

chemical. texturizing

CHAPTER 4





CHEMICAL TEXTURIZING ENCOMPASSES ALL SERVICES THAT ALLOW YOU TO ALTER THE TEXTURE AND SHAPE OF YOUR GUEST'S NATURAL HAIR. BECOMING PROFICIENT AT ALL CHEMICAL TEXTURIZING SERVICES WILL ALLOW YOU THE ABILITY TO OFFER A COMPLETE RANGE OF SOLUTIONS TO ALL OF YOUR GUESTS. THIS NOT ONLY INCREASES YOUR INCOME POTENTIAL, BUT WILL ATTRACT A WIDER RANGE OF GUESTS FOR YOUR SERVICES.

CHAPTER PREVIEW

// Need to Know

// Beauty by the Numbers

// Safety and Disinfection

// Tools and Products

// Anatomy and Physiology

// Chemistry

// Chemical Texturizing Fundamentals

Permanent Waving

Fundamentals

Consultation Process

Permanent Waving Techniques

Chemical Straightening

Fundamentals

Consultation Process

Straightening Techniques

// Finishing and Styling

// Ergonomics

// What If: Problems and Solutions

// Terminology

NEED TO KNOW

Acid Balanced Waves

Aldehyde

Alkaline Waves

Amino Acids

Ammonia Free Waves

Ammonium Bisulfite
Relaxer

Ammonium Thioglycolate (ATG)

Base Control

Base Cream

Base Direction

Base Relaxer

Base Sections

Basic Perm Wrap

Bender Rod

Book End Wrap

Bricklay Perm Wrap

Chemical Relaxing

Concave Rod

Croquignole Wrap

Curvature Perm Wrap

Disulfide Bonds

Double Flat Wrap

Elasticity

Endothermic Wave

Exothermic Wave

Formaldehyde

Formaldehyde Free

Glyceryl Monothioglycolate (GMTG)

Guanidine Hydroxide

Hydrogen Bonds

Hydroxide Neutralization

Hydroxide Relaxer

Immiscible

Lanthionization

Loop Rod

Miscible

Neutralizer

Neutralizing

Neutralizing Shampoo

No-Base Relaxer

Normalizing Lotions

Occupational Disease

Peptide Bonds

Permanent Waving

pH Scale

Piggyback Perm Wrap

Polypeptide Chain

Porosity

Potassium / Lithium Hydroxide
(No Lye) Relaxer

Physical Mixture

Potential Hydrogen (pH)

Preliminary Strand Test

Protective Cream

Salt Bonds

Side Bonds

Single Flat Wrap

Sodium Hydroxide (Lye) Relaxer

Soft Curl Reformation

Spiral Wrap

Sponge Rod

Straight Rod

Test Curl

Thioglycolate Relaxer

Thio Neutralization

True Acid Waves

Viscosity

Weave Perm Wrap

BEAUTY BY THE numbers

FACT

1975

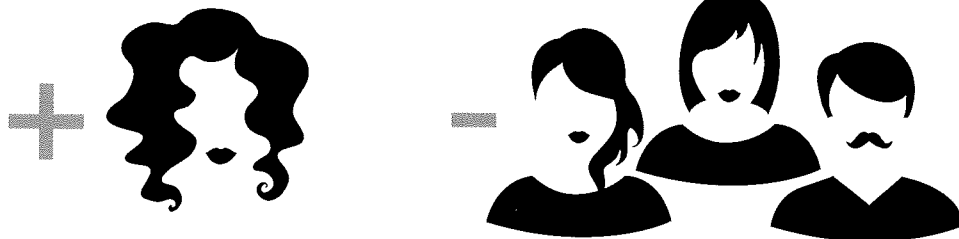
A licensed professional working 40 hours per week needed only 75 Guests to stay busy because Guests scheduled weekly appointments.

TODAY

That same professional would need

320 **GUESTS**
to stay busy

You can reduce the number of Guests you need to keep yourself booked, while increasing Guest loyalty and earnings at the same time.



By increasing the number of chemical services you perform, you can dramatically reduce the number of Guests required to stay busy.

Number of Guests receiving a Chemical Service per week	Number of Haircut or Styling Guests per week	Total Number of Guests needed to keep busy
0	53	320
5	43	288
10	33	258
15	23	228
20	13	198
25	3	168

Average Non-Chemical Appointment Time – 45 minutes
 Average Chemical Appointment Time – 1.5 hours
 Average Appointment Cycle of all Guests – 6 weeks



chemical. texturizing

Chemical Texturizing services allow you the ability to offer many style options to your Guests that may not have been otherwise possible. These services allow your Guests to have hair textures that are different than the ones they were born with. They also present your Guests with opportunities to shorten the amount of time spent styling their hair to achieve the look they desire.

CHEMICAL TEXTURIZING OFFERS THE FOLLOWING POSSIBILITIES:

- // Add curl or wave to straight hair (**Permanent Waving**).
- // Transform curly hair to straight hair (**Chemical Relaxing**).
- // Reduce curly hair texture from tight curl to moderate curl for ease of styling (**Curl Reformation**).
- // Eliminate frizziness from wavy, curly or over-curly hair (**Keratin Straightening**).

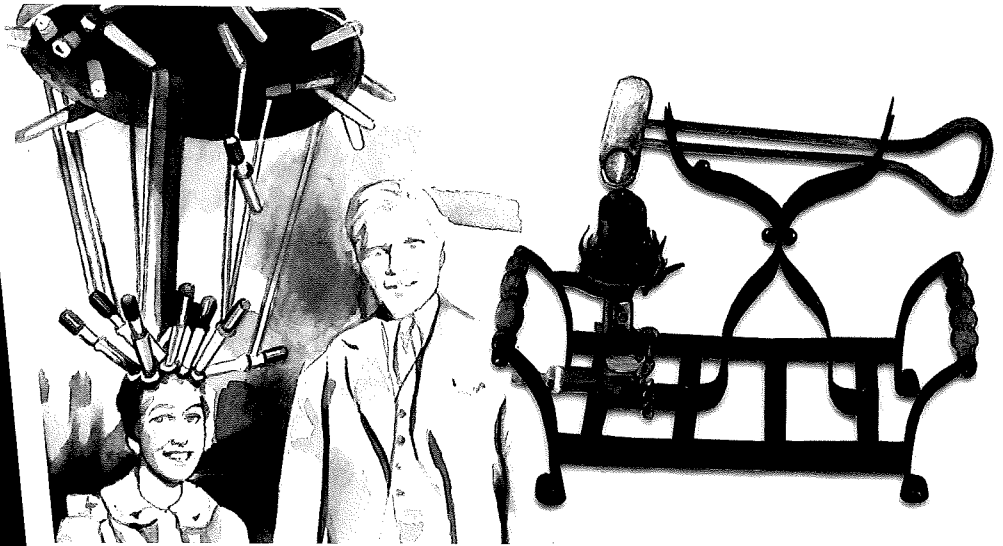


HISTORY OF CHEMICAL TEXTURIZING

In 1906, a German hairdresser named Karl Nessler created the electric permanent wave machine to create permanent curls in the hair. Long hair was spiral wrapped from scalp to ends around metal rods that were connected by electric cords to an overhead device. A sodium hydroxide solution was applied to the hair along with heat; this procedure took 6 hours to complete.

In 1909, Garret Augustus Morgan experimented with a liquid that gave sewing machine needles a high polish and prevented the needle from scorching fabric. He accidentally created a liquid that straightened both fabric and hair, which he converted into a cream and started the G.A. Morgan Hair Refining Company.

In 1924, a Czech hairstylist, Josef Mayer, introduced the croquignole (KROH-ken-yohl) wrapping method for medium to short lengths of hair. The 'overnight wave' was also invented around this time to produce curls or waves without the use of heat. A strong alkaline solution was applied to pre-wrapped hair and processed overnight; Guests would return to the salon the next day to have the perm completed.



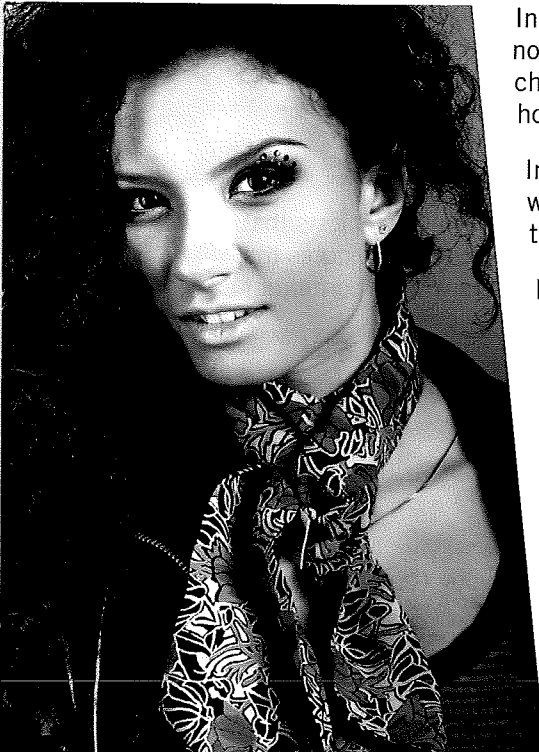
In 1938, the cold wave was invented by Arnold F. Willatt, which needed no heat or machines for processing. This procedure required the use of chemicals and body heat to process the curl or wave, but still took 6 to 8 hours to complete.

In the 1970's, the acid perm was invented. This soft and gentle wave contained chemical ingredients with a low pH, along with the application of an outside heat source to obtain processing.

In 1977, the Jheri Curl was marketed as a 'curly perm' and was named after Jheri Redding who invented many hair care products. This service is known today as a 'Soft Curl Reformation'.

In 1981, Johnson Products Company, Inc. introduced Gentle Treatment, the first no-lye chemical relaxer. Instead of lye, their product used mild alkaline agents, such as potassium hydroxide and lithium hydroxide.

Today, chemical texturizing offers a variety of services for all hair textures from curly perms to organic straightening.



Be sure to adhere to the following when using chemical texturizing products:

- // If a chemical gets into the eyes, flush them thoroughly with cool water and seek medical attention, if necessary.
- // Wear gloves when working with chemicals. Some Guests may have a sensitivity to latex. Check with your Guest before beginning the service.
- // Dispose of all service waste materials in a covered trash container. Regularly remove trash from the salon.
- // Use product immediately and dispose of any leftover product(s) in a closed trash container.
- // Avoid leaving your Guest unattended during any chemical service.
- // Clean all tools (rods, picks, brushes, bowls, etc.) with soap and hot water, then immerse in a wet disinfectant according to the manufacturer's directions.



SAFETY DATA SHEETS (SDS) AND GLOBALLY HARMONIZED SYSTEM (GHS)

The Department of Labor set up the regulatory agency called the Occupational Safety & Health Administration (OSHA). OSHA mandates that every chemical located within a business must have a Safety Data Sheet (SDS) available. These sheets detail the proper storage and disposal of all chemicals used in the salon.

The Globally Harmonized System of Classification and Labeling of Chemicals (GHS) was developed with the purpose that chemicals 'should be harmonized in order to develop a single, globally harmonized system to address classification of chemicals, labels and safety data sheets.' The GHS also set the standards for the SDS and what information is contained within them.

Misuse or overexposure to a chemical(s) could result in an occupational disease(s). An **Occupational Disease** is any illness caused by overexposure to certain products or ingredients.

SAFETY DATA SHEETS CONTAIN SIXTEEN POINTS OF INFORMATION.

Section Number	Topic	Description
1	Identification	Includes the product name, manufacturer, distributor, address, phone number, emergency phone number, recommendation, and restrictions on use.
2	Hazards identification	Includes all hazards about the chemical and required labeling elements.
3	Composition / ingredients	Includes the information on the chemical ingredients and any trade secret claims.
4	First-aid	Includes important symptoms / effects, acute or delayed, and any required treatment.
5	Firefighting	Lists the suitable fire extinguishing techniques, equipment needed, and chemical hazards from fire.
6	Accidental release	Describes the emergency procedures, protective equipment, and the proper methods of cleanup and containment.
7	Handling and storage	Lists the precautions for safe handling and storage.
8	Exposure controls / personal protection	Lists OSHA's Permissible Exposure Limits, Threshold Limit Values, appropriate engineering controls, and Personal Protective Equipment needed.
9	Physical and chemical properties	Lists the chemical characteristics.
10	Stability and reactivity	Lists the chemical's stability and possibility of hazardous reactions.
11	Toxicological information	Discusses routes of exposure, related symptoms, acute and chronic effects, and the numerical measures of toxicity.
12	Ecological information	Not regulated by OSHA
13	Disposal considerations	Not regulated by OSHA
14	Transport information	Not regulated by OSHA
15	Regulatory information	Not regulated by OSHA
16	Other information	Includes the date the SDS was prepared and/or the last revision.



DRAPING

Safety must come first when servicing your Guests to protect them from potential exposure to hair and scalp diseases and/or harm to their skin or clothing. Therefore, it is important to follow the proper draping technique based upon the desired service.



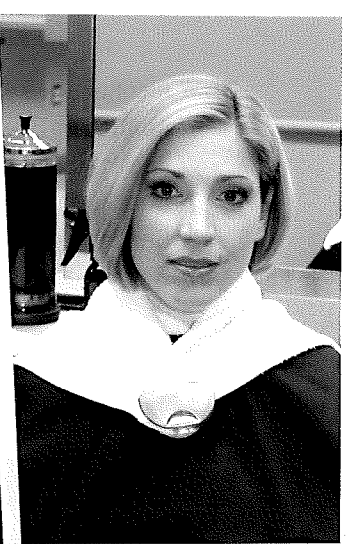
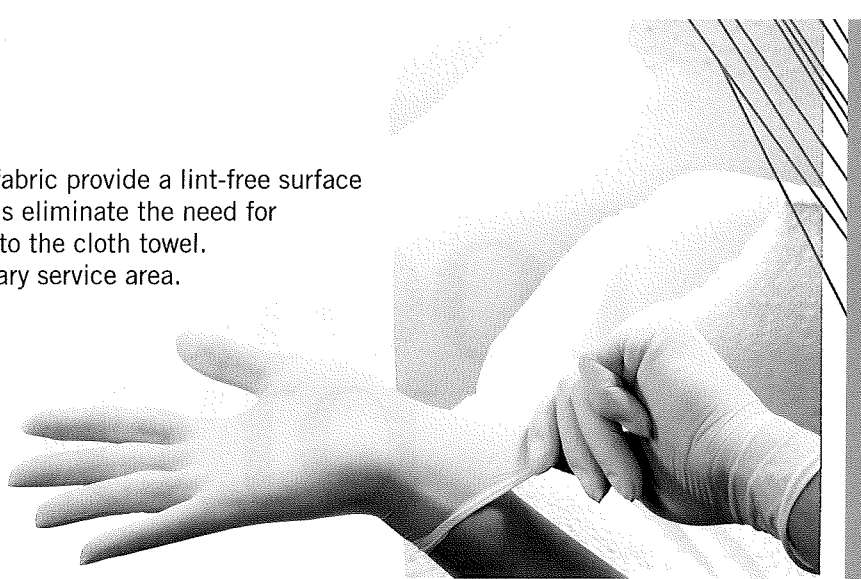
// **Capes** are used to cover and protect your Guest's clothing during the hair service. Capes are available in different materials, lengths, colors, and have a variety of closures. Most capes are machine washable.

// **Neck Strips** or towels are wrapped around your Guest's neck to prevent skin-to-cape contact. Neck strips are available in paper or cloth and come in different widths and lengths.

// **Cloth Towels** are made from an absorbent, washable material and will help to catch water or chemical liquids that may possibly escape during the service. Towels are also used to remove moisture from hair and dry hands after washing.

// **Disposable Towels** made from non-woven fabric provide a lint-free surface to place tools during services. These towels eliminate the need for laundering and are used as an alternative to the cloth towel. They ensure each Guest a clean and sanitary service area.

// **Gloves** are manufactured from latex, vinyl or synthetic materials to protect hands from stains, chemical sensitivity, and to ensure Guest safety. Gloves are required to be worn for all cosmetology services in many states.



Draping for Chemical Services: (Permanent Waving, Chemical Relaxing, Soft Curl Reformation, and Keratin Straightening)

1. Wash and sanitize your hands.
2. Have your Guest remove all jewelry and glasses; store items away for safekeeping. Do not place them on the station where loss or damage may result.
3. Turn your Guest's collar under to help protect it from chemicals and water damage.
4. Place a neck strip around your Guest's neck.
5. Place a towel around your Guest's neck, crossing in the front.
6. Place a cape around your Guest's neck. Ensure that the towel and cape are tight enough to prevent dripping, but not so tight as to be uncomfortable for your Guest.
7. Place a second towel around the neck and secure by clipping it in the front. Place the clip low enough on the towel so your Guest can comfortably bend their neck down.
8. Before your Guest lays back into the shampoo bowl, ensure that the cape is draped over the back of the chair. This will help to prevent damage to your Guest's clothing. It is best to recheck this every time your Guest leans forward.
9. Always disinfect the shampoo bowl and surrounding area after each use.

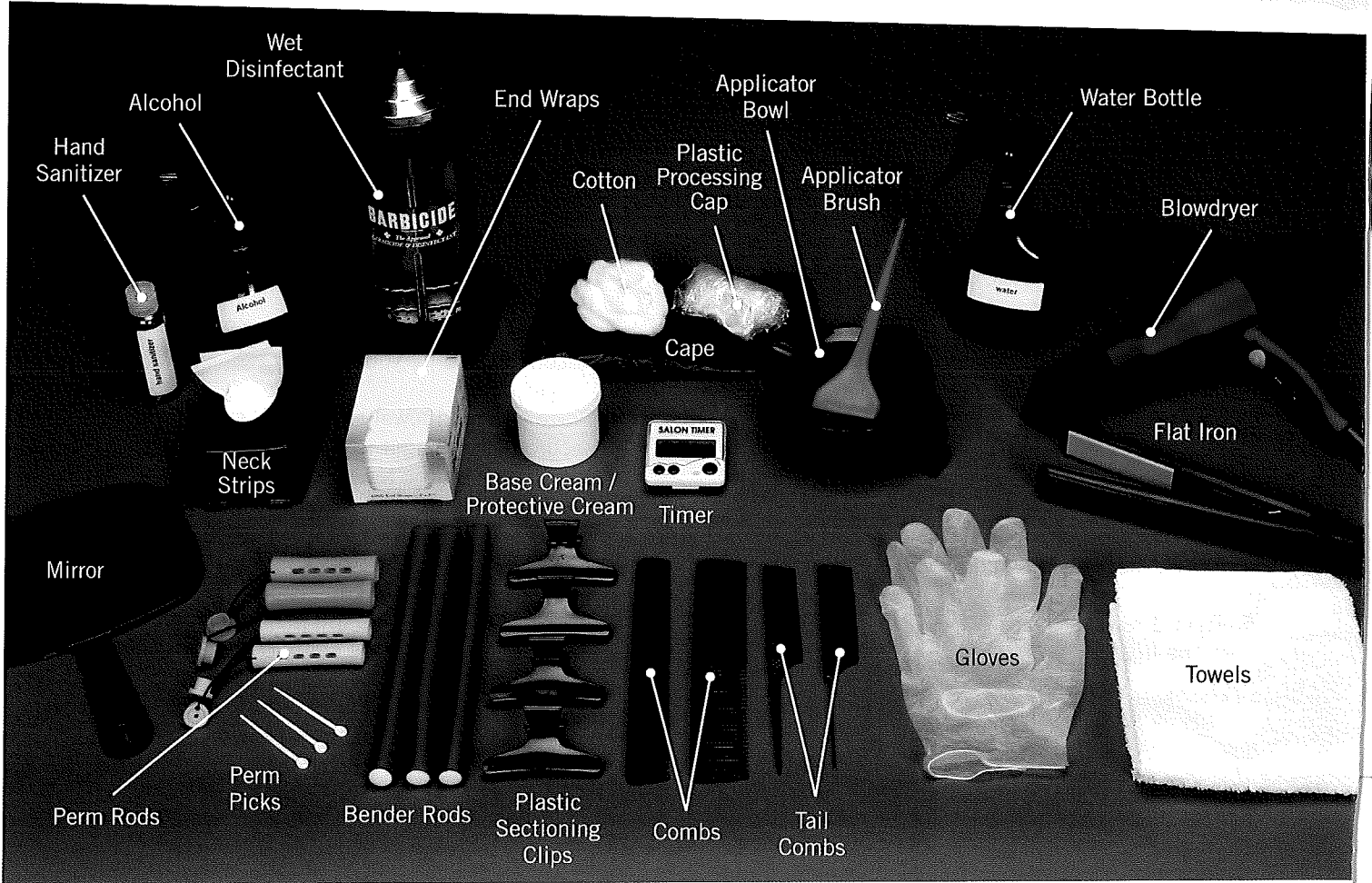
tools AND products

FOR CHEMICAL TEXTURIZING

- // Alcohol
- // Applicator Bowl
- // Applicator Brush
- // Base Cream
- // Bender Rods
- // Blowdryer
- // Cape
- // Combs
- // Cotton

