

COURSE NAME: INDUSTRIAL PIPING SYSTEM

**LECTURE IV-WEEK IV: CATEGORIZE AND USE TOOLS USED IN
PIPING SYSTEM INSTALLATION**

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OBJECTIVES

By the end of this session the learner/student will be able to:

- ✓ Identify the categories of tools used in piping system
- ✓ Describe the use of tools used in piping system
- ✓ Differentiate the categories of tools used in piping system

IV.1. Introduction

Performing piping system activities requires having different tools; all those tools fall in the following categories: measuring, holding, marking and cutting tools. Each category perform specific function during pipeline installation or maintenance activities.

IV.2. Pipeline measuring tools

Measuring tools or instruments used in piping system are different depending on their functions; some can perform linear measurement (size and length of the pipe) and others can measure other parameters such as pressure, temperature, etc.

a. Measuring Tape

It is used for measuring the length of the physical object. It is very convenient and portable and thus can be easily carried from one place to another. It usually comes with a handy switch that locks the tape into a steady position. And when you release it, the tape retracts back inside the casing instantly.



b. Caliper

A caliper is a measuring tool used to measure the dimensions of an object such as thickness, outside and inside diameter, length, width, and depth. For pipe it can be used to measure the diameter (internal and outer), thickness of the pipe.



Source:

<https://www.theengineerspost.com/measuring-tools/>

c. Level

It is a type of measuring tool that is used to indicate the horizontal plane. The level is an optical device that consists of air bubbles in a liquid medium to display measured results. The tube is sealed and fixed horizontally to a block of wood with a smooth bottom surface



Source:

<https://www.theengineerspost.com/measuring-tools/>

d. Pressure Test Gauges

Pressure test gauges are used to check for leaks and water pressure problems. They only perform this one niche job and won't be used for every project. However, they are essential when checking water pressure, so even the average homeowner should have one.



Source: <https://housegrail.com/essential-plumbing-tools-list/>

e. Thermometer

Thermometer is used for measuring temperature. It is used to measure the object and surrounding temperature. It comes in different styles and is suitable for both out and inside the object. The digital thermometer has a digital display that works faster than the traditional ones.



Source:

<https://www.embibe.com/exams/instruments-for-measurement/>

f. Flowmeter

A flow meter (or a flow sensor) is type of flow instrument that is used to indicate the amount of liquid, gas, or vapor moving through a pipe or conduit by measuring linear, non-linear, mass, or volumetric flow rates.



Source: <https://www.omega.com/en-us/resources/flow-meters>

IV.3. Pipe holding, tightening and loosening tools

a. Pipe Wrench

Every pipeline technician needs a pipe wrench in his daily activities. It is the most massive wrench a technician probably needs and is used to tighten and loosen the nuts/fittings that hold pipes together. Any time a technician is going to work on pipes, he/she needs to have this wrench.



Source:

<https://housegrail.com/essential-plumbing-tools-list/>

b. Basin Wrench

The basin wrench is specially designed for working on pipeline which has faucets. It is T-shaped and has a clamp mechanism that helps reach narrow spaces to tighten hard-to-reach nuts and bolts often found on faucet piping system.



Source: <https://housegrail.com/essential-plumbing-tools-list/>

c. Adjustable Wrench

An adjustable wrench is helpful for a wide variety of tasks. If one of the other wrenches isn't suitable for the job, an adjustable wrench will likely work. It works best for hexagonal nuts, which are commonly found on pipes of all sorts



Source: <https://housegrail.com/essential-plumbing-tools-list/>

d. Faucet Key

This isn't technically a wrench, but it is a necessary part of any pipeline technician toolbox. These small tools are designed to open and close spigots and sill-cocks. If you want to be a serious plumber, you must work on spigots at some point. There are different tools for dealing with various stem fittings, so you may want to invest in a set



