RESIDENTIAL IRRIGATION WORKSHOP "IRRIGATION 101 AND BEYOND" FOR WEST BENCH RESIDENTS

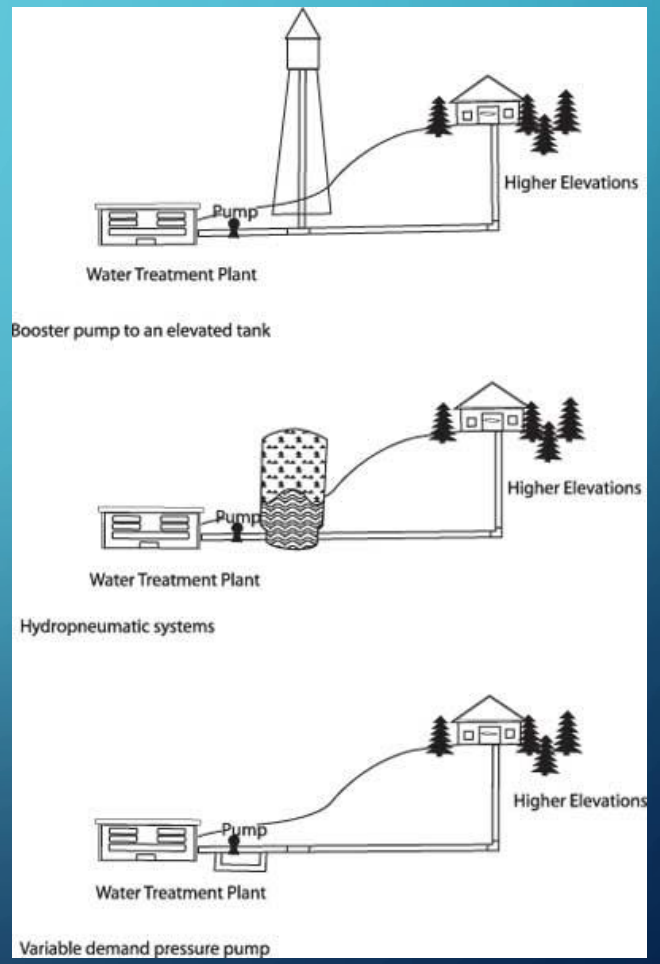
IDM
Irrigation Design Management

UNDERSTANDING BASIC HYDRAULICS

Hydraulics is defined as the study of fluid behavior, at rest and in motion.

Also known as:

Static pressure & Dynamic pressure



UNDERSTANDING BASIC HYDRAULICS

- One gallon of water weighs 8.3 lbs
- A cubic foot of water weighs 62.4 lbs
- A cubic inch of water weighs .036 lbs

UNDERSTANDING BASIC HYDRAULICS

$$P = \frac{\text{Force}}{\text{Area}}$$

P = pressure in pounds per square inch (PSI)