- // End Wraps
- // Flat Iron
- // Gloves
- // Hand Sanitizer
- // Mirror
- // Neck Strips
- // Perm Rods
- // Perm Picks
- // Plastic Processing Cap

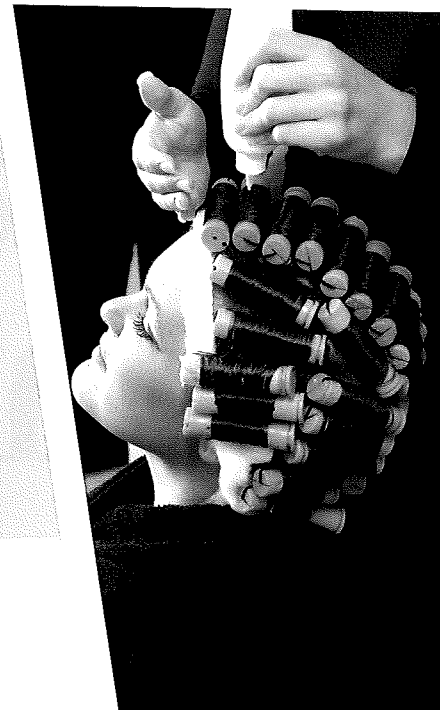
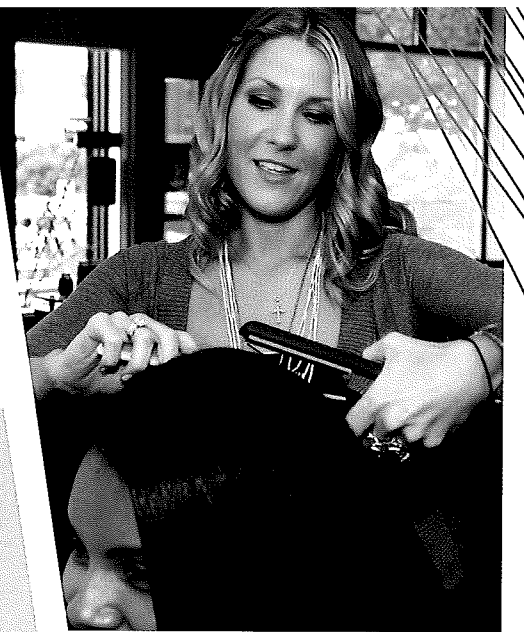
- // Plastic Sectioning Clips
- // Protective Cream
- // Tail Combs
- // Timer
- // Towels
- // Water Bottle
- // Wet Disinfectant



OPTIONAL TOOLS AND PRODUCTS

// **Applicator Bowls** are metal or plastic professional bowls used to hold the relaxer or keratin product during the application.

// **Applicator Brush** is used to apply the relaxer or keratin treatment product.



// **Base Cream**, also known as **Protective Base Cream**, is a barrier that is applied directly to the scalp before the chemical relaxer process.

// **Capes** are used to protect your Guest's skin and clothing during the chemical service.

// **Combs** come in an array of sizes and serve varying purposes for a chemical service procedure.

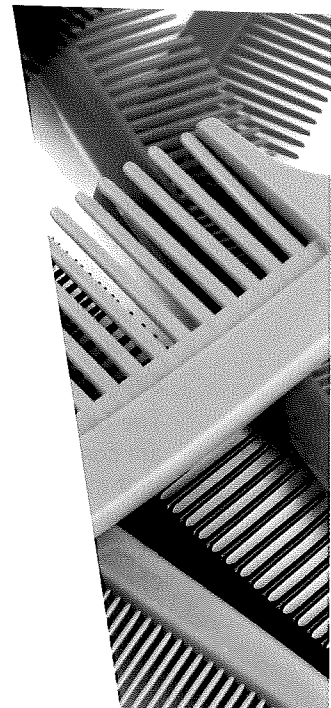
// **End Wraps** are thin, tissue-like papers that are used to provide control of the ends of the hair in a perm wrap.

// **Keratin Straightening Treatments** are used to help eliminate curl, frizz and improve the hair's manageability.

// **Perm Rods** are the tools that the hair is wound around to change the curl pattern. They come in varying lengths, diameters, textures and colors.

// **Perm Picks** are optional items used to maintain balance and eliminate pressure by lifting the bands of the perm rod off the hair.

// **Protective Cream** is a cream barrier applied around the hairline and ears to protect the skin from permanent wave lotions or haircolor.





anatomy AND physiology

Trichology (tri-KAHL-uh-jee) is the technical term for the study of the hair, the disorders and diseases of hair and hair care. As a licensed professional, you must fully understand what hair is comprised of, how it is formed, and how the environment can affect it. You must also understand the hair's composition and foresee how it will react to the hair care treatments and chemical texturizing services you may perform.

COMPOSITION OF HAIR

Hair begins to form in the underlying layers (dermis) of the skin. Living cells collect in a pocket of skin located in the dermis layer, which starts the process of building the hair root. This pocket is referred to as the follicle. The follicle surrounds the entire root, providing a space or a pocket. (If you imagine slipping your hand inside a glove, the follicle is the area that surrounds your hand.)

These cells begin to move upward, maturing and keratinizing (hardening) before dying and starting to form the structure (root) of the hair. As this process continues, the hair continues to form and gradually moves out of the skin, creating the hair shaft, a non-living fiber.

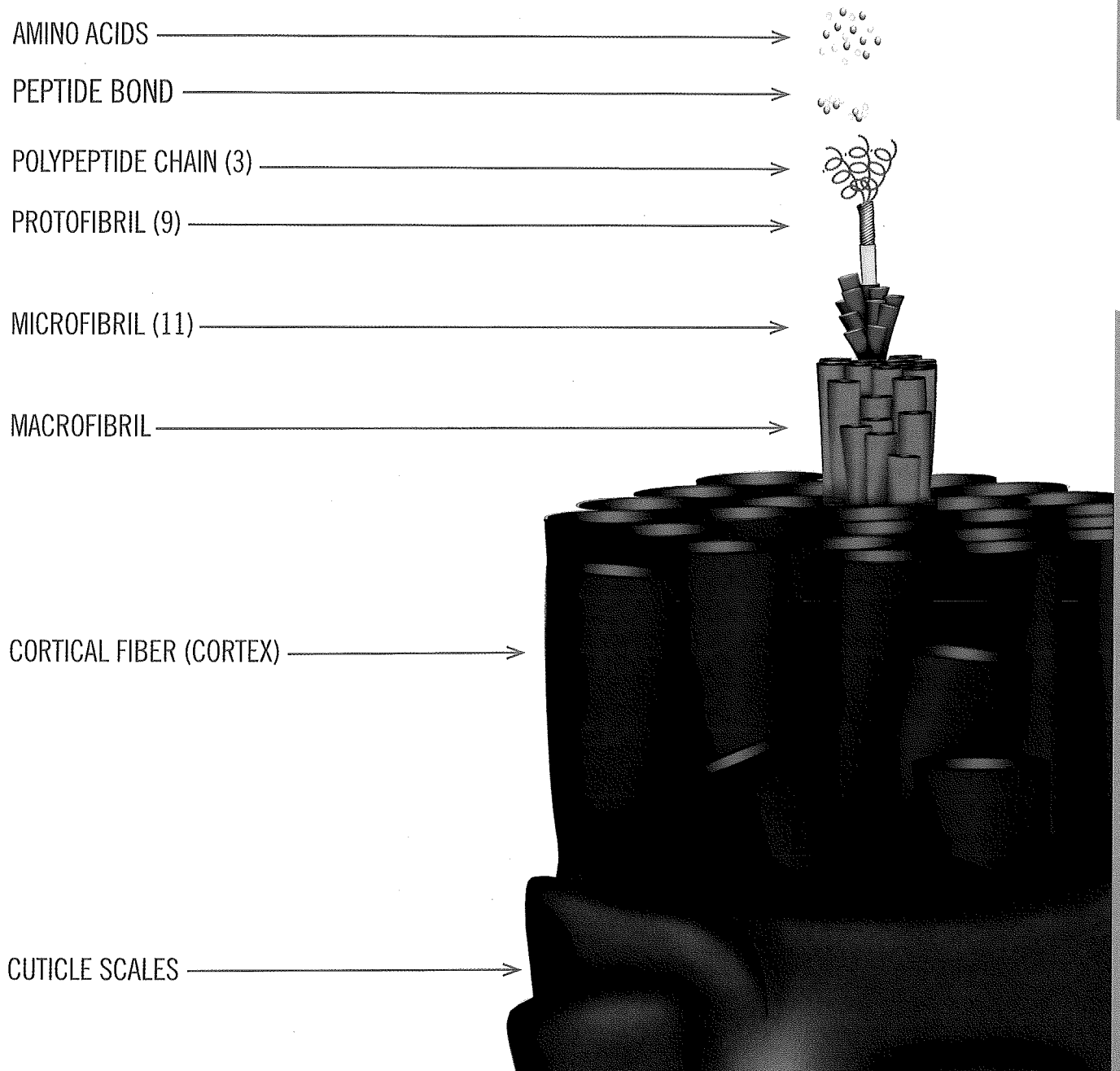
The living cells that start this whole process, and are the building blocks for the hair, skin, and nails, are composed of a strong, fibrous protein called **Keratin**. The protein is derived from the amino acids that make up hair and nails. **Amino Acids** (uh-MEE-noh AS-udz) are the protein building blocks of hair and link together to form tiny protein fibers. Each amino acid consists of the elements, hydrogen, oxygen, nitrogen, carbon and sulfur. These elements will play an important role in the chemical breakdown for permanent waving and chemical relaxing.

Amino acids are connected end to end forming a **Peptide Bond** (PEP-TYD), also known as an **End Bond**. The peptide bonds are very strong and create a spiral chain effect. **Polypeptide Chains** (pahl-ee-PEP-TYD) are a spiraling chain of amino acids joined together by peptide bonds. Keratin proteins are long, coiled chains of polypeptides.

- // 3 polypeptide chains twist around each other to form a protofibril.
- // 9 protofibrils are packaged together as a bundle.
- // 11 bundles will produce a microfibril.
- // 100's of microfibrils are cemented together in a fibrous protein bundle, known as a macrofibril.

This process continues with hundreds of macrofibrils grouped together to create a cortical fiber. The cortical fibers grouped together produce the cortex. The dried, dead cells that surround the cortex are the cuticle scales.

Development of a Single Strand of Hair



Side Bonds, also known as **Cross Bonds**, connect the polypeptide chains side-by-side and are responsible for the hair's strength and elasticity.

Types of Side Bonds

Hydrogen Bonds are weak, physical side bonds that are easily broken by water or heat. They reform when the hair cools and/or dries. Hydrogen bonds account for approximately 33% of the hair's strength.

Salt Bonds are also weak, physical side bonds that are easily broken by changes in pH. They reform when the pH is restored. They also account for approximately 33% of the hair's strength and elasticity.

Disulfide Bonds (dy-SUL-fyd) are strong chemical side bonds that can only be broken by chemical solutions. They are not as numerous as the hydrogen or salt bonds but still account for approximately 33% of the hair's strength and elasticity. Disulfide bonds connect 2 sulfur atoms located in the amino acid called **Cysteine** (SIS-ti-een). A sulfur atom, contained in the cysteine amino acid from 1 polypeptide chain, will link up by way of the disulfide bond to a neighboring sulfur atom contained in a **Cystine** (SIS-teen), forming another polypeptide chain. This bond breaking plays a major role in permanent waving and chemical hair relaxing processes, since they are broken within the first 5 to 10 minutes of the chemical texture service. Essentially, the majority of the chemical process is completed within this time frame.

STRUCTURE OF HAIR

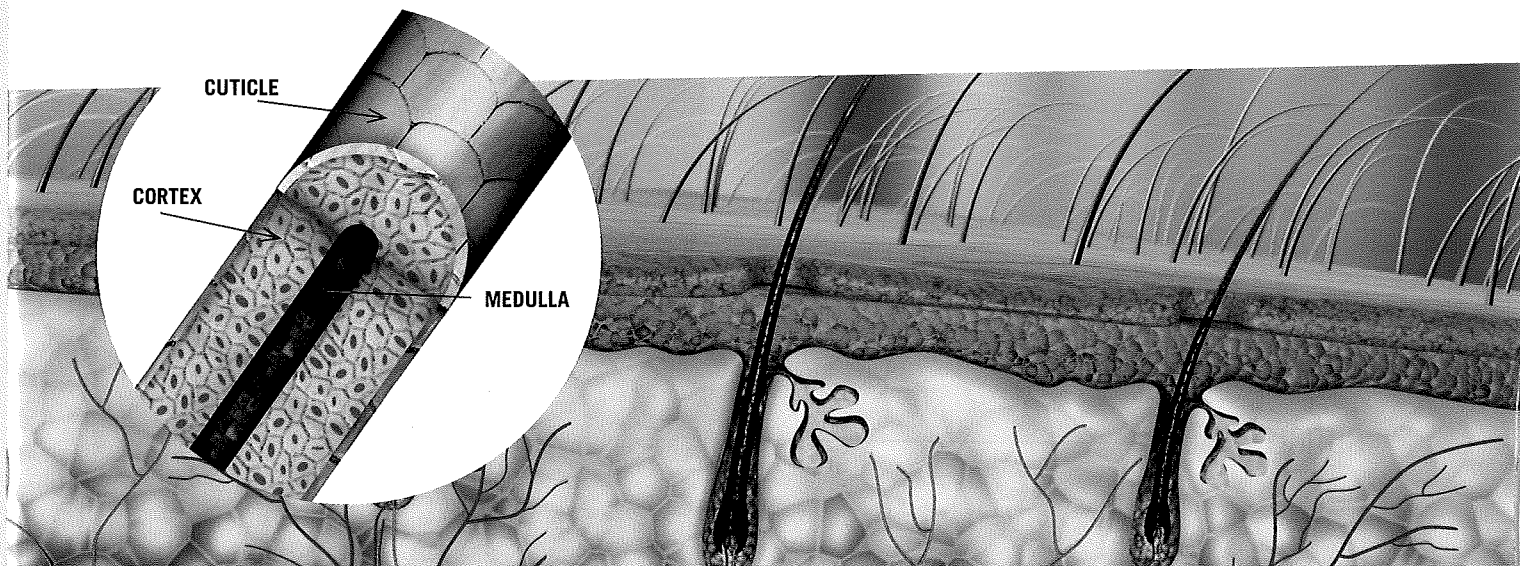
Hair is a group of 'thread-like' strands growing out from the skin or scalp. The portion of hair that extends beyond the skin or scalp is the hair shaft. The hair shaft is divided into 3 layers: the cuticle, cortex and medulla.

// Cuticle is the tough, outer protective covering. This layer is generally made up of 7 to 12 layers of overlapping scale-like (flat) cells. How tightly the cells overlap determines how quickly product will be absorbed.

// Cortex is the soft, elastic, thick, inner layer made up of elongated cells. This layer is responsible for elasticity (stretch) in the hair and it also contains melanin or coloring matter. The cortex is responsible for an estimated 90% of the hair's weight.

// Medulla is the deepest layer, consisting of round cells. Sometimes it is intermittent or totally absent, which is not known to have any true effect on the hair.

INTERESTING FACT: The cuticle and cortex play a vital role in chemical texturizing services.





chemistry

Learning the chemistry behind the products used in chemical texturizing will help you to understand and make the appropriate service recommendation to your Guest.

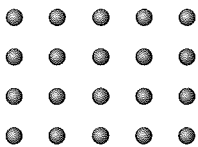
Matter is a substance that has mass and occupies space. It has physical and chemical properties and exists either as a solid, liquid or gas. Each area of matter is distinguished by its very own property and whether there is or is not a chemical change.

Forms of Matter

- 1 Gas
// Vapor
- 2 Liquid
- 3 Solid

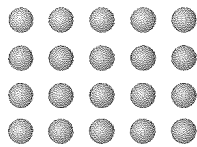
The difference between the forms is how the molecules are placed within the form they occupy.

GAS



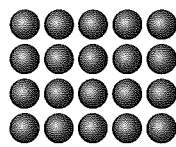
Consists of molecules that are very far apart

VAPOR



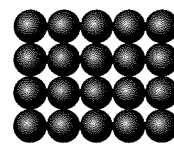
(A component of gas) Consists of molecules that are close together

LIQUID



Consists of molecules that are very close together

SOLID

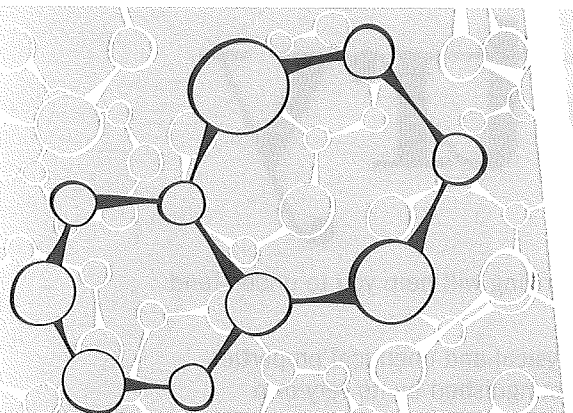
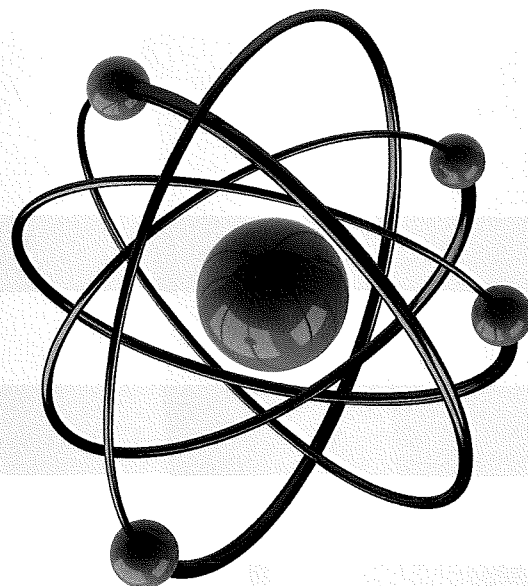


Consists of molecules that are the closest together

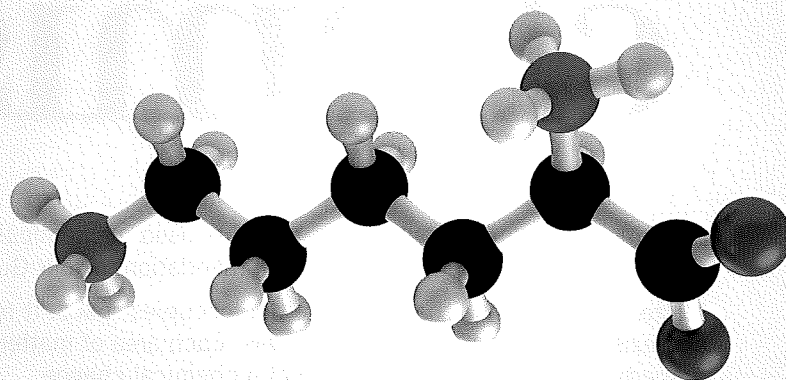
INTERESTING FACT: Gases and vapors are not the same. Vapors develop when liquid evaporates. For example, water, acetone and alcohol. Gases occur when a liquid is placed under extremely high or low temperatures. For example, the air we breathe is a combination of gases, consisting mostly of nitrogen and oxygen.

Atoms are the smallest part of an element. All matter consists of atoms. Atoms are made up of the following:

- // Neutrons – neutral particles found in the nucleus.
- // Protons – positively charged particles found in the nucleus.
- // Electrons – negatively charged particles that revolve around the nucleus on orbiting paths.
- // Ions – atoms containing an excess amount or not enough electrons in their orbiting paths.



MOLECULE



COMPOUND

Elements are any substance made of 1 type of atom and cannot be chemically broken down.

Molecules (MAHL-uuh-kyools) are created when 1 or 2 atoms combine and retain their chemical and physical properties to form matter.

Compounds, also known as **Chemical Compounds**, are chemical substances consisting of atoms or ions of 2 or more elements in definite proportions, which cannot be separated by physical means.

PROPERTIES AND CHANGES OF MATTER

// **Physical Change** is matter altered to a different shape temporarily, but eventually returning to its original state. For example, water that is in a liquid form can be frozen to become a solid form of matter (ice). When the ice melts, the water returns to its original state.

// **Physical Properties** occur without a chemical reaction or change to the matter. Some physical identities are hardness, color, weight, odor and boiling point. For example, the application of mascara to the eyelashes, provides a temporary color.

// **Chemical Change** is matter altered to a completely different form permanently. For example, chemically altering the melanin / pigment found in the cortex by using an oxidative product, like permanent haircolor.

