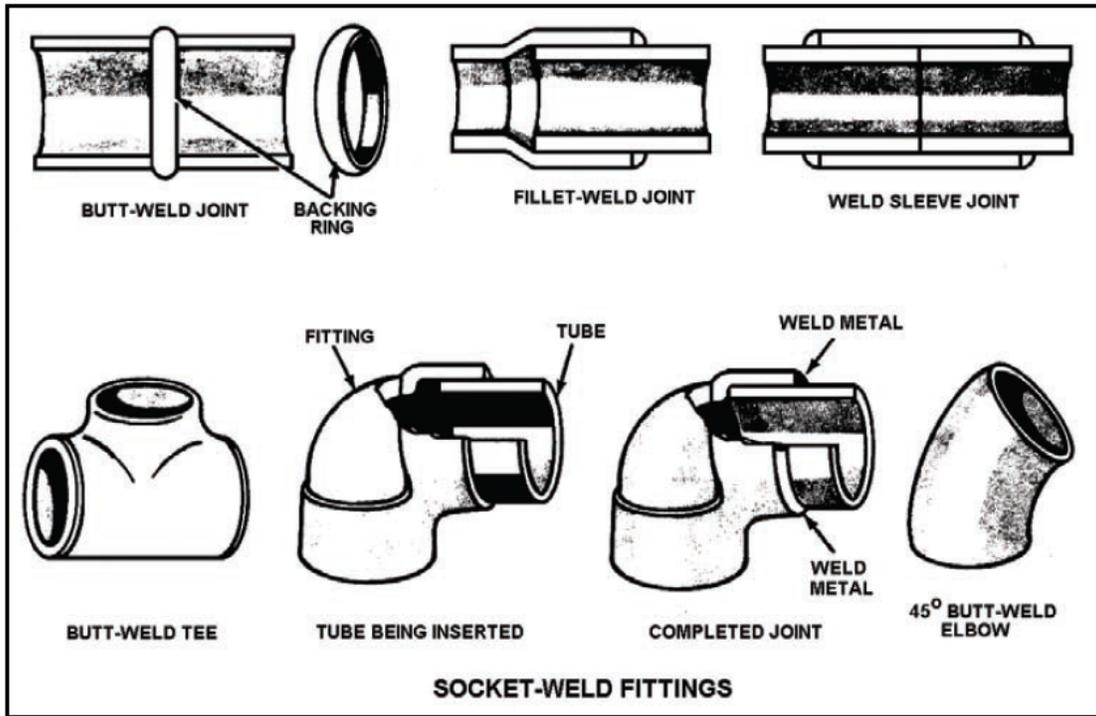
(2) **BOLTED FLANGE JOINTS** - Bolted flange joints are suitable for all pressures now in use.