F = force in pounds

A = area in square inches

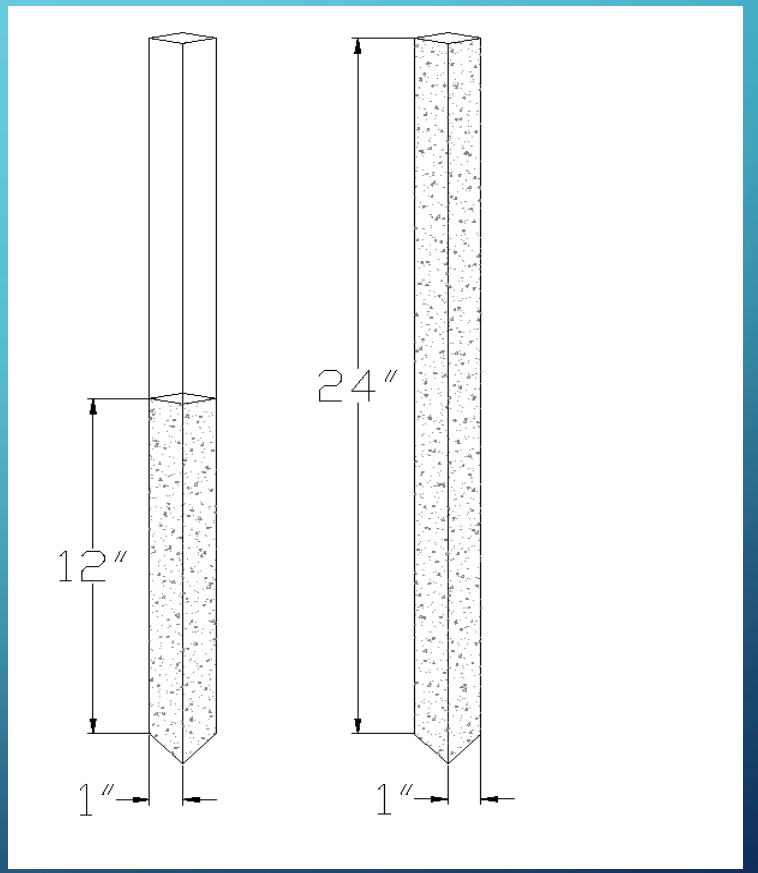
UNDERSTANDING BASIC HYDRAULICS

- One foot of water

  = .433 psi

- One psi

  = 2.31 ft



UNDERSTANDING BASIC HYDRAULICS

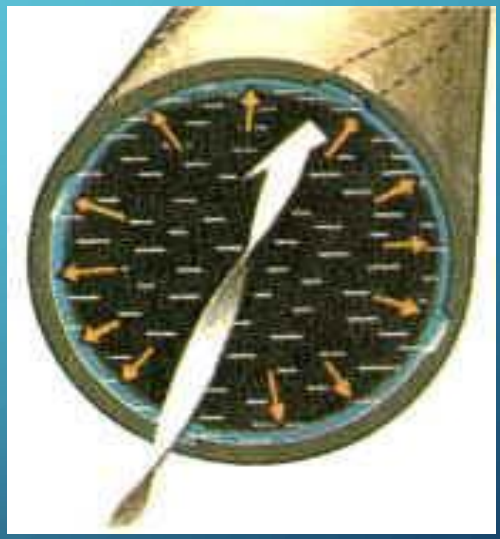
A container 1 in^2 is filled with water to a height of 1 ft. How much pressure (psi) is being exerted at the bottom of the container?

$$P = \frac{F}{A} = \frac{.036 \text{ lb } in^3 \text{ x } 12 \text{ } in^3}{1 \text{ in x } 1 \text{ in}} = \frac{0.433 \text{ lb}}{1 \text{ } in^2}$$