// **Chemical Properties** cause a chemical reaction and change to the matter. For example, the ability of iron to rust.

PHYSICAL AND CHEMICAL CHANGES OF CHEMICAL TEXTURIZING

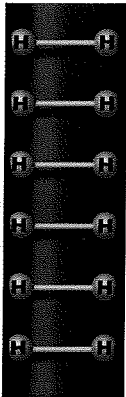
Temporary Change

Let's take a look at what happens when altering straight hair temporarily into a wavy or curly form. Hair is shampooed and conditioned (wet), which causes the hydrogen and salt bonds to detach and allow for hair flexibility, manageability and stretch when applying tension to wrap around a perm rod. To obtain curl temporarily (physical change), allow hair to dry and cool and then remove rods or rollers. Once hair is dried and cooled, the hydrogen and salt bonds reconnect into a temporary wave or curl position.

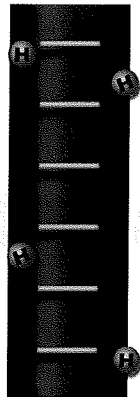
Permanent Change

In permanent waving, we are interested in changing the composition and curl of the hair on a more permanent basis (chemical change). If performed correctly and cared for using the correct maintenance products, the curl or wave should remain on a permanent basis. As the hair grows out, the new growth area will need to be permed to keep a consistent style look.

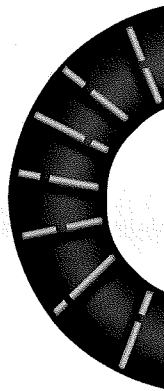
Permanent waving is a double process. The first step is a physical change that is caused by wrapping the wet hair on the perm rods. The second step is a chemical change; this final step occurs when the hair is neutralized into its new curly form.



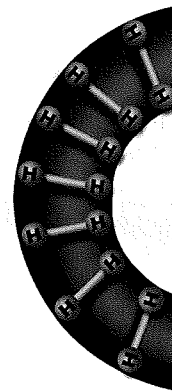
STRAIGHT, DRY HAIR
HYDROGEN BONDS
ARE INTACT



HAIR IS WET,
HYDROGEN
BONDS DETACH



WET HAIR IS
STRETCHED
AROUND ROLLER



HYDROGEN BONDS
RE-ATTACH IN
NEW POSITION

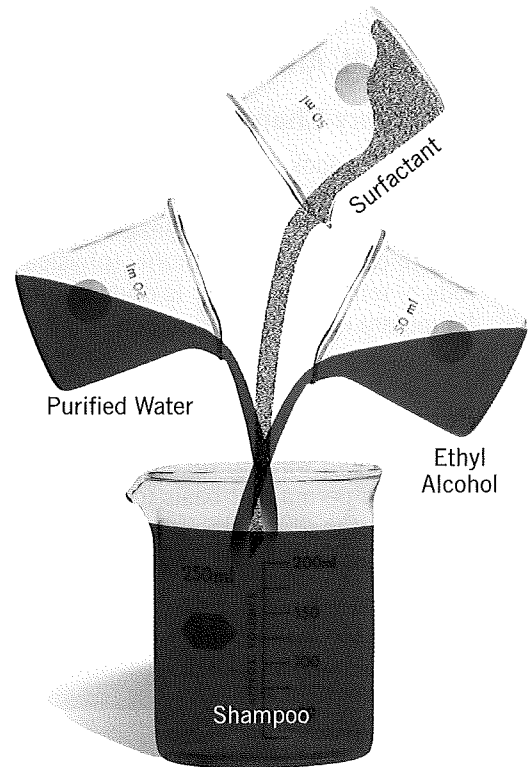
PHYSICAL MIXTURES

All matter can be classified as either a pure substance or a physical mixture. Let's look further into physical mixtures.

Physical Mixtures consist of 2 or more types of matter that are blended together, but not chemically altered. Each part in the mixture maintains its own properties. Many things are mixtures, such as alcohol, hydrogen peroxide and water. A mixture can be separated physically or mechanically. Understanding the different types of mixtures will heighten your awareness of the science behind the products you use and the methods of application. The following are all physical mixtures of matter.

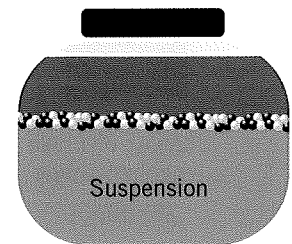
Miscible (MIS-uh-bul) is when a substance is able to be mixed with another substance. For example, alcohol and water.

Solution is a mixture that blends 2 or more small particles of gases, liquids or solids that do not separate. A **Solute** is the substance that is dissolved in the solution. A **Solvent** dissolves other substances to form a solution with no chemical change. For example, ethyl alcohol used in many products, such as hairspray, shampoo, skin lotion or facial masks.



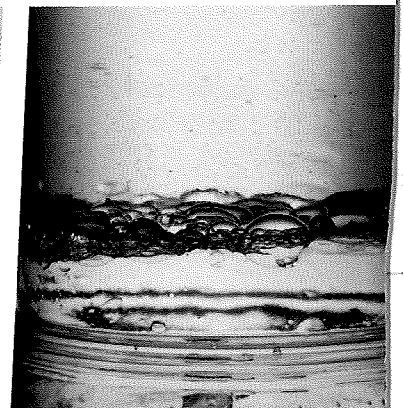
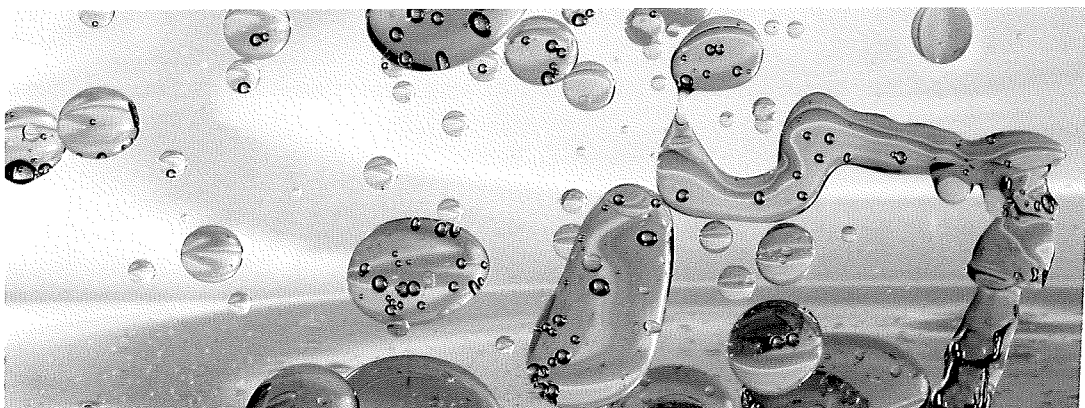
“Water is considered a **Universal Solvent** because it dissolves many substances.”

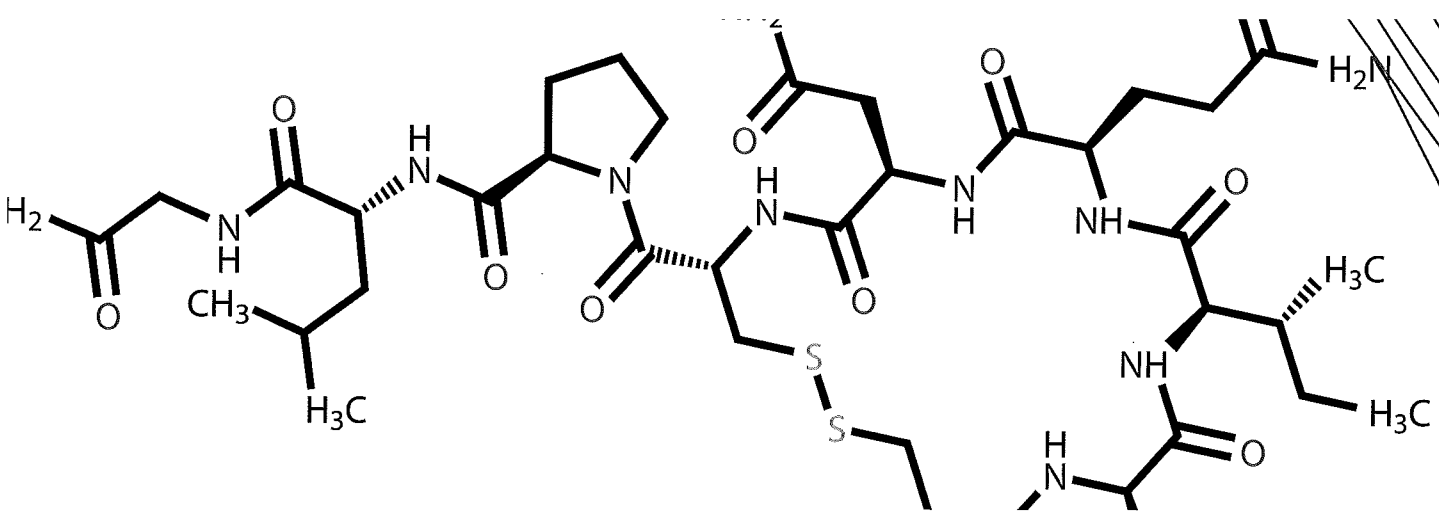
Suspension is a mixture that blends large particles together without dissolving into a liquid or solid. The particles do not stay mixed; they separate back to their original state. Suspensions must be mixed or shaken before use. For example, powder into oil or water (solid into liquid), such as certain foundation makeup or nail polish.



Immiscible (im-IS-uh-bul) is when a substance is not able to mix with another substance.

Emulsion (ee-MUL-shun) is a mixture of 2 or more immiscible substances that are dispersed throughout a liquid that eventually separate from each other. For example, oil dispersed into water, such as shampoos, conditioners and haircoloring; or water dispersed into oil, such as facial creams.





POTENTIAL HYDROGEN (pH) AND pH SCALE

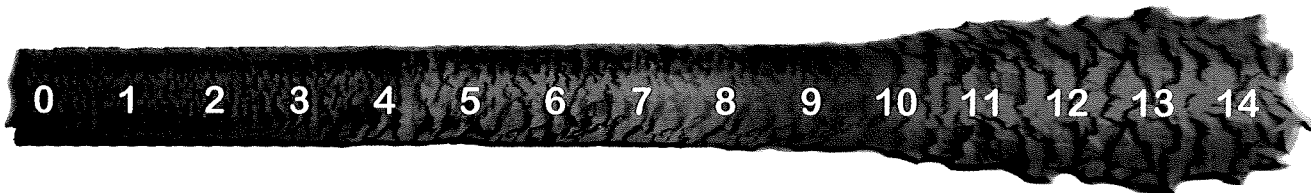
Potential Hydrogen (pH) is the measure of the acidity or alkalinity of a solution. It is the concentrated amount of hydrogen ions in a solution containing water. The amount of hydrogen ion concentrations are measured to determine if a solution is acid, neutral or alkaline.

