

Chapter 13: Basics of Electricity

Cosmetologists should have an understanding of electricity because **they rely on and use electrical appliances, it will help them to use those appliances safely, and it impacts the services offered to clients.**

Electricity is the movement of particles around an atom that creates pure energy.

- **Electric current**- the flow of electricity along a conductor
- **Conductor**- any material that conducts electricity; electricity will pass through the material easily (most metals, water)
- **Nonconductor**- also known as an insulator; material that does not transmit electricity (rubber, silk, wood, glass, cement)

TYPES OF ELECTRIC CURRENT (p. 265)

- **Direct current- (DC)**; a constant, even-flowing current that travels in one direction only and is produced by chemical means
- **Alternating current- (AC)**; a rapid and interrupted current; flows first in one direction and then in the other; produced by mechanical means
- **Converter**- changes direct current to alternating current
- **Rectifier**- changes alternating current to direct current

ELECTRICAL MEASUREMENTS (p. 266)

- **Volt (voltage)**- unit that measures the pressure or force that pushes electric current forward through a conductor
- **Amp (amperage)**- unit that measures the strength of an electric current
- **Milliampere**- the current used for facial and scalp treatments (an ampere would be too strong and cause damage)
- **Ohm**- unit that measures the resistance of an electric current
- **Watt**- unit that measures how much electric current is being used in one second
- **Kilowatt**- 1000 watts

ELECTRICAL EQUIPMENT SAFETY

Safety Devices

- **Fuse**- prevents excessive current from passing through a circuit
- **Circuit breaker**- switch that automatically interrupts or shuts off an electric circuit at the first indication of an overload
- **Grounding**- completes an electric circuit and carries the current safely away
 - *Two-prong plug*- two connects on the plug, one slightly larger so plug can only go into the socket one way
 - *Three-prong plug*-has a third circular prong called a grounding pin; guarantees safe path of electricity (offers most security)

GUIDELINES FOR SAFE USE OF ELECTRICAL EQUIPMENT (p. 268-269)

- All electrical appliances should be UL certified
- Read all instructions before using
- Disconnect all appliances when not in use; pull on the plug not the cord
- Inspect electrical equipment regularly
- Keep wires, plugs, and equipment in good repair
- Use only one plug in each outlet; if more are needed, use a power strip with a surge protector
- Avoid contact with water and metal surfaces when using electrical equipment
- Keep electrical cords off the floor
- Do not leave client unattended when connected to an electrical device
- Do not clean around electrical equipment that is plugged in
- Do not step on electrical cords
- Do not allow cords to become twisted; this can break wires and cause a short circuit
- Do not attempt to repair electrical devices

ELECTROTHERAPY (p. 269-271)

Electrotherapy- the use of electrical currents to treat the skin

- **Modalities**- currents used in electrical facial and scalp treatments
 - **Galvanic current**- constant, direct; has positive and negative pole; produces chemical changes when it passes through tissues
 - **Microcurrent**- extremely low level of electricity; used for firming, toning and soothing skin; does not travel through entire body- only serves the specific area being treated
 - **Tesla High-Frequency current**- also known as violet ray; thermal or heat-producing current with a high rate of oscillation; common for scalp and facial treatments
- **Electrode (probe)**- an applicator for directing electric current from an electrotherapy device to the client's skin
- **Polarity**- the negative or positive pole of an electric current
 - **Anode**- positive pole; usually red and marked with a P or +
 - **Cathode**- negative pole; usually black and marked with a N or –

Other electrical equipment you may use: conventional hood dryers or heat lamps, ionic dryers, electric curling or flat irons, heating caps, hair color processing machines, a steamer or vaporizer, and/or light therapy equipment.

LIGHT ENERGY AND LIGHT THERAPY (p. 272-275)

The electromagnetic spectrum is the name given to all forms of energy (or radiation) that exist.

The forms of energy in the electromagnetic spectrum are: radio waves (radios and tv), microwaves (used microwave ovens), light waves (infrared light, visible light, ultraviolet light), x-rays (used by doctors) and gamma rays (used in power plants).

- **Visible light**- light that can be seen; only 35% of natural sunlight is visible light
- **Invisible light**- light that cannot be seen by the naked eye
- **Ultraviolet light**- invisible light that causes chemical reactions to happen more quickly; kills some germs
 - UVA (aging light)- often used in tanning beds
 - UVB (burning light)- can cause skin cancer
 - UVC- blocked by the ozone layer
- **Infrared light**- makes up 60% of natural sunlight; used mainly in conditioning treatments, warming muscles (relaxation), diminish signs of aging, healing wounds

LIGHT THERAPY (p. 275-277)

Light therapy is the application of light rays to the skin for the treatment of wrinkles, capillaries, pigmentation or hair removal.

- **Lasers (light amplification stimulation emission of radiation)**- medical device that uses electromagnetic radiation for hair removal and skin treatments
- **LED (light emitting diode)**- medical device used to reduce acne, increase skin circulation, and improve collagen content in the skin
- **Intense Pulse Light**- medical device that uses multiple colors and wavelengths of focused light to treat spider veins, hyperpigmentation, rosacea, redness, wrinkles, enlarged hair follicles, and excessive hair