P = 0.433 psi

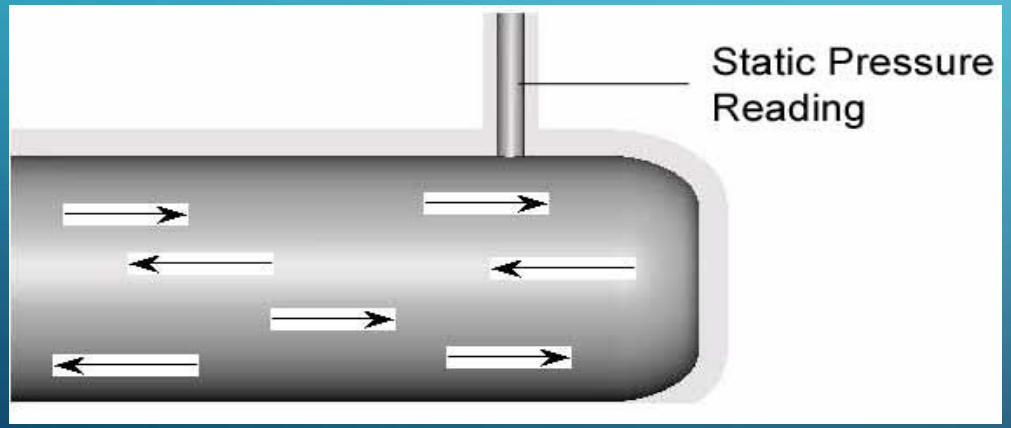
UNDERSTANDING BASIC HYDRAULICS

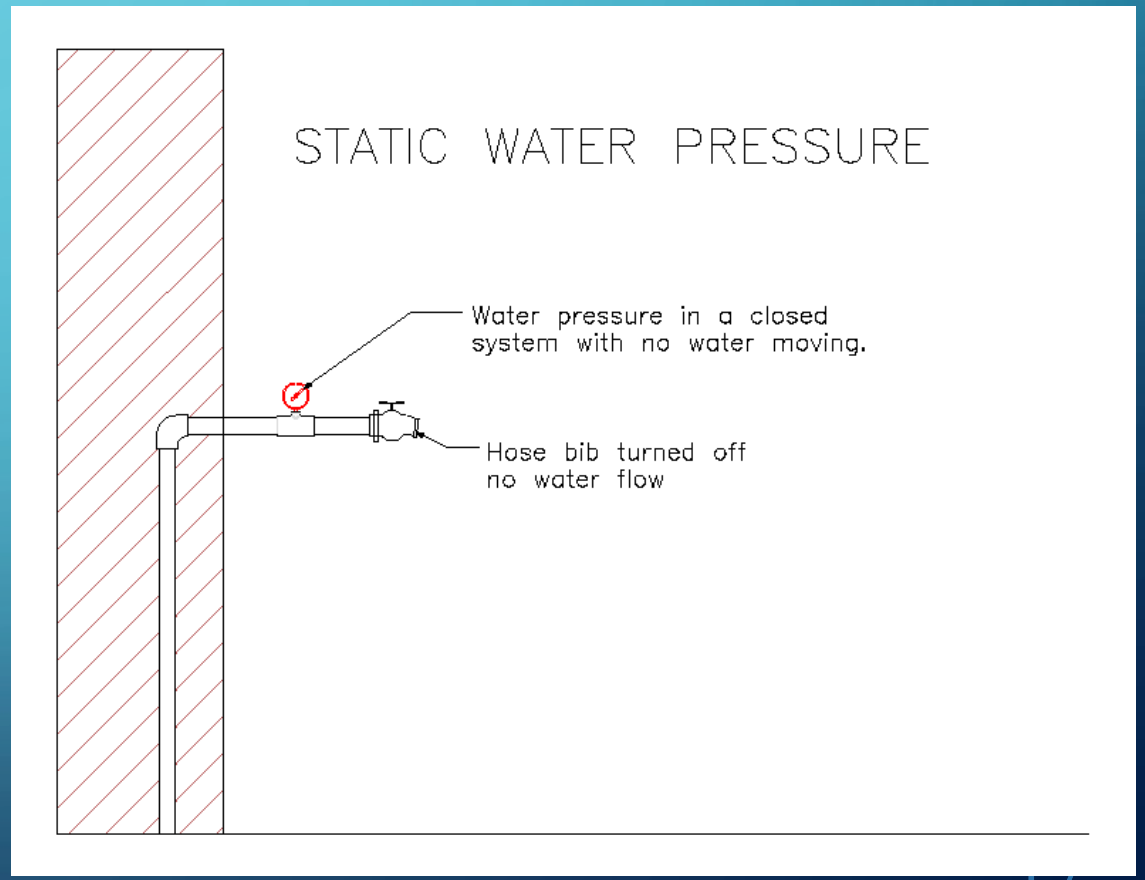
Friction loss is the reduction of water pressure which occurs as water travels over distance and through any kind of restriction.