The **pH Scale** is a scale ranging from 0 to 14 that measures if a product is an acid (0 to 6.9), neutral (7), or alkaline (7.1 to 14). It is designed logarithmically (LOG-ah-rhyth-mik-ah-lee), meaning each number on the pH scale represents an increase in multiples of 10. Therefore, each number on the scale is 10 times more alkaline or acidic than the next number in the sequence.

Acidic solutions contain more hydrogen ions and alkaline solutions contain fewer.

- // Acidic products contract and harden the hair.
- // Alkaline products soften and swell the hair.

A solution tested using the pH scale will show a range from 0 to 14. This scale shows the dramatic increase in acidity or alkalinity when moving from one end of the pH scale to the other.



ACIDITY \rightleftarrows **ALKALINITY**

ACID – pH ranges from 0 to 6.9

NEUTRAL – pH is 7

ALKALINE – pH ranges from 7.1 to 14

The natural pH level of hair ranges from 4.5 to 5.5. Healthy, normal hair has both acidic and alkaline amino groups in its protein chains. The protein chains have both positive and negative ion charges.

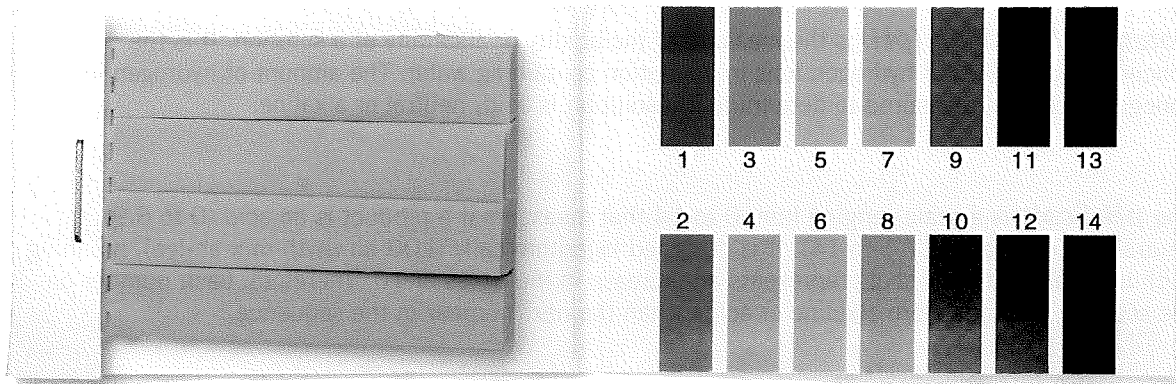
Testing products for pH levels will help you use and recommend the appropriate professional products to your Guest and help in maintaining the proper pH level for their hair.

PRODUCT TESTING

To determine if a product is within this range or low in acidity or high in alkalinity, test with small strips of color-coded litmus or nitrazine paper. These papers are the most widely used pH testing tool within the cosmetology industry.

Litmus pH paper – immerse paper into product. If paper turns blue, product is alkaline; if paper turns red, product is acidic.

Nitrazine pH paper – immerse paper into product, wait 30 seconds. Color of paper can range from orange to dark purple. Using the color chart provided, compare the tested paper against the color on the chart to determine the pH of the product.



The following examples indicate the pH ranges of chemical texturizing products:

Hydroxide Relaxers – pH 13+

Thio Relaxers – pH approximately 10

Exothermic Waves – pH 9.0 to 9.8

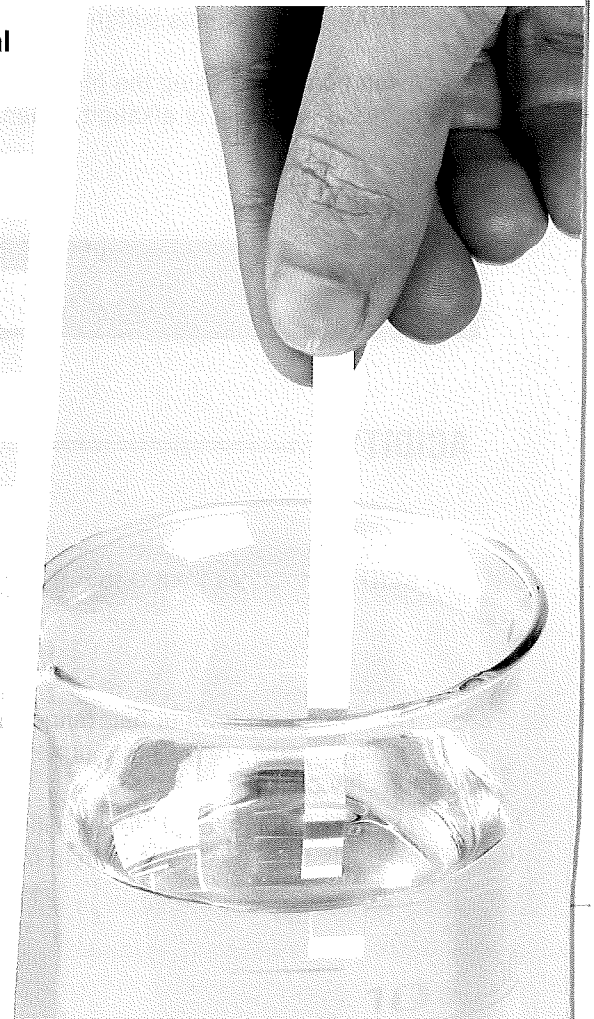
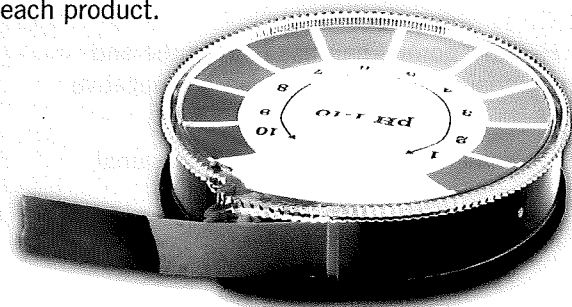
Alkaline / Cold Waves – pH 9.0 to 9.6

Ammonia Free Waves – pH 7.0 to 9.6

Thio Free Waves – pH 7.0 to 9.5

Acid / Heat Waves – pH 4.5 to 7.0

INTERESTING FACT: pH will fluctuate depending on the manufacturer and the various ingredients added to each product.





permanent waving FUNDAMENTALS

We are going to look closely at the permanent waving category of chemical texturizing. **Permanent Waving** is chemically rearranging straight hair into a curly or wavy form. It gives your Guest, who is not born with natural curl or waves, the opportunity to experience a new type of texture or appearance. A permanent wave, commonly called a perm, gives the freedom of creativity to licensed professionals to design styles that otherwise may not be possible.

PERMANENT WAVING PROCESS

PROCESSING

This requires applying a permanent waving lotion to the hair that has been wrapped around rods, rollers, flexible benders or some other perm tool to alter the texture and shape of the hair. The permanent waving lotion contains hydrogen atoms that will separate and replace the disulfide bonds in the cortex by introducing hydrogen atoms that attach to the sulfur atoms located in the amino acid, cysteine. This process allows hair to soften, swell and conform to the rod size. The breaking of the disulfide bond is also known as **Reduction**. A good perm result usually requires the breaking of an average of 50% of the disulfide bonds in healthy hair.

Next, a test curl is performed to determine if more processing time is required. It also determines if the hair has formed to the diameter size of the perm rod. Once proper curl is achieved, the permanent wave lotion is thoroughly rinsed from the hair for 5 minutes or following manufacturer's directions. The hair is towel-blotted to ensure complete absorption of moisture and to prevent dilution of the neutralizer. Use a cloth towel initially to absorb excess moisture and follow up with disposable towels as a final step to ensure adequate absorption.

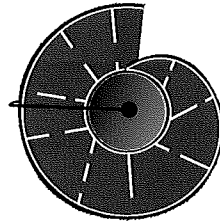
INTERESTING FACT: Prior to applying permanent waving lotion, be sure to apply a protective cream and cotton to your Guest. **Protective Cream** is a cream barrier applied around the hairline and ears to protect the skin from permanent wave lotions.

NEUTRALIZING

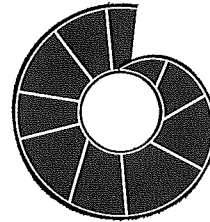
A **Neutralizer** is a chemical solution that stops the waving process of a permanent wave; it rebuilds the bonds into their new form. This complete process is known as **Thio Neutralization**. Neutralizers usually range from a pH of 3.0 to 7.0.

The main ingredient in a neutralizer is hydrogen peroxide or sodium bromate, which is a clear liquid compound with a slight odor. **Hydrogen Peroxide** is a strong oxidizing agent (releases oxygen). The chemical process of neutralizing any remaining permanent wave lotion in the hair after processing and rinsing is called **Oxidation**. Always follow the manufacturer's directions for the duration of time the neutralizer remains on the hair and the procedure to remove perm rods.

The application of the neutralizer will reform the disulfide bonds in the cortex into their new curled position by releasing oxygen atoms, reforming the disulfide bonds. The 2 hydrogen atoms located between 2 sulfur atoms will release and attach to the oxygen atoms from the neutralizer to form a molecule of water, which is removed in the final water rinse. Once the extra hydrogen atoms are removed, the sulfur atoms form a new bond with the adjacent sulfur atom, reconnecting into a new curled position. Only the application of neutralizer will reconnect the disulfide bonds to make the curl permanent.



Waving lotion is applied, disulfide bonds separate.



Neutralizer reforms disulfide bonds in their new curled position, perm rod is removed.

TEST CURL

A preliminary test curl is an optional method performed as part of your Guest consultation to ensure the correct wave pattern and perm rod choice. Take a subsection of hair located at the back area of the head, wrap in a perm rod, and apply permanent wave lotion. Process following manufacturer's directions and check results.

During the permanent wave process, a test curl is taken. A **Test Curl** determines the required processing time and ensures that the desired curl has been achieved. A perm rod is unwrapped one and a half times to allow an 'S' shape formation to appear, looking within the shape for the diameter of the rod. An alternate method of test curling is removing the entire rod and checking the hair ends for the diameter of the rod and 'flip-up' effect.