Source: <https://housegrail.com/essential-plumbing-tools-list/>

e. Garbage Disposal Wrench

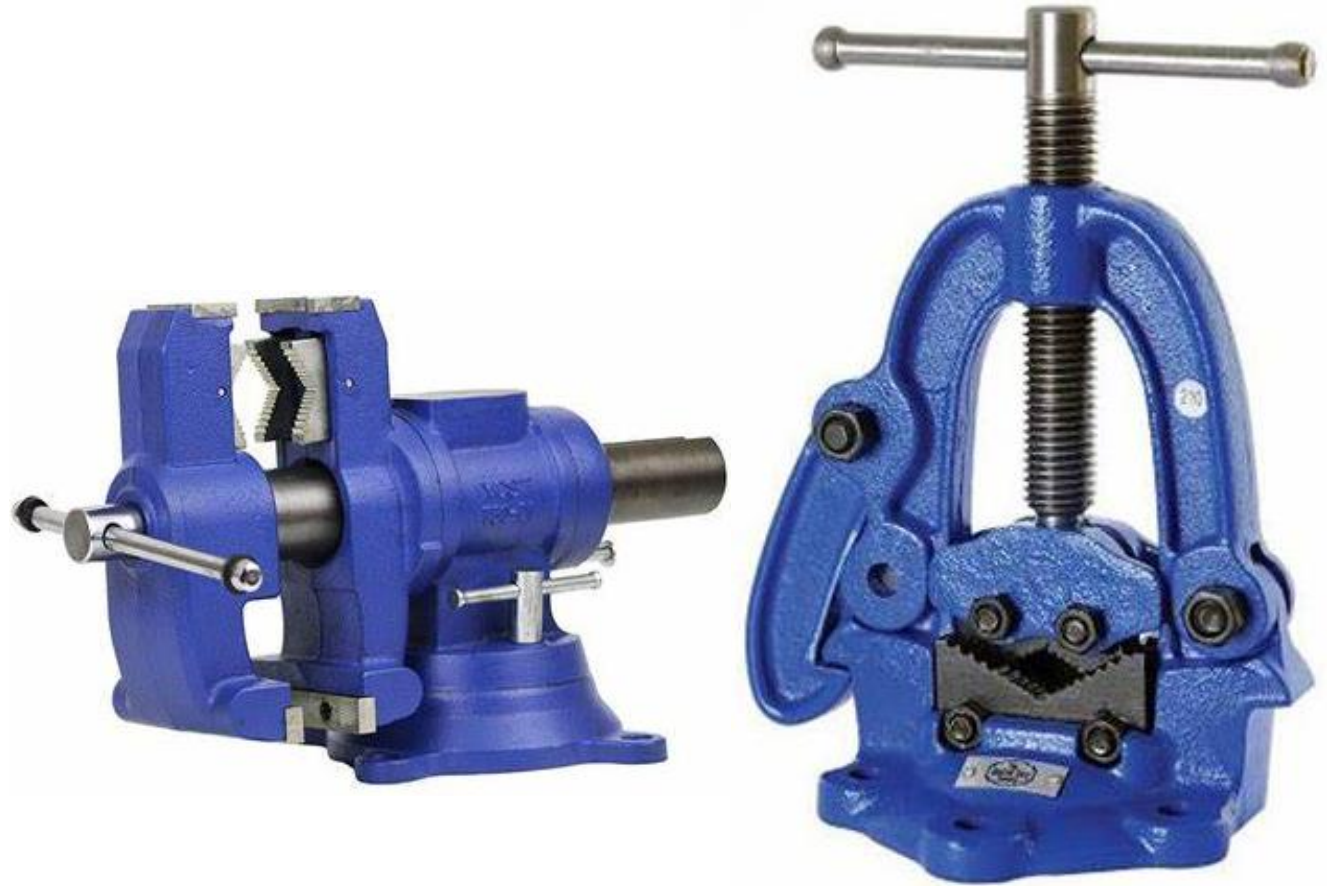
This wrench is used explicitly for garbage disposals. If you have a garbage disposal, you should have one of these. It can turn the shredder and help clear clogs. This inexpensive tool can prevent you from calling a plumber.



Source: <https://housegrail.com/essential-plumbing-tools-list/>

f. Pipe Vice

A pipe vice is a tool/device used to hold a pipe so that it can be cut, threaded and welded. In manufacturing environment, a pipe vice is a critical piece of apparatus in the assembly of pipeline components.



Source: <https://www.slideshare.net/hiro1524/pipe-vice>

g. Pipe Clamp

Pipe clamps are widely used in the piping and plumbing industry. They are used to fasten and fix pipes with structures to provide support, to provide fast, safe, economic service and installation in a piping system, and to absorb shock, dampen vibration, and reduce noise.



Adjustable pipe clamp



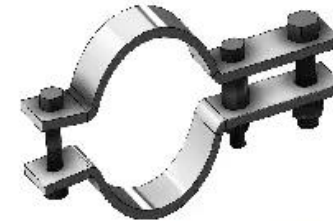
Cushioned Pipe Clamp



U-Bolt



Two-Bolt Pipe Clamp



Three-Bolt Pipe Clamp



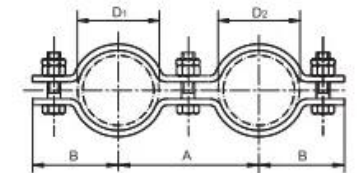
Yoke Type Pipe Clamp



Riser Clamp



Extended Pipe Clamp



Multiple Pipe Clamps

Source: <https://whatispiping.com/types-of-pipe-clamps/>

h. Tube Benders

A **pipe bender** is a tool used to bend piping of different materials and sizes, such as copper and stainless steel, to form various angles and curves. There are four main categories of pipe benders: manual, hydraulic, electric and mechanical.