STATIC WATER PRESSURE

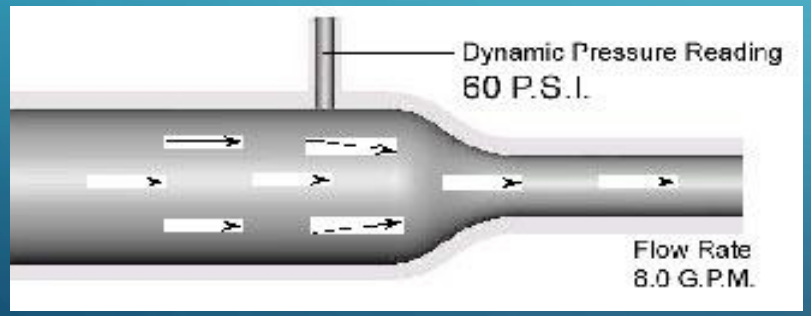
- Static water pressure refers to the pressure of a closed system with no water moving.

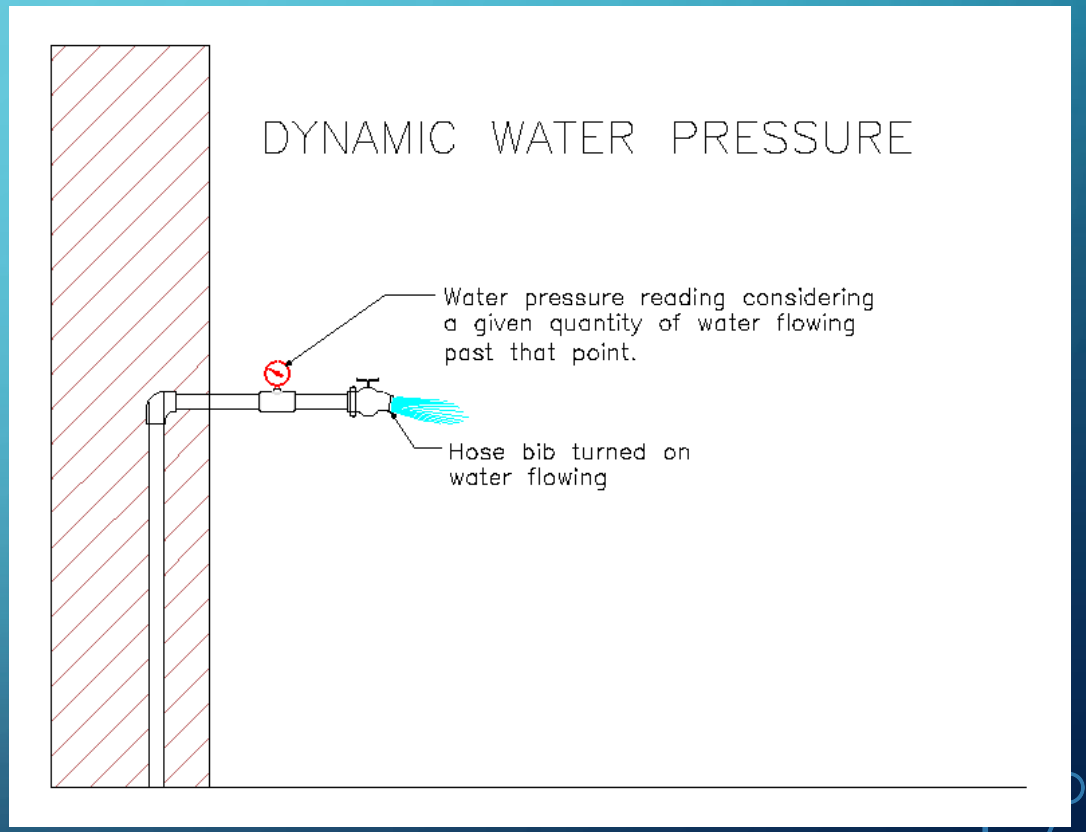




DYNAMIC WATER PRESSURE

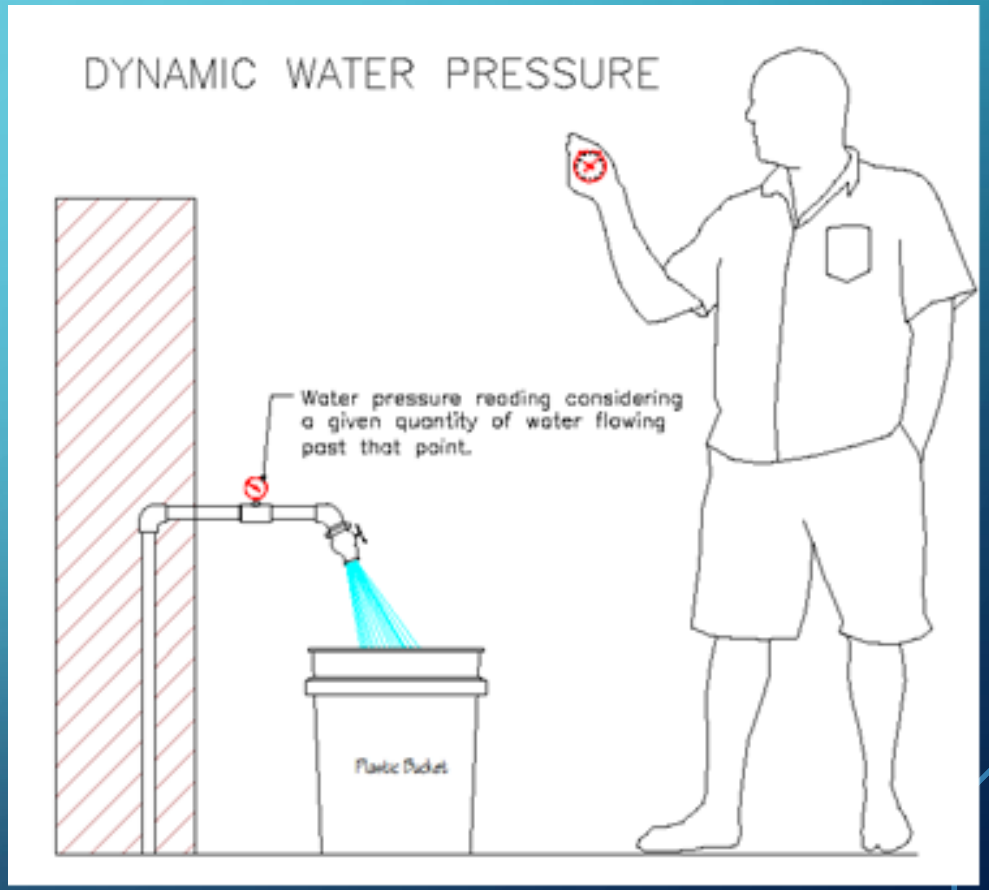
- The dynamic water pressure is the pressure at any point in the system considering a given quantity of water flowing past that point.





MEASURE FAUCET FLOW RATE

- While measuring the dynamic water pressure, open the faucet till the pressure gauge reeds minimal pressure required. Quickly place the container under the running water and time how long it takes to fill.



MEASURE FAUCET FLOW RATE

For: e.g.
If the 5 gallon bucket takes 40 seconds to fill, how many gallons will you get in 1 minute?