Four Types of Bolted Flange Piping Joints

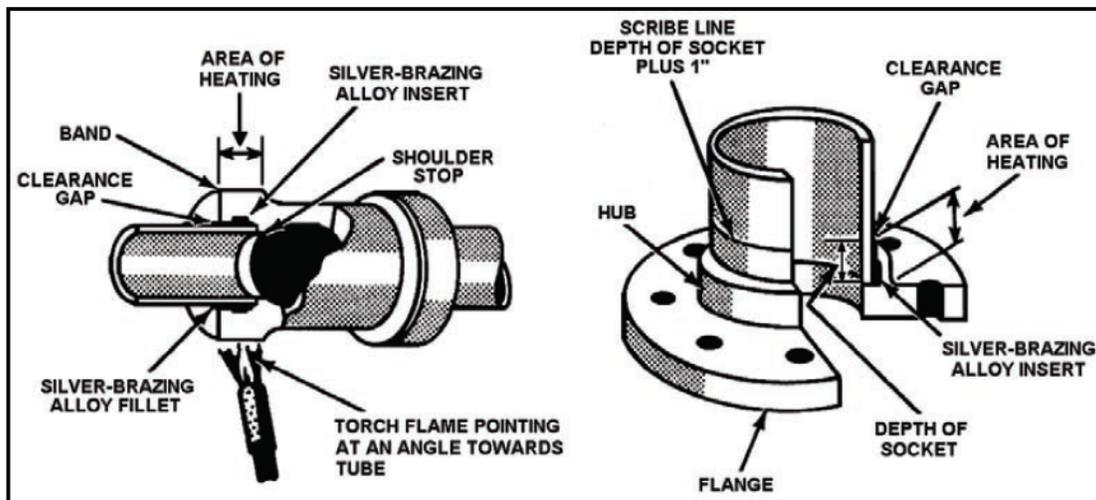
Figure 551-88L-2067_01

(3) **WELDED JOINTS** - The majority of joints found in subassemblies of piping systems are welded joints, especially in high-pressure piping.



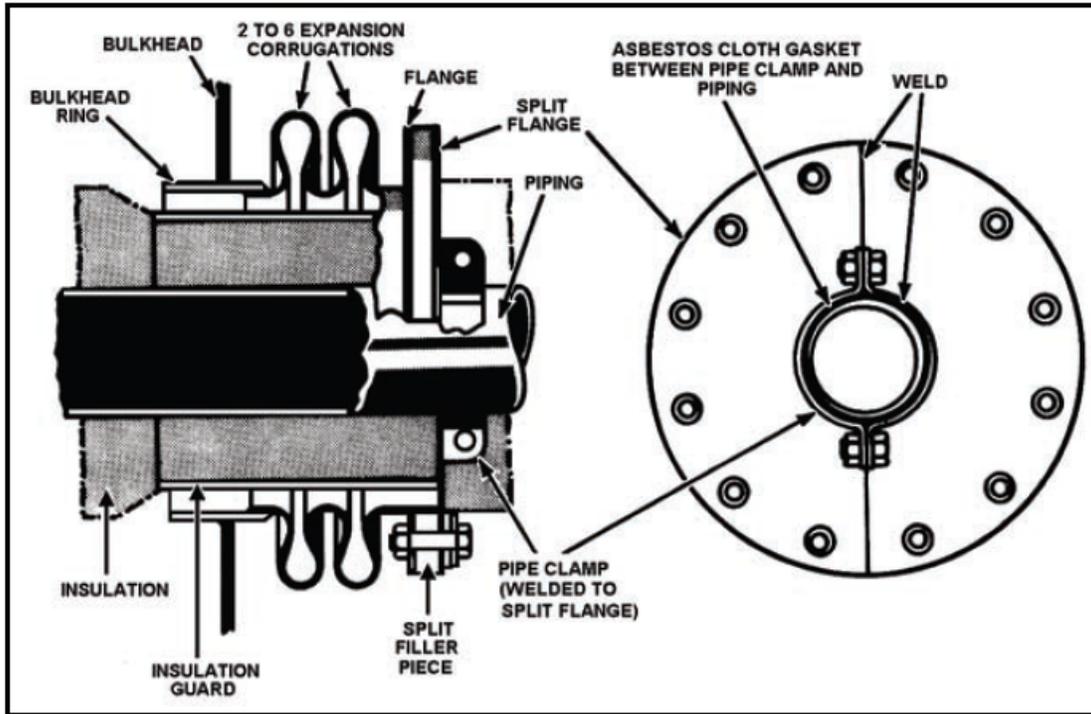
Various Types of Welded Joints
Figure 551-88L-2067_02

(4) SILVER-BRAZED JOINTS - Silver-brazed joints are commonly used for joining nonferrous piping when pressure and temperature in the lines make their use practicable.



