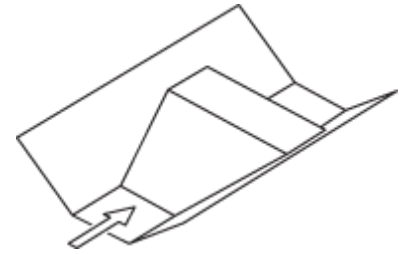


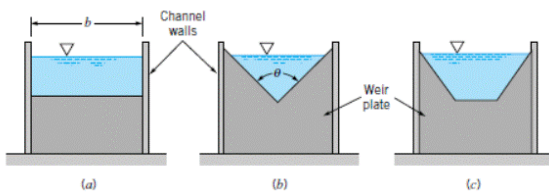
Types of Flow Measurement

Ramp Flume

- Open Channel Flow measurement.
- Can be custom sized/shaped for specific canal or ditch geometry.
- 5%+/- accuracy in normal field flow conditions.
- Low investment for accurate water measurement.
- Portable Ramp Flume do not require flow rate table (direct read flow gauge).



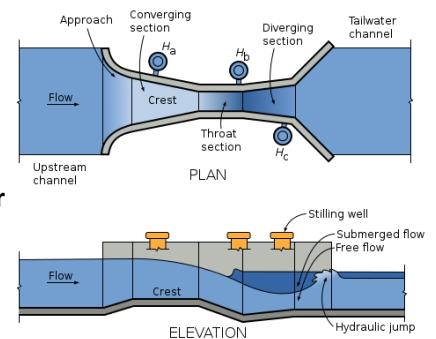
Weir Plate



- Open Channel Flow measurement.
- Weir plates have many types of geometry (suppressed, v-notch, cipoletti, contracted, etc.)
- Fit great in concrete ditch boxes.
- Can be incorporated with splitter plates to accomplish measurement and split in same location.
- Crest needs to be sharp.
- Weir should be vented to prevent nappe from hugging weir.

Parshall Flume

- Open Channel Flow measurement.
- Sized by throat width to accommodate different flow ranges.
- 5%+/- accuracy in normal field flow conditions.
- Needs a calm approach and free flow out of the throat (there are charts for submerged flumes).
- Created by a CSU professor, Ralph Parshall. Very common in Colorado.



Pressure Gauge

- In pressurized systems there is a ratio of pressure to flow.
- This allows sprinkler manufactures to develop an output curve for sprinkler heads.
- Inexpensive way to ensure proper operation of irrigation systems.
- Works great for big gun systems to ensure overlap/uniformity.
- Allows producers to balance out complex irrigation systems with multiple types of irrigation types.



Propeller Meter



- Mechanical Operation (moving parts).
- Inserted into pipe. Can get algae buildup or trash caught on propeller (Friction loss?).
- Can have issues with low flows (always check design flow range).
- More straight pipe required .
- Cheaper than mag or ultrasonic flowmeters.
- May require a straightening Vane.

Mag Meter – Electromagnetic

- Voltage proportional to flow is generated by moving water.
- No Moving Parts.
- Noninvasive to flow.
- Minimal straight pipe required.
- Higher Price.



Seametrics AG2000
Mag Meter

Ultrasonic Meter

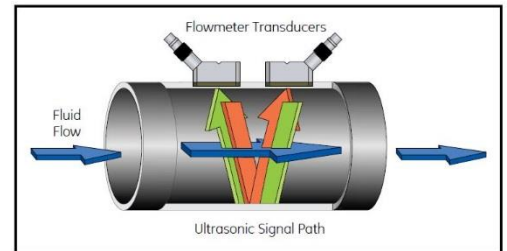
- Sound waves determine velocity of fluid via Doppler effect.
- No moving parts.
- Noninvasive to flow.
- Minimal straight pipe required.
- Higher price.

Octave Ultrasonic Water Meter



GE Panametrics Portable Ultrasonic Flow Meter

- Sound waves determine velocity of fluid via Doppler effect.
- Must have full pipe flow to take measurement.
- Not very user friendly.
- 0.5" to 300" pipe size
- Rangeability 400:1
- 10dia upstream and 5dia downstream straight pipe required.



Hach Open Channel Flow Meter

- User friendly way to calculate flows in ditches, streams and rivers.
- Real time data and will log info for later download (10 profiles with 32 stations each).
- Uses electromagnetic sensor to determine water velocity.



Sotera Turbine Flow meter



- For a 1" pipe.
- 3 to 26 gpm range.
- Has an internal turbine (Debris will get hung up on turbine, needs fairly clean water).
- Accurate for small acreage/market garden applications.

SpotOn Irrigation Flow Meter

- Great for checking older pivots to verify that nozzles are still at the desired flow rate
- Can be used on many types of sprinklers and gated pipe also.
- 0 to 15 gpm range.
- Determines flow rate by weighing water