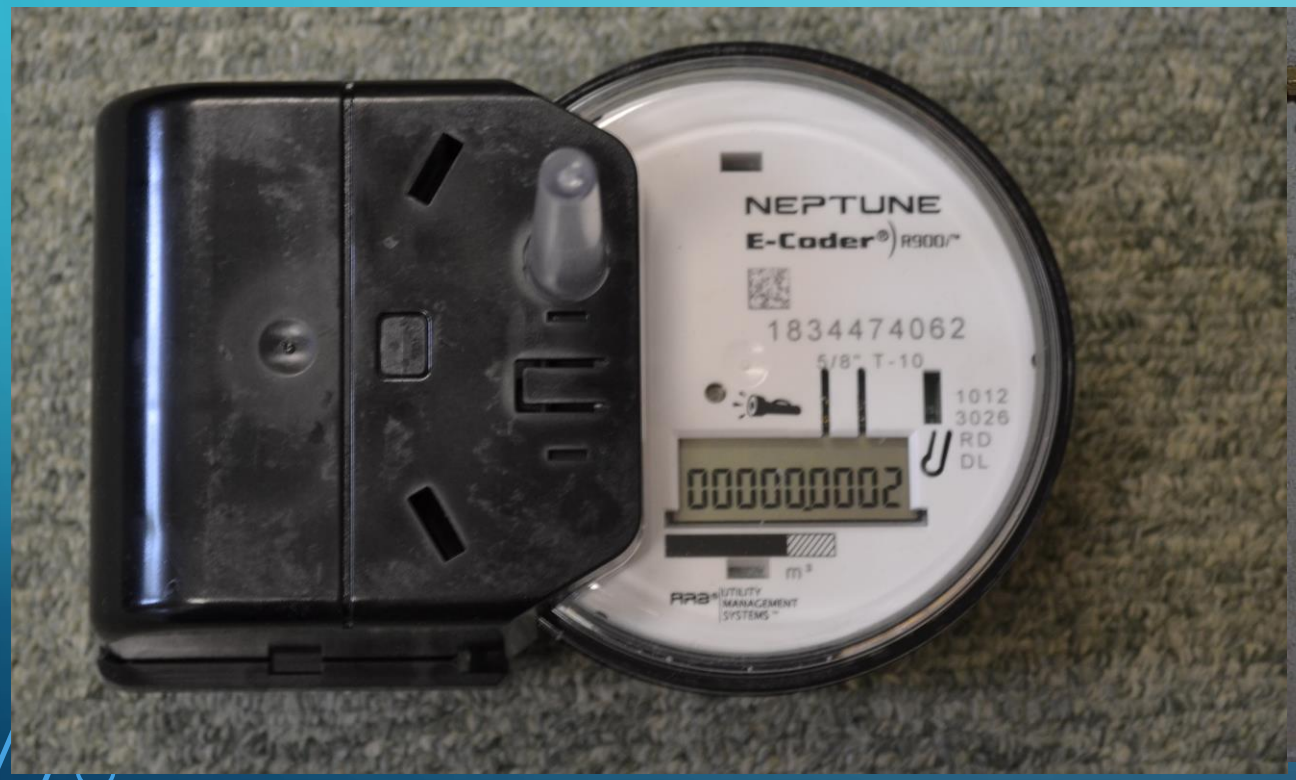
$$\frac{\text{40 seconds}}{\text{5 gallons}} = \text{8 GPM}$$

You have now established the maximum GPM and the approximate working pressure available for the sprinkler system.

SOLVENT WELDING PIPE

- Use the two-step method (employing cleaner/primer and solvent).
- Inspect the pipe end and fitting socket for cracks, gouges, dirt, and abrasion.
- Test-fit them. The pipe should enter the fitting but meet resistance part-way in. Held upside down, it should hold on and not fall off.
- Cut pipes. Cut the pipe off squarely to proper length using a fine-tooth saw or plastic pipe cutter then remove any burrs left behind.
- Clean them. Using a quality cleaner/primer, clean the pipe end and fitting socket. Apply cleaner/primer with a dauber to remove grease, oil, dirt, and to prepare the plastic mating surfaces for solvent cement action. The pipe should be dry before applying cement.
- Solvent welding. Brush on a coat of ASTM-rated solvent cement that is matched to the type of pipe and fitting you are using. It is important that the solvent cement is the right type.
- Liberally apply cement first to the pipe end and then apply it sparingly to the fitting socket. Leave no bare spots.
- Immediately join pipe and fitting full depth with a slight twist that brings it to correct alignment. The twist breaks up insertion lines in the solvent cement. Hold the fitting on until the solvent cement grabs tightly.
- The fillet of cement around the fitting indicates that enough solvent cement was used to ensure a leak-free joint. With PVC do not wipe off the fillet. The joint should be ready for use in an hour. The rule of thumb is a minimum of 1 hour for every 1" of diameter.