Over-Processed hair is when the permanent wave lotion remains on the hair beyond the recommended processing time, producing dry and damaged hair. This causes increased broken disulfide bonds with further breakdown of hair structure. In this condition, the hair becomes unable to hold a curl.

Under-Processed hair is when the permanent wave lotion does not remain on the hair long enough to produce the desired curl pattern. This may occur either through improper test curling or an insufficient amount of broken disulfide bonds and/or inadequate saturation of hair with permanent wave lotion.



There are a variety of permanent waves to choose from to meet the styling needs of your Guest. A permanent wave type is chosen after careful consultation and analysis of the scalp and hair.

TYPES OF PERMANENT WAVES

Alkaline Waves, also known as **Cold Waves**, are processed without the application of heat; the main ingredient is usually thioglycolic acid. Because alkaline waves are higher in alkalinity, they usually begin breaking down the disulfide bonds within the first 5 minutes following the application of the permanent wave lotion. They usually vary in pH from an 8.5 to 9.5, because of the inclusion of ammonia into the formula. Ammonia will soften and swell the cuticle to allow penetration of the chemical ingredients into the cortex.

- // The main ingredient in an alkaline wave is **Thioglycolic Acid** (thy-oh-GLY-kuh-lik), which is an organic compound of clear liquid with a strong unpleasant smell. An additive of ammonia is used in permanent wave lotions.
- // **Ammonia** (uh-MOH-nee-uh) is an inorganic compound of colorless liquid composed of 1 part nitrogen and 3 parts hydrogen. It has a pungent odor and is an alkaline substance used in the manufacturing of permanent wave lotions and hair lighteners to aid in opening the cuticle layer.
- // **Ammonium Thioglycolate (ATG)** is a combination of ammonia and thioglycolic acid that creates a reducing agent used in permanent waves and relaxers.
- // **Sodium** is a highly soluble chemical element that is an alkaline substance used in permanent wave lotions and chemical hair relaxers.

An alkaline wave is the strongest type of permanent wave lotion and is best used on hair that is classified as resistant. Resistant hair is when the cuticle scales are lying flat or compact, which hinders chemicals from penetrating into the cortex. This requires a stronger formula to swell and open up the cuticle scales, so it is important not to wrap the rods using a lot of tension. Excessive tension can result in breakage of the hair once it swells.

Acid Waves contain Glyceryl Monothioglycolate (GMTG), which is the main ingredient in true acid and acid balanced waving lotions. All have 3 separate components: permanent waving lotion, activator, and neutralizer. GMTG has a low pH; however with repeated GMTG contact, it is known to cause allergic reactions.

// **Glyceryl Monothioglycolate** (GLIS-ur-il mon-oh-thy-oh-GLY-co-layt) the main active ingredient in true acid waves, consisting of thioglycolate acid and glycerin. Glycerin replaces the use of ammonia.

// **Glyceryl** (GLIS-ur-il) is derived from **Glycerin** (GLIS-ur-in). It is an odorless, colorless liquid and is miscible in water. Glycerin is an ingredient used in a permanent wave lotion to help lower the pH due to its moisturizing properties.

True Acid Waves are permanent waves processed with the application of heat and have a pH between 4.5 to 7. These acid waves process slower than alkaline waves. The main ingredient is typically glyceryl monothioglycolate (GMTG).

Acid Balanced Waves are permanent waves processed without heat and have a pH between 7.0 to 8.2. These acid balanced waves produce a firmer curl and process more quickly than true acid waves.

Acid waves may require an added heat source (dryer), create their own heat source (chemically), or process at room temperature (sometimes with a plastic cap).

// **Endothermic Waves** (en-doh-THUR-mik) are processed by the application of a heat source like a hood dryer or heat processor. They cannot process properly at room temperature.

// **Exothermic Waves** (ek-soh-THUR-mik) are processed by a chemical reaction that releases heat. They are considered self-heating; therefore, an outside heat source is not needed.

Because acid waves are mild, a longer processing time is usually required. Acid waves are often recommended for hair that is color treated, damaged, overly porous or previously permed. The mildness and slower processing allows you to ensure the hair does not become over-processed and damaged. Because there is less swelling with an acid wave, wrapping with firm, even tension is usually recommended. Always read and follow the manufacturer's directions before application. Sometimes the application of a special shampoo or pre-wrap solution is required.

INTERESTING FACT: Sensitization is an allergic reaction caused by repeated exposure to a chemical or substance. To help protect yourself, wear gloves when mixing and applying chemicals.





OTHER PERM TYPES

// **Ammonia-Free Waves** use an ingredient other than ammonia to reduce the odor associated with ammonia perms.

// **Thio-Free Waves:** These permanent waves are recent additions to the perm market types and use components other than thioglycolate as the reducer.

// **Low pH Waves:** These are usually lower in pH and recommended for body waves, as they do not form a strong curl pattern.

PERM CATEGORY	RECOMMENDED FOR
Alkaline Waves (Cold Wave)	Coarse, resistant, extremely thick hair types
Exothermic Wave	Coarse, resistant, extremely thick hair types
Acid Wave	Porous, fragile, color-treated, damaged hair types
Ammonia-Free Wave	Normal hair types
Thio-Free Wave	Normal hair types
Low pH Wave	Normal, fragile, damaged hair types

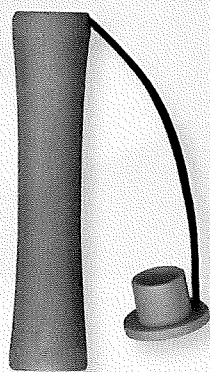
PERMANENT WAVE TOOL ESSENTIALS

Permanent wave rods are designed to create the perfect size curl or wave along with the permanent wave lotions that structurally reform the hair bonds. Most perm rods are plastic with a stretchable band that is used to secure the rod in the hair.

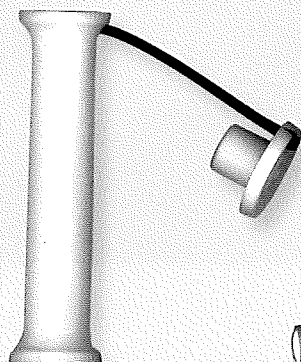
The diameter or width of the perm rod determines the size of the curl or wave. Different types of perm rods create various curl patterns.

// **Concave Rods** have a small diameter in the center with a larger diameter increase throughout the remaining length of the tool. These rods produce a slightly uneven curl or wave pattern within a subsection of hair. The concave rod is manufactured in varying lengths and diameters.

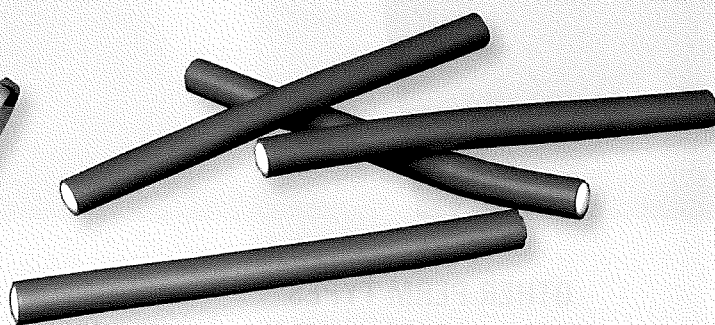
// **Straight Rods** have an even diameter width throughout the entire rod length, producing uniform curl or wave throughout a subsection of hair. These rods are manufactured in varying lengths and diameters.



CONCAVE ROD



STRAIGHT ROD



BENDER RODS

Other Types of Perm Wrapping Tools

// **Bender Rods**, also known as **Flexible Rods**, are foam covered rods that are easily bent into different shapes. They come in differing diameters and are approximately twelve inches in length. The rods are folded over once the wrapping is completed. They do not require bands or clips to keep them in place. They can be bent in numerous ways to create a variety of wave textures and patterns.

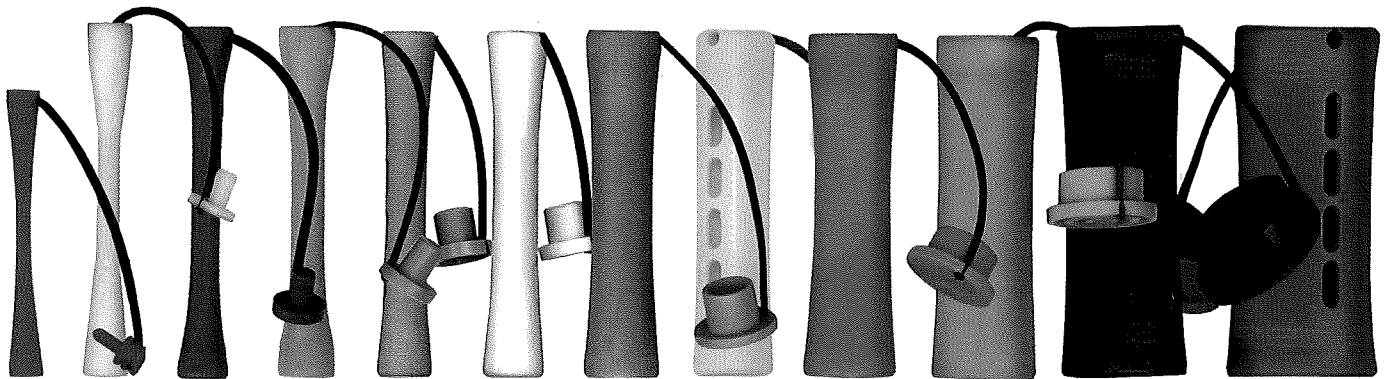
// **Loop Rods**, also known as **Circular Rods**, are long, plastic rods that are used to create spiral curls. They are wrapped while straight, then bent and connected to form a circle.

// **Sponge Rods** are pliable foam rods that allow hair to be chemically altered, resulting in a soft-end result.

INTERESTING FACT: Perm Picks are optional items used to maintain balance and eliminate pressure by lifting the bands off the hair.

Below is a list of common perm rods, color-coded with curl and/or wave results. The diameter or width of the rod determines the degree of curl or wave produced in the hair. The length of hair is also a contributing factor to be considered for intensity of curl or wave.

This is just a reference guide. If uncertain, always perform a preliminary test curl to obtain actual results. Remember some manufacturers might color-code perm rods differently to identify a perm rod's diameter.



RED
Creates Tightest Curl
Smallest perm rod – typically only used on short hair (under 2 inches).



PURPLE
Creates Medium Curl
Medium-size perm rod – used on short hair for body; medium to long lengths for curl (4.5 to 6.5 inches).