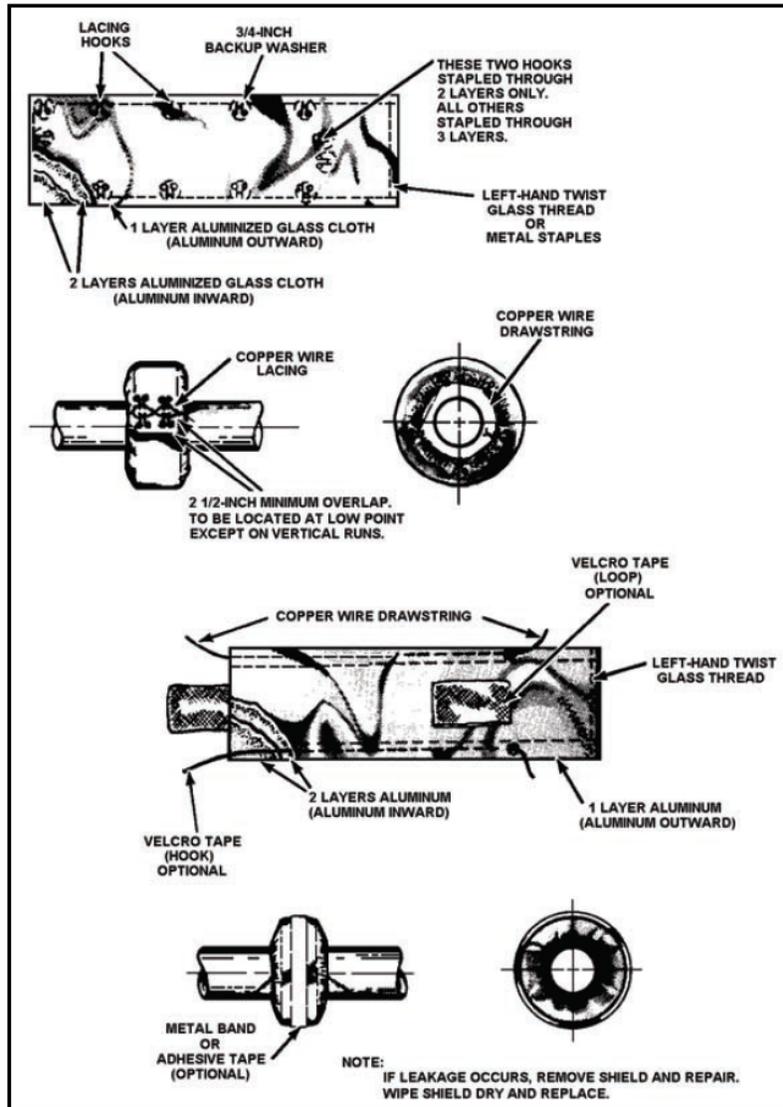
Silver-brazed Joints
Figure 551-88L-2067_03

(5) CORRUGATED AND BELLOWS JOINTS - The corrugated and bellows types of expansion joints are used for both medium and high pressures and temperatures.



Corrugated Bulkhead Expansion Joint
Figure 551-88L-2067_04

(6) FLANGE SAFETY SHIELDS - Spray shields are provided around piping flanges of flammable liquid systems, especially in areas where a fire hazard is apparent to prevent droplets or spray in case of fire.



Flange Safety Shield
Figure 551-88L-2067_05

d. Valves - A valve is a device (usually made of bronze) to start, stop, and regulate the flow of liquid, steam, or gas into, through, or from pipes.