WATER METER


NEPTUNE
E-Coder R900/
1834474062
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1012
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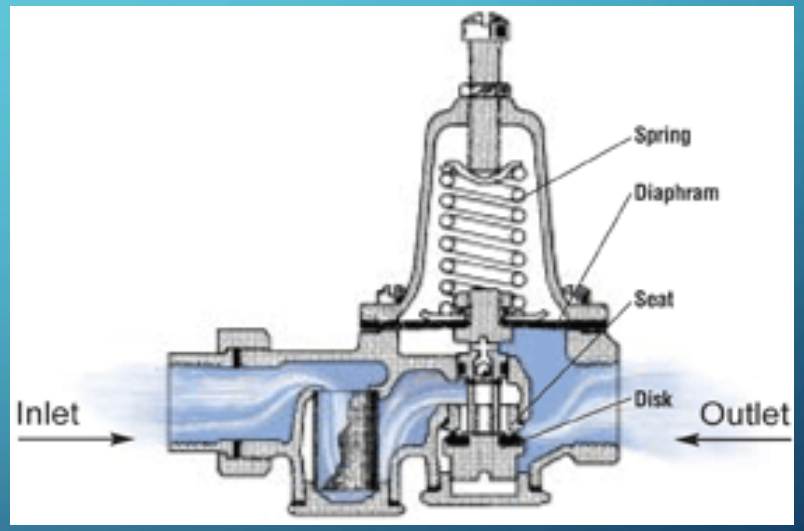
UTILITY MANAGEMENT SYSTEMS

PRESSURE-REDUCING VALVE

Acts as a buffer between the high water pressure supply and the system.



IRRIGATION CONTROLLERS

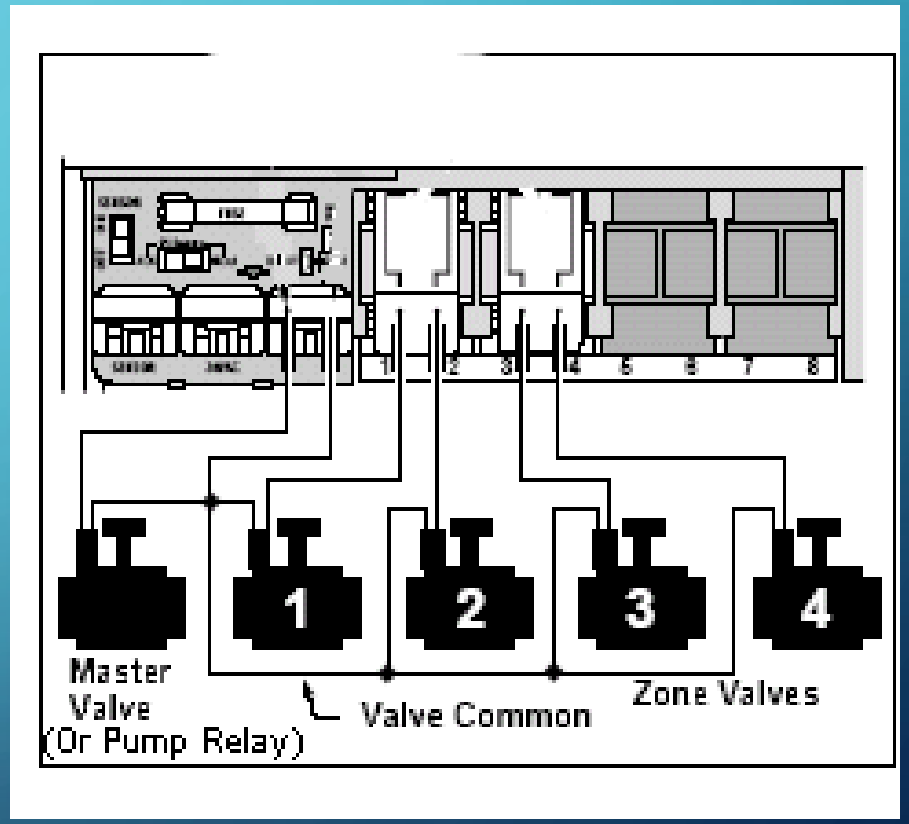
They can be simple devises with sliders to control functions or as complex as a central control system that might be utilized by a city to control all it's green space.