BROWN
Creates Soft Waves
Largest perm rod – used on medium-lengths for body and long lengths for curl (over 6 inches).

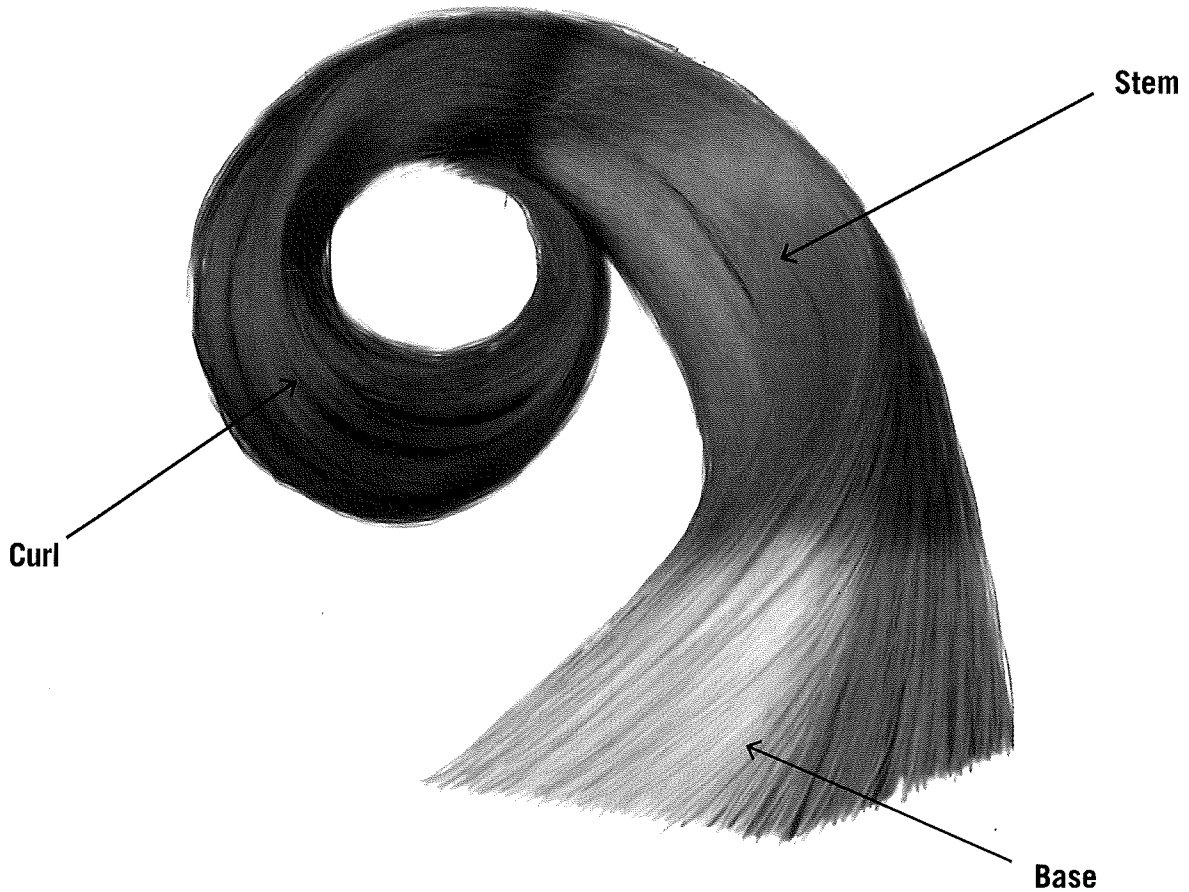
PERM ROD SELECTION REFERENCE GUIDE

- Red creates the tightest curl
- Yellow creates tight to small curl
- Blue creates small curl
- Pink creates small to medium curl
- Gray creates medium curl
- White creates medium to large curl
- Purple creates largest curl to tight wave
- Peach creates medium to large waves
- Orange creates large wave
- Teal creates largest wave to body waves
- Black creates body with minimal wave
- Brown creates just body (volume)



PERMANENT WAVE ROD APPLICATION

To understand how perm rods are placed within the base section or subsection of hair, we need to become better acquainted with the parts of each curl or wave. This knowledge will help clarify how perm rod placement contributes to the overall hairdesign.



The Parts of the Perm Curl

// Base is the area of hair that is attached to the scalp. When making the base selection, use the diameter and length of the rod as a measuring device. The end result of the permanent wave will be influenced by the length of hair, diameter of rod and rod placement.

// Stem is the area of hair between the base and the first turn of the hair around the perm rod. Stems are the part of the hair combed and held at an angle as the hair is wrapped around the perm rod. It is the stem that determines the perm rod placement as either on-base, half off-base or off-base.

// Curl or circle is the end of the hair that is first wrapped completely around the perm rod. The size of the circle, along with the length of the hair, determines the amount of curl produced from the permanent wave. A subsection of hair needs to be wrapped around the perm rod at least $2\frac{1}{2}$ times in order to create a complete curl formation.

Perm Rod Application

Perm rod application is when the perm rod rests on an area of the base within a subsection. The hair is combed, held, and the rod is applied, wound down to the scalp, resting on a certain part of the base.

Base Direction is the position of the perm rod within the section. For example, if the rod is placed horizontally, vertically or diagonally to the base section.

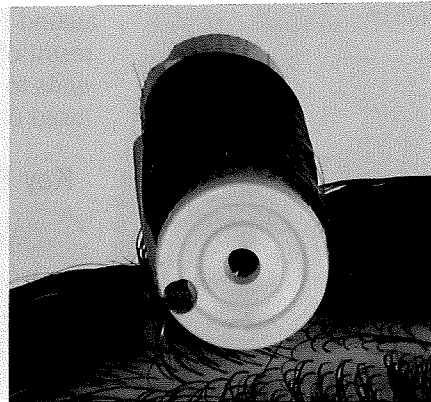
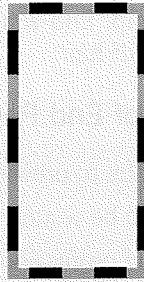
Base Sections are the subsections located within a larger panel section. The hair is divided into smaller subsections that hold 1 perm rod each.

Base Control, also known as **Base Placement**, is the position of the tool in relation to its base section and is determined by the angle at which the hair is wrapped.

Perm Rod Positioning

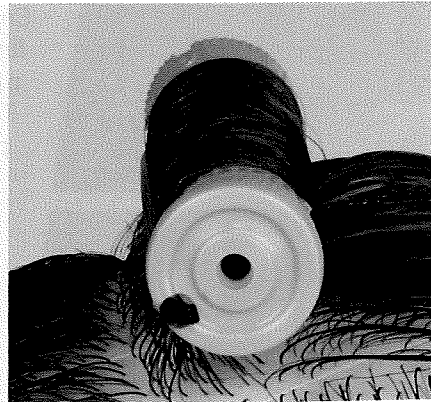
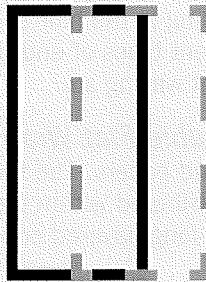
ON-BASE PLACEMENT

is created when the hair is combed at an angle above the subsection parting. The hair is wound around the perm rod and rolled down to the scalp. The perm rod will sit directly on top of the base area. This placement creates a maximum amount of volume.



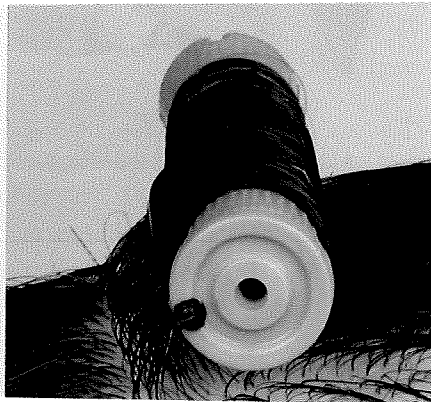
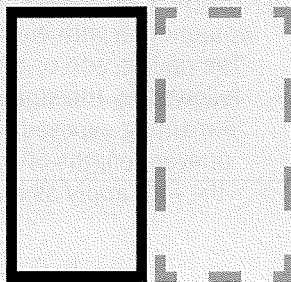
HALF OFF-BASE PLACEMENT

is created when the hair is combed straight up from the center of the subsection. The hair is wound around the perm rod and rolled down to the scalp. The perm rod will sit half on top or bottom of the subsection parting. This placement creates a moderate amount of volume.



OFF-BASE PLACEMENT

is created when the hair is combed at an angle below the subsection. The hair is wound around the perm rod and rolled down to the scalp. The perm rod will sit directly below the subsection or base area. This placement creates a minimal amount of volume.



Perm Wrapping Techniques

The most common methods of wrapping hair for a permanent wave service are:

Croquignole Wrap (KROH-ken-yohl) is wrapping the hair from ends inward toward the scalp in overlapping layers. This wrap produces curls that are tighter on the ends and larger at the scalp.

Spiral Wrap consists of wrapping the hair at an angle other than parallel to the length of the rod, which will create a coiling, springing effect of the hair.

End Papers

End Papers, also known as **End Wraps**, are absorbent pieces of thin tissue-type paper that control and protect the hair ends or any texturized lengths of hair within a subsection. The end papers will generally extend slightly beyond the hair ends. This will allow the hair to be wrapped smoothly around the perm rod and prevent 'fish hook' ends. Fish hook ends are the result of hair ends not wrapped around the perm rod smoothly, causing the ends to bend or crimp. End wrap papers come in various sizes and can be used on any length of hair.

Key Essentials of End Papers

- // Control hair ends to prevent fish hooks
- // Smooth hair to be wound around rod evenly
- // Provide added protection to the hair

Placement

End papers are placed on the hair using the thumb, index and middle fingers. Water is sprayed on the end paper, allowing the paper to cling to the hair and help maintain control while wrapping. The different types of end paper wrap techniques commonly used in permanent waving are:

- // **Double Flat Wrap** requires hair to be placed between 2 end papers. The technique allows hair to be evenly distributed within the papers. This type of wrap is excellent for long, layered or texturized hair.
- // **Book End Wrap** requires only 1 paper, which is folded in half much like a book. Hair ends are to be combed close together and placed within the folded paper. This wrap is recommended for short hair.
- // **Single Flat Wrap** requires only 1 paper used in conjunction with either the double end or book end wraps. The double end or book end is placed on the hair ends, followed by the single end wrap placed on top of the remaining exposed hair. To ensure all texturized and/or uneven lengths of hair are wrapped smoothly around the rod, apply as many single flat wraps as necessary.