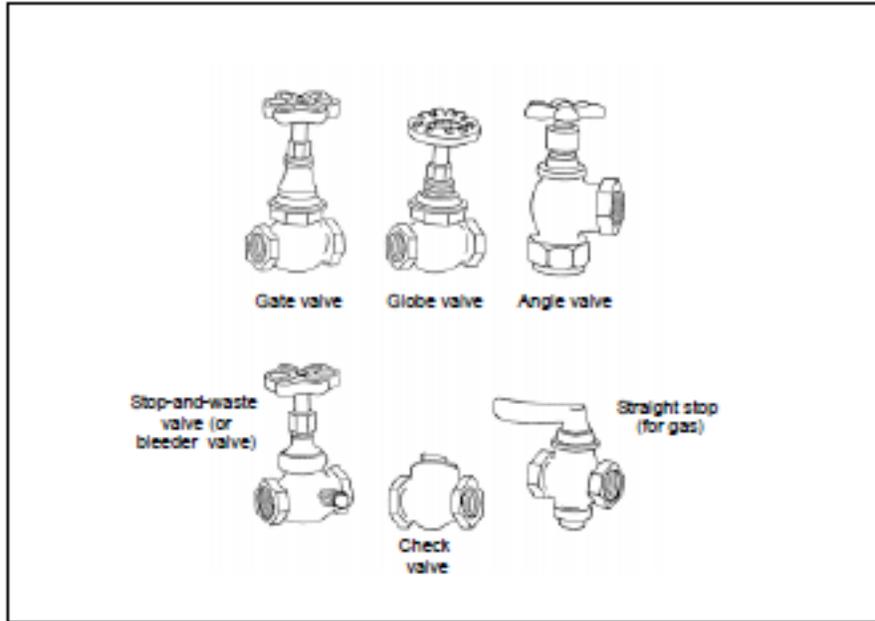
(1) GATE VALVE - A gate valve is used to start or stop liquid, steam, or gas flow.

(2) GLOBE VALVE - A globe valve is a compression-type valve that controls the flow of liquid by means of a circular disk, forced (compressed) onto or withdrawn from an annular ring seat that surrounds the opening through which liquid flows.

(3) ANGLE VALVE - An angle valve is a globe valve with the inlet and outlet at a 90-degree angle to one another.

(4) CHECK VALVE - A check valve permits the flow of liquid within the pipeline in one direction only and closes automatically to prevent backflow.

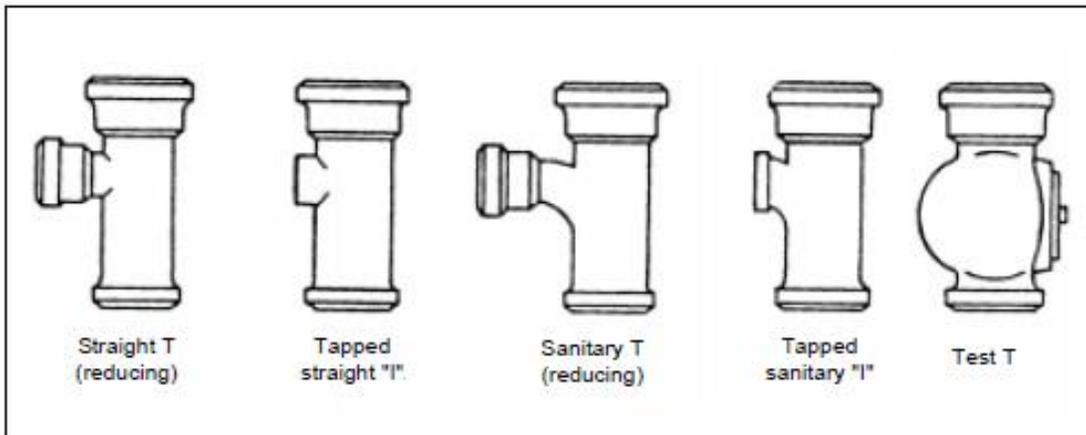
(5) STOP-AND-WASTE VALVE - A stop-and-waste valve, also known as a bleeder valve, has a plug on the outlet side that allows water to be drained from pipelines.



