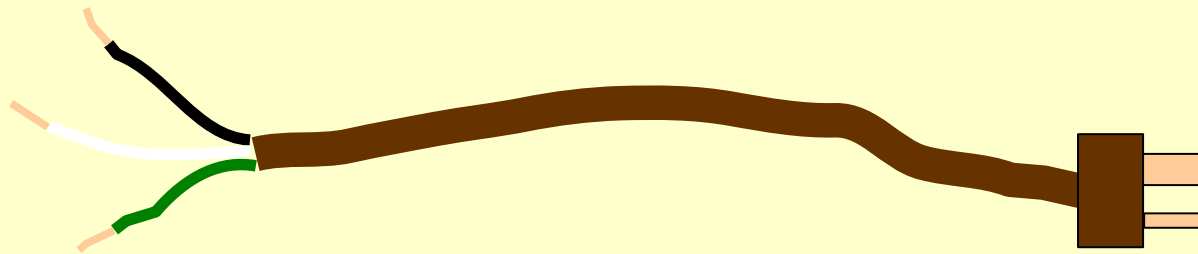


It Just Kills Me...

- ◆ People have been killed by as little as 30 Volts.
- ◆ As little as 100 milliamperes can be fatal.
- ◆ The heart can be fatally affected by a very small amount of electric current.
- ◆ The path electric current takes across the body is important. Therefore, always keep one hand in your pocket when working near dangerous voltages.

Three Wire Plug



In a three wire AC electrical line:

Black is **HOT**

White is NEUTRAL

Green is Chasis Ground

The Fuse

- ◆ A fuse or circuit breaker should always be added in series with home built equipment that is powered from 110 volt AC lines.
- ◆ In a 12 volt DC system fuses should be located at the voltage source.
- ◆ When a fuse blows an open circuit is created.
- ◆ Never replace a blown fuse with a higher amperage rated fuse.



Two Types of Radiation

◆ Ionizing

- Can knock electrons loose from their atoms forming positive & negative ions
- Gamma rays, X-rays, and ultraviolet rays

◆ Non-ionizing

- Radio frequency waves
- Can cause heating of biological tissue
- If sufficient energy is present, can cause burns

RF and the Human Body

- ◆ The human body's ability to absorb RF energy varies with frequency.
- ◆ Exposure of the human body to high levels of RF energy can cause heating of body tissue.
- ◆ Exposure of the eye to RF can expose the eye to more than the MPE limit and cause heating, which can result in the formation of cataracts.

Who is Exempt?



The RF safety regulations do NOT apply to:

- A. Any station that produces less than 50 watts PEP
- B. Mobile equipment
- C. Hand-held radios

Mobile & Hand-held Considerations

- ◆ Even though hand-held radios are exempt from RF exposure limits, minimum power should be used with a hand-held to minimize RF exposure to the operator's head.
- ◆ A mobile transceiver with roof mounted antenna would have better shielding for the vehicle occupants than using a hand-held transceiver in a vehicle.

Measurement Units

- ◆ The power density of a radiated RF signal is measured in “milliwatts per square centimeter (mW/cm²).”

Determining RF Power Densities

Use one or more methods in the amateur supplement to FCC OET Bulletin 65

- Direct measurement of the RF fields
 - Requires calibrated field strength meter
- Calculate the RF fields with a computer model
- Use the charts published by the FCC in OET Bulletin 65

RF Safety & Duty Cycle

- ◆ Duty cycle takes into account the amount of time a transmitter is operating at full power during a transmission.
- ◆ The lower the duty cycle, the shorter the compliance distance.
- ◆ The higher the duty cycle, the longer the compliance distance.
- ◆ Lower duty cycles expose people to lower radio-frequency radiation.

Operating Mode	Duty Factor
Morse code (CW)	40%
SSB phone	20%
FM	100%
RTTY/Digital	100%
AM	100%

RF Exposure Limit Factors

- ◆ Duty cycle
- ◆ Frequency & power level
- ◆ Antenna height & distance to a person
- ◆ Antenna radiation pattern
- ◆ Any of these can be changed to prevent exposure to RF radiation in excess of FCC specified limits.