Source: <https://housegrail.com/essential-plumbing-tools-list/>

i. Thread Sealing Tape

This tape is used to carefully seal small leaks or prevent possible leaks from occurring to begin with. It can be used at a threaded joint connection to make them stronger and prevent possible leaks. High-quality thread sealing tape is resistant to temperature changes, can stretch to form better seals, and never dries out. The low-quality tape will likely wear down faster and needs replacing more often.



Source: <https://housegrail.com/essential-plumbing-tools-list/II>

IV.4. Pipe marking tools

a. Pipe Wraps

Pipe wraps are used to mark pipes before cutting. The wrap is put around the pipe, making sure that all edges are perfectly aligned where the wrap overlaps itself. Pipefitters then draw a line around the pipe with a sharp piece of soapstone. This ensures a straight cut on the pipe.



Source: <https://housegrail.com/essential-pipefitter-tools-list/>

IV.5. Pipe cutting tools

a. Hacksaw

A hacksaw is necessary for cutting pipes, and without one, you may be unable to complete pipeline projects. They can also be used to cut through nuts and bolts. You should keep multiple blades nearby, just in case your primary blade breaks.



Source: <https://housegrail.com/essential-plumbing-tools-list/>

b. Plastic Pipe Cutters

Today, many pipes are made out of plastic. You'll need a plastic pipe cutter to work on plastic pipes, which you'll run into a lot, whether you're a professional. Luckily, these cutters aren't expensive, so you should have no problem stocking them in your toolbox



Source: <https://housegrail.com/essential-plumbing-tools-list/>

c. Pliers

You need pliers to work on pipes. You will be using them every day, just like wrenches. You should choose a pair of slammer pliers since you will likely work in tight places. These are great for bolts and nuts that are too far for your wrenches to reach.



Source: <https://housegrail.com/essential-plumbing-tools-list/>

d. Deburring Tool

Deburring tool is used to remove burrs from pipes. Deburring tools make this much faster, easier, and safer.



Source: <https://housegrail.com/essential-plumbing-tools-list/>

e. Reaming Tools

This simple tool enlarges pipe holes and openings. You'll need to do this at some point, though most projects will not require it. It is always best to have a reaming tool on standby in case you need it.



Source: <https://housegrail.com/essential-plumbing-tools-list/>

f. Pipe threading machine

A pipe threading machine is an equipment that is used to cut threads onto the end of a pipe. This allows the pipe to be screwed into a fitting, such as a coupling or an elbow. A cutting die is attached to the end of the machine, and this die cuts the threads onto the pipe as it is rotated.



Source: <https://www.pvcworkshop.com/pipe-threader/>

IV.6. Safety Equipment used in piping system

The application of piping system includes oil & gas industry, power plant, offshore and marine, chemical and petrochemical, pharmaceutical industry, food processing, solar energy, utilities such as water supply, sewage treatment, natural gas transportation, heat supply, fire extinguishing system, etc. From all these mentioned application we find that some can expose piping system professionals to risks that is why essential safety equipment are very important to be available

a. Goggles

The purpose of using goggles during piping activities is that debris or chemicals can damage eyes when installing or maintaining piping system. Contaminated water, bits of metal, and sparks can all injure the eyes while closely examining pipes and leaks. To prevent all those aforementioned hazards always goggles must be worn.



Source: <https://housegrail.com/wp-content/uploads/2021/08/Yuntuo-Safety-Goggles.webp>

b. Gloves

Having a set of nice gloves that you work with at all times as pipeline technician is very important. These equipment are needed because pipeline technician probably would be touching materials that shouldn't be touched with bare hands. Heavy-duty gloves are necessary and protect your hands from sharp metal, extreme temperatures, and chemicals.



Source: <https://housegrail.com/wp-content/uploads/2021/08/DEX-FIT-Nitrile-Work-Gloves-FN330-856x1024.webp>

c. Heat Shields

During soldering activities, a heat shield is very important to stay safe. You'll need one to protect yourself and the surrounding area from the torch's heat. It also prevents unnecessary fires, which can occur when flammable material gets too hot near the soldering torch.



Source: <https://housegrail.com/wp-content/uploads/2021/08/Reflective-White-Foam-Insulation-Heat-Shield.webp>

d. Safety boots

As a pipeline technician, you need a durable and comfortable work boot that is going to take on every situation you find yourself in. Pipeline professionals sometimes need to walk through pools of water frequently where they should consider getting these waterproof **boots**. Thus, boot should have good traction, be oil and slip-resistant, resist against heavy equipment, won't get feet wet and comfortable.



Source: <https://bruntworkwear.com/pages/best-boots-for-plumbing>

Working as a pipeline professional is a tough job, so having a great work boot is essential in order to help in work day performance. In this career, there is a need of safety boot that keeps them safe on the job and comfortable to wear all day. Whether you're working in residential or commercial plumbing and other industrial pipeline system you need a **waterproof work boot**, preferably with a **safety toe**, that is **oil and slip-resistant**. However, working in advanced pipeline systems may require a more durable boot with extra protection.

References

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