Valves
Figure 551-88L-2067_06

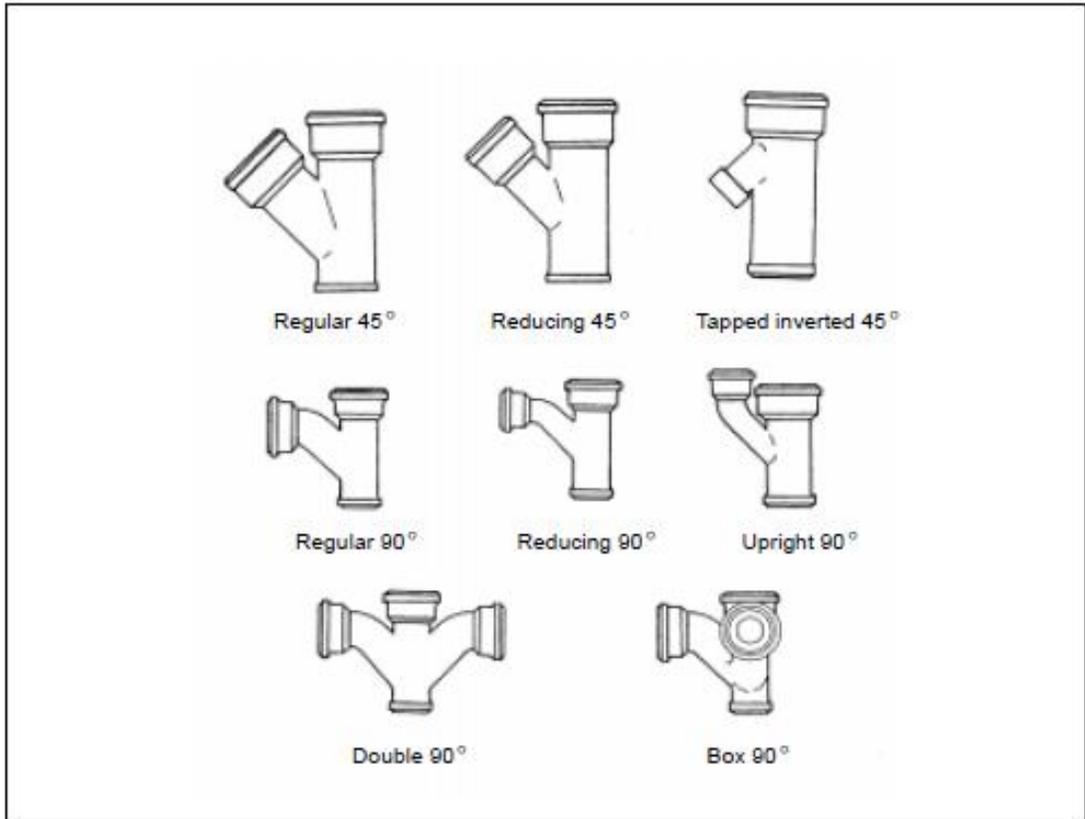
e. Fittings - The major types of fittings used are as follows:

(1) Ts - Sanitary Ts are designed to carry drainage and straight Ts are used for vent lines.



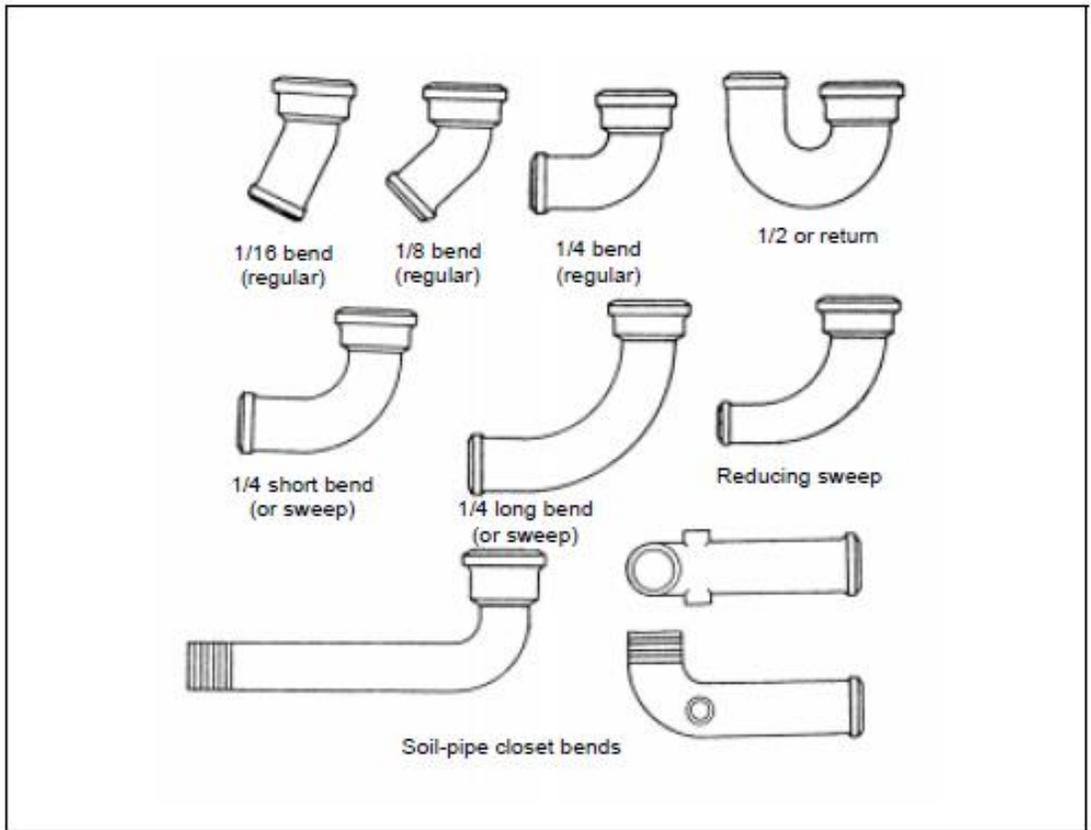
Ts
Figure 551-88L-2067_07

(2) Y-Branches - Y-branches are used to join one or more sanitary sewer branches or to connect a branch to a main line.



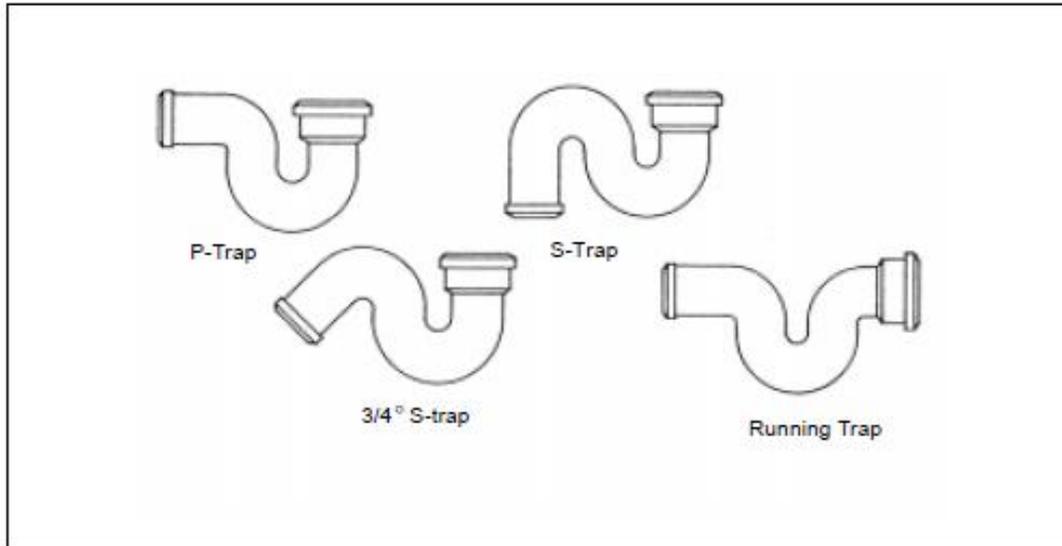
Y-Branches
Figure 551-88L-2067_08

(3) Bends - Bends are used to change the direction of a cast-iron ipeline.



Bends
Figure 551-88L-2067_09

- (4) Closet Bends - A closet bend is a special fitting to connect a soil waste branch line for a water closet (toilet).
- (5) Traps - A trap provides a water seal, which keeps sewer gases from entering a building through a waste outlet.



Traps
Figure 551-88L-2067_10

2. Perform basic maintenance of piping system.

a. Inspect piping system for corrosion.

b. Inspect piping systems for cracks, pitting, corrosion, scale, broken or thin pieces in the piping including welded joints, screwed fittings, expansion joints, and watertight bulkhead fittings.

c. All joints, valves, and cocks in the lines must be examined frequently and kept tight.

d. The external surfaces of uncovered and ungalvanized steel or iron piping should be kept properly painted and free of moisture.

e. Shipboard piping will be identified by a color coding and marking as specified in TB 44-0143.

(1) Color codes will be applied to valve handwheels only.

(2) Valve stems, threads, and tags will not be painted.

3. Perform maintenance of piping system for leakage at joint and pipe threads.

a. Leaks in joints can be corrected by slightly altering the anchorages, connections, hangers, or leads of the piping to allow the required expansion to prevent strain.

b. Leaky joints may also be due to poor alignment of the piping or to movement of decks or bulkheads.

(1) Realignments should be made so that flanges or screw threads meet properly without being forced.

(2) Sometimes flange joints may need to be refaced or distance (shims) pieces may need to be fitted.

(3) Small leaks in gaskets should be taken up immediately, before a dangerous blowout results from progressive growth of the leak.

c. Pipe thread leaks should be repaired promptly.

(1) Leaky screwed joints that cannot be tightened with a reasonable amount of tightening should be repaired.

(2) They should be taken apart, cleaned, examined for bad thread conditions, recoated with the appropriate (if any) compound and carefully reassembled to avoid any other thread damage.

(Asterisks indicates a leader performance step.)

Evaluation Guidance: None

Evaluation Preparation: None

| PERFORMANCE MEASURES | GO | NO-GO | N/A |
|--|----|-------|-----|
| 1. Demonstrated basic knowledge of pipe system. | | | |
| a. Defined piping system | | | |
| b. Identified joints | | | |
| c. Identified valves | | | |
| d. Identified fittings | | | |
| 2. Performed basic maintenance of piping system. | | | |
| 3. Performed maintenance of piping system for leakage at joint and pipe threads. | | | |

Supporting Reference(s):

| Step Number | Reference ID | Reference Name | Required | Primary |
|-------------|--------------|--------------------------------------|----------|---------|
| | TC 55-509 | MARINE ENGINEMAN's HANDBOOK | No | No |
| | TM 3-34.70 | Plumbing, Pipe Fitting, and Sewerage | No | No |

Environment: Environmental protection is not just the law but the right thing to do. It is a continual process and starts with deliberate planning. Always be alert to ways to protect our environment during training and missions. In doing so, you will contribute to the sustainment of our training resources while protecting people and the environment from harmful effects. Refer to FM 3-34.5 Environmental Considerations and GTA 05-08-002 ENVIRONMENTAL-RELATED RISK ASSESSMENT.

Safety: In a training environment, leaders must perform a risk assessment in accordance with ATP 5-19, Risk Management. Leaders will complete the current Deliberate Risk Assessment Worksheet in accordance with the TRADOC Safety Officer during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection, FM 3-11.5, Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Decontamination.

Prerequisite Individual Tasks : None

Supporting Individual Tasks : None

Supported Individual Tasks : None

Supported Collective Tasks : None

ICTL Data :

| ICTL Title | Personnel Type | MOS Data |
|---------------------------|-----------------------|--|
| 88L20 Watercraft Engineer | Enlisted | MOS: 88L, Skill Level: SL2, Duty Pos: TFS, LIC: EN |
| 88L30 Watercraft Engineer | Enlisted | MOS: 88L, Skill Level: SL3, Duty Pos: TFR, LIC: EN |
| 88L40 Watercraft Engineer | Enlisted | MOS: 88L, Skill Level: SL4, Duty Pos: TGB, LIC: EN, SQI: O |