

Facilities for aquaculture FISH5630

Electrical system

http://www6.homedepot.com/tv/hdtv_player.html?videoID=000119

http://www6.homedepot.com/tv/hdtv_player.html?videoID=000075

Electrical problems:



- Electrical motors (unless designed otherwise) produce sparks, if flammables are present you have a fire or explosion.
- Electric equipment should be grounded, GFI when appropriate. If there is no ground there is no GFI interruption!
- Extension cords should be avoided, when used they need to be of appropriate size and in good shape.
- Electrical repairs and splicing should be done by an electrician.
- Unplug all equipment when working on it.

Numerous electrical hazards



Safety

- Turn off electricity
- Double check with hand meter
- Touch with the back of your hand if you are unsure (contraction of muscles may pull you away if there is a current)
- Keep dry
- Have rubber soled shoes.

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- Voltage, wattage, and amperage all work together and effect each other,
- **Watts (wattage):** Measure of total electrical power of a device, the end result.
- **Volts (voltage):** potential energy in a circuit before amperage and resistance come into play (to create the wattage of an appliance). Refers to the line electric runs through, or how fast the electric runs through that line. In a US household, the lines are usually 110-120V or for higher use systems (220-240V).
- **Amps (amperage)** is what actually costs you money on your electric bill. Amperage is the actual current being pulled from the line. Amps is a measure of the wattage divided by the voltage, $A=W/V$.

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- So naturally if you increase your volts it will take less amperage to power your appliance.
- **1: EXAMPLE:** If you use a 9 volt battery to power a 60 watt light bulb... You are drawing 6.6 amps of electricity from a 9 volt circuit to power device that creates 60 watts of power. $60W / 9V = 6.6666$ **AMPS** **2: EXAMPLE:** Now say you are powering that same 60 watt light bulb in your home off a 110V line. You would be pulling .54 Amps... $60W / 110V = .54$ **AMPS** **3: EXAMPLE:** Now say you live in Europe and you are powering that same 60W light bulb, but off a 220 volt line... $60W / 220V = .27$ **AMPS**
- Ohms – measures continuity
- Farad (U) measure used for capacitors to control start up voltage and amperage.

Service panel

- Line in from meter
 - (1) Neutral, (2) Hot lines, (1) Ground
- In from ground to the panel
 - (1) ground wire
- Panel has two lines in



- Panel has two lines in
- Breakers determine the line capacity (amp and voltage)
 - 1 hot line & neutral = 110-120 V
 - 2 hot lines & ground = 220-240
- Breakers are matched to the line capacity and can not exceed the lines capacity to carry electricity
 - Breaker is designed to trip prior to the line burning from to high a load.

Electrical use

- When setting up a facility you must estimate all electrical demands.
 - Determine expected uses for electricity. Remember startup amps are almost 2X running amps.
 - Remember to consider emergency use and possible future expansion. i.e. today you may be using 3 hp/acre but in the future you may need 5 hp/acre. Thus you must evaluate costs for future expansion of use.
- In addition to demand you must also look at circuits. This is a cost, convenience vs risk analysis.

Motor wiring (Single Phase)

- Most motors do not come with plugs, hence you must wire in a new plug and you may need to switch rotation or voltage.
- Remember L1 is the hot line for 120