RAIN SENSORS

- The reliable wireless and wired rain sensors conserve water by preventing irrigation during or after sufficient rainfall.

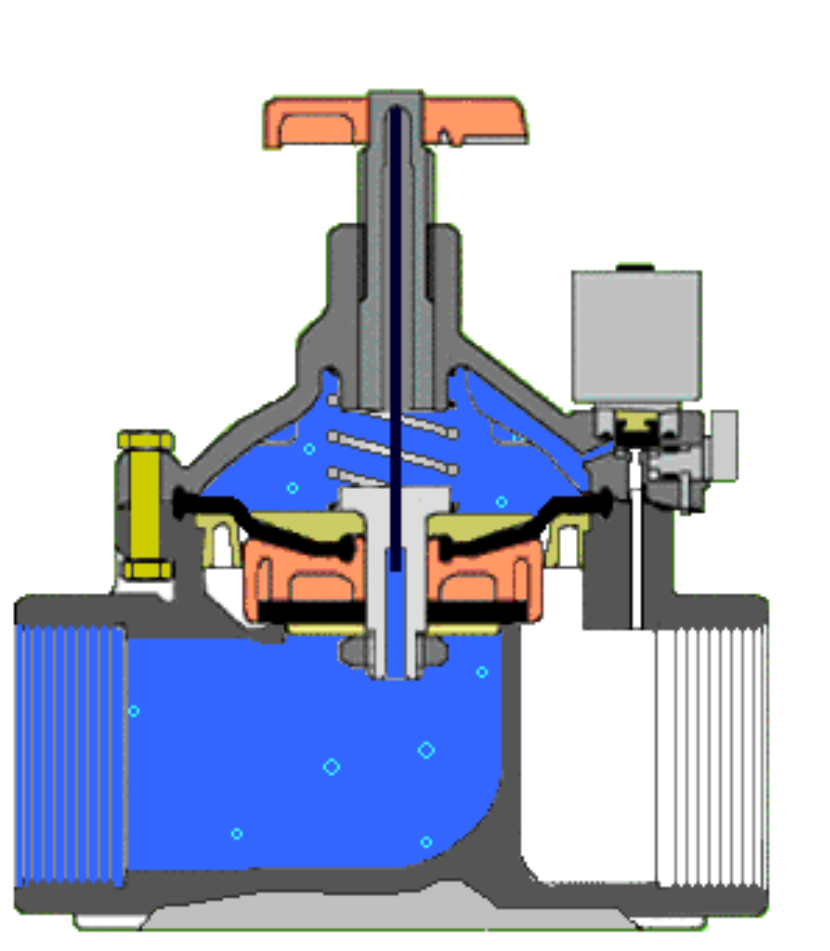
IRRIGATION CONTROLLERS

The controller has two different imputes for each valve. First impute is called the common, this will either be marked with a C or COM in the controller, one wire from all valves will be linked to this impute in series. On the controller board we will find a number of imputes labeled with numbers, each one will represent a zone or individual valve, a single wire will be required from each valve to one of these impute.



SOLENOID VALVE

Within a series of chambers the valve utilizes line water pressure exerted over diaphragm surfaces to control the movement of the diaphragm



SOLENOID VALVE

Rule #1

When there is an issue with the valve not shutting off, the problem will be with the diaphragm. The easiest cure is just to replace it with a new one.

Rule #2

When there is an issue with the valve not opening when using the controller, the problem will be electrical to do with the solenoid or the wire leading to the solenoid (a break).

WEEPING VALVES

- Weeping valve can be caused by debris in solenoid or diaphragm.
- If you have water flowing from a sprinkler head continuously, even when the sprinkler system is off, then the problem is a leaking control valve
- Another common sign is puddles of water around the lowest sprinklers that never dry out.
- To fix the leaking valve you must disassemble the valve, clean it and replace any bad parts, then reassemble it.