

ALL ABOUT NAILS, DISEASES & DISORDERS

COURSE OUTLINE:

- 1) Diseases and Disorders of the Nail
 - a) Common Nail Irregularities
 - b) Diseases
 - c) Disorders
- 2) Understanding Artificial Nail Terminology
- 3) Acrylic and Artificial Nail Product Chemistry
 - a) Starting With a Clean Nail
 - b) Common Misconceptions
- 4) Monomers and Polymers
 - a) Cross-linking Monomers
 - b) Shrinkage
 - c) Initiators
- 5) Gel Nail Chemicals and Property Reactions
 - a) Product Types
 - b) Catalyst
 - c) Exothermic Reaction
- 6) Primers and Dehydrators
- 7) Nail Polish Chemistry
 - a) Nail Hardeners
 - b) Toluene

- c) TSF Resin
- 8) Acrylics
 - a) Two-part (Liquid and Powder) Systems
 - b) Consistency (Mix Ratio)
- 9) Wrap Systems
- 10) Tip Adhesives
 - a) Cyanoacrylates
 - b) Glue
- 11) Wrap Fabrics
 - a) No-light Gel
 - b) Playing it Safe
 - c) Reduce Your Exposure
- 12) Salon Safety Guidelines for Nail Technicians
 - a) Basic Salon Sanitation
 - b) Product Safety
 - c) Disposable Items
 - d) About Disinfectants and Detergent Cleaners
 - e) Your Professional Responsibility

LESSON OBJECTIVE:

Upon completion of this course the student will be able to:

1. Define diseases and disorders of the nail.
2. Understand artificial nail terminology.
3. Generalize the chemistry of acrylic and artificial nail products.

4. Identify monomers and polymers.
5. Compile a listing of product types to make service choices.
6. Classify wrap fabrics and systems utilized in the salon.
7. Demonstrate the use of UV Gel Systems.
8. Apply safe practice procedures when servicing clients.
9. Outline a detailed understanding of the nail anatomy.
10. Explain the basic fundamentals of nail growth.
11. Generate answers to commonly asked questions about natural nails.
12. Analyze the relationship of nail services and allergic reactions to promote prevention.
13. Evaluate the dangers of MMA.
14. Develop a portfolio of manicure procedures utilized in the salon.
15. Relate the General Acrylic Nail Application Guidelines.
16. Follow general nail maintenance procedures for the pink and white of the nail.
17. Summarize finishing procedures to promote safe and sanitary services.





Diseases and Disorders of the Nail





Our bodies host a variety of microorganisms, some of which are beneficial to us. These microorganisms also include **bacteria** and **fungi**. Fungal infections are caused by microscopic plants that live on our skin and on the dead tissue of our hair and nails.



Common Nail Irregularities, Diseases, and Disorders

The following list contains the more common nail irregularities, diseases and disorders.

<p>Paronychia infections of the nail fold can be caused by bacteria, fungi and some viruses. The proximal and lateral nail folds act as a barrier, or seal, between the nail plate and the surrounding tissue. If a tear or a break occurs in this seal, the bacterium can easily enter. This type of infection is characterized by pain, redness and swelling of the nail folds. People who have their hands in water for extended periods may develop this condition, and it is highly contagious.</p>	 <p>Paronychia Infection</p>
<p>Pseudomonas bacterial infection can occur between the natural nail plate and the nail bed, and/or between an artificial nail coating and the natural nail plate. Many people have been led to believe that the classic 'green' discoloration of this type of infection is some type of mold. In actuality, mold is <i>not</i> a human pathogen. The discoloration is simply a by-product of the infection and is caused primarily by iron compounds. Pseudomonades thrive in moist places; it feeds off the dead tissue and bacteria in the nail plate, while the moisture levels allow it to grow. The after effects of this infection will cause the nail plate to darken and soften underneath an artificial coating. The darker the discoloration, the deeper into the nail plate layers the bacteria has traveled. If the bacteria have entered between the nail plate and the nail bed, it will cause the same discolorations and may also cause the nail plate to lift from the nail bed.</p>	 <p>Pseudomonas bacterium trapped between the nail plate and the nail bed. ("The 'Greenies'")</p>
<p>A fungal or yeast infection which results in Onychomycosis, can invade through a tear in the proximal and lateral nail folds as well as the eponychium. This type of infection is characterized by Onycholysis (nail plate separation) with evident debris under the nail plate. It normally appears white or yellowish in color, and may also change the texture and shape of the nail. The fungus digests the keratin protein of which the nail plate is comprised. As the infection progresses, organic debris accumulate under the nail plate often discoloring it. Other infectious organisms may be involved, and if left untreated, the nail plate may separate from the nail bed and crumble off.</p>	 <p>Fungal Infection of the nail plate.</p>

<p>Tinea Unguis, or ringworm of the nails, is characterized by nail thickening, deformity, and eventually results in nail plate loss.</p>	 <p>Ringworm of the nails.</p>
<p>Onychatrophia is an atrophy or wasting away of the nail plate which causes it to lose its luster, become smaller and sometimes shed entirely. Injury or disease may account for this irregularity.</p>	 <p>Nail Atrophy</p>
<p>Onychogryposis are claw-type nails that are characterized by a thickened nail plate and are often the result of trauma. This type of nail plate will curve inward, pinching the nail bed and sometimes require surgical intervention to relieve the pain.</p>	 <p>Ingrown Toenail</p>
<p>Onychorrhaxis are brittle nails which often split vertically, peel and/or have vertical ridges. This irregularity can be the result of heredity, the use of strong solvents in the workplace or the home, including household cleaning solutions. Although oil or paraffin treatments will re-hydrate the nail plate, one may wish to confer with a physician to rule out disease.</p>	 <p>Vertical Split in the nail plate</p>

<p>Onychauxis is evidenced by over-thickening of the nail plate and may be the result of internal disorders -- seek medical advice.</p>	 <p>Onychauxis</p>
<p>Leuconychia is evident as white lines or spots in the nail plate and may be caused by tiny bubbles of air that are trapped in the nail plate layers due to trauma. This condition may be hereditary and no treatment is required as the spots will grow out with the nail plate.</p>	 <p>Leuconychia</p>
<p>Beau's Lines are nails that are characterized by horizontal lines of darkened cells and linear depressions. This disorder may be caused by trauma, illness, malnutrition or any major metabolic condition, chemotherapy or other damaging event, and is the result of any interruption in the protein formation of the nail plate. Seek a physician's diagnosis.</p>	 <p>Beaus Lines</p>
<p>Koilonychia is usually caused through iron deficiency anemia. These nails show raised ridges and are thin and concave. Seek a physician's advice and treatment.</p>	 <p>Koilonychia</p>

<p>Melanonychia are vertical pigmented bands, often described as nail 'moles', which usually form in the nail matrix. Seek a physician's care should you suddenly see this change in the nail plate. It could signify a malignant melanoma or lesion. Dark streaks may be a normal occurrence in dark-skinned individuals, and are fairly common.</p>	 <p>Melanonychia</p>
<p>Pterygium is the inward advance of skin over the nail plate, usually the result of trauma to the matrix due to a surgical procedure or by a deep cut to the nail plate. Pterygium results in the loss of the nail plate due to the development of scar tissue. Cortisone is used to prevent the advancement of scar tissue. Never attempt to remove pterygium -instead, consult a physician for advice and treatment.</p> <p>NOTE: The 'true cuticle' is often referred to as Pterygium. If you have pterygium, it can only be treated by a physician and should never be removed by a nail technician.</p>	 <p>Pterygium</p>
<p>Pterygium Inversum Unguis is an acquired condition characterized by a forward growth of the hyponychium characterized by live tissue firmly attached to the underside of the nail plate, which contains a blood supply and nerves. Possible causes are systemic, hereditary, or from an allergic reaction to acrylics or solvents. Never use force to 'push back' the advancing hyponychium -- it is an extremely painful approach, and will result in a blood flow. Consult a physician for diagnosis and treatment.</p>	 <p>Pterygium Inversum Unguis</p>
<p>Psoriasis of the nails is characterized by raw, scaly skin and is sometimes confused with eczema. When it attacks the nail plate, it will leave it pitted, dry, and it will often crumble. The plate may separate from the nail bed and may also appear red, orange or brown, with red spots in the lunula. Do not attempt salon treatments on a client with Nail Psoriasis. Consult with a dermatologist for diagnosis and treatment.</p>	 <p>Psoriasis of the nails</p>

MMA Damaged Nails: D. Tuggle, owner of The Nail Academy, Jamaica, Queens, N.Y., submitted this picture of nails damaged by MMA to the Beauty Tech Web Site and allowed it to be added to this page. MMA (methyl methacrylate) is a liquid monomer used for acrylic nails by some unscrupulous salons even though it is considered by and prohibited by the FDA to be a poisonous and deleterious substance. According to Dianna Bonn of Indiana, as of May 1, 1999, 23 states have banned this chemical from being used in nail salons. MMA nails are very rigid and do not bend or have the flexibility to break. When MMA does finally break, it will break the natural nail with it, causing severe nail damage.



MMA Damage
Photo by D. Tuggle

Brittle Nails are characterized by a vertical splitting or separation of the nail plate layers at the distal (free) edge of the nail plate. In most cases, nail splitting and vertical ridges are characteristic of the natural aging process. This nail problem is also the result of overexposure to water and chemical solvents such as household cleaning solutions. As we age, the nail bed's natural flow of oils and moisture is greatly reduced. This oil and moisture is the cement that holds the nail plate layers together and gives the plate its inherent flexibility. At the first signs of splitting or peeling, re-hydrate the nail plate layers with a good quality cuticle and nail oil that contains Jojoba and Vitamin E as two of the botanical oils. Jojoba oil has a very tiny molecule which can penetrate the nail plate surface, open up the layers and draw the Vitamin E in after it. The molecular structure of Vitamin E is too large to penetrate the nail plate layers or the surface layer of the skin without the benefits of Jojoba oil. Oil the nail plate and surrounding cuticle at least twice daily; more if you have your hands in water a lot. Wear gloves whenever working with household cleaning solutions, and remember: water is considered the 'universal solvent', and is indeed a 'chemical'.

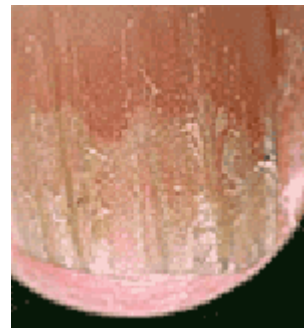


Splitting Layers



Peeling Layers

Vertical Ridges are also characteristic of aging, although are not limited to the aged or elderly. The nail plate grows forward on the nail bed in a 'rail and groove' effect, much like a train rides on its' tracks. As we age, the natural oil and moisture levels decline in the nail plate and this rail and groove effect becomes apparent. Ridged nails will improve through re-hydration of the nail plate with twice daily applications of a good quality nail and cuticle oil containing Jojoba and Vitamin E.



A **Hematoma** is the result of trauma to the nail plate. It can happen from simply trapping your finger or toe in the car door to friction from improperly fitting or 'too-tight' shoes, to a sports related injury. A hammer does a pretty good job at causing a hematoma as well! The nail bed will bleed due to this trauma, and the blood is trapped between the nail bed and the nail plate. A hematoma may also indicate a fractured bone. Many people who participate in sports activities experience hematoma because of the constant friction from the shoes against the toenails. Hematoma may result in nail plate separation and infection because the blood can attract fungi and bacteria. If several days have passed and the blood clot becomes painful, the nail plate may require removal so the nail bed can be cleansed.



Nail Patella Syndrome is a rare genetic disorder involving nail and skeletal deformities (among a host of other related anomalies) that occurs in approximately 2.2 out of every 100,000 people. It is transmitted as a simple autosomal dominant characteristic in the ABO blood group (Autosomal dominant means that you only have to inherit one copy of the gene to get it). It also means that there is no such thing as an unaffected carrier, and NPS CAN NOT skip a generation.



In cases where there seems to be no previous family history of NPS, it is thought to be caused by a sporadic gene mutation (which is probably how it began in all families at one time or another). Once NPS is in a family, the risk of transmitting the disorder from parent to offspring is 50% for each pregnancy, regardless of the sex of the child, with females being affected approximately 10% more often.

The severity of nail dysplasia is extremely variable. Nails may be small and concave, longitudinally grooved, abnormally split, pitted, softened, discolored, or brittle. Toe nails are usually less affected than finger nails.

There are other nail irregularities that only a trained dermatologist will be able to diagnose and treat. Some are contagious, and some are the result of injury or illness. Physicians will sometimes examine your fingernails because many diseases will appear as various changes in the nail plate. Any change in the nail plate could be cause for concern, whether it is a simple splinter hemorrhage that appears as a tiny black line in the nail plate, or a drastic change. Nail technicians are trained to beautify the hands/feet and are not allowed to diagnose nail diseases or to treat them in the salon. For your nail health, seek the diagnosis and recommendation of a knowledgeable dermatologist.

Understanding Artificial Nail Terminology

Many of us hear terms associated with nails and artificial nail enhancements that are either unclear in their definition, or they are confusing by their very nature. Many of these terms are chemically related, yet they can be simple terms to understand. This list contains terminology associated with natural and artificial nails, procedures, and a few product or additive definitions.

- **Adhesive:** A chemical that causes two surfaces to stick together.
- **Allergen:** A substance capable of producing an exaggerated or adverse reaction, such as sneezing, coughing, rash or irritation in sensitive individuals.
- **Allergic Reaction:** Allergic reaction, or an allergy, is an adverse reaction to the body usually characterized by skin redness, itching, blisters and localized swelling.
- **Acrylic:** A polymerized polymer coating... This coating is formed through the combination of an exact mix ratio of monomer to polymer. Today's acrylic monomers (liquid) are made with Ethyl Methacrylate (EMA) due to its inherent flexibility. Acrylic polymers (powder) contain approximately 70% EMA, and 30% MMA (Methyl Methacrylate). This combination of chemicals creates an enhancement that is both flexible and strong and mimics the natural nails flexibility and strength.
- **Benzoyl Peroxide:** A heat-sensitive initiator used in monomer and polymer systems.
- **Chemical:** Everything you see and touch except for light and electricity.
- **Contamination:** To make impure, infected, corrupt, etc., by contact with or addition of something.
- **Co-polymer:** Polymers made of two or more different types of monomers.
- **Cross-linked:** Polymers that create a chemical bond between two other polymer chains.
- **Crystallization:** An undesirable, but preventable formation of tiny crystals in the uncured nail coating that usually results from unusually cold temperatures or drafts. Liquid will actually freeze and turn into a solid before it polymerizes with the powder (polymer).
- **Cuticle:** True cuticle is the layer of translucent or colorless skin that is constantly being shed from the underside of the proximal nail fold.
- **Dehydration:** To remove moisture from a surface, substance or object this will improve adhesion and help to prevent yeast, bacterial and fungal infections.
- **Ventilate:** To admit fresh air into a space in order to replace stale air.

- **Viscosity:** The measure of a liquid's ability to 'flow'; related to the thinness or thickness of a liquid. You will see this term used on the MSDS.

Acrylic and Artificial Nail Product Chemistry

Starting With a Clean Nail

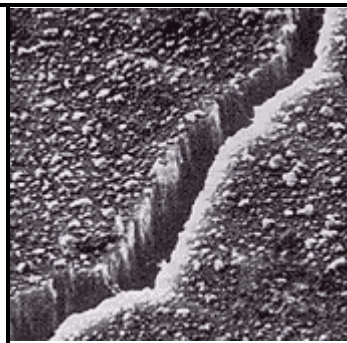
Whenever an artist begins a painting on canvas, he/she always prepares the canvas by applying a coat of white primer. Why? Because it allows the paint to better adhere to the porous surface. This same principal holds true for nail enhancement coatings. In order for the products to properly adhere to the porous surface of the nail plate, one must begin with a clean start.

A clean start begins with simple hand-washing and scrubbing the nail plate to remove surface oils and other contaminants that interfere with proper adhesion. Nail scrubs will do much more than remove oils. Scrubs get rid of bacterial and fungal spores which lead to infections. Skipping this step is the major cause of nail infections, and can also cause enhancements to lift at the cuticle.

Common Misconceptions

One of the most dangerous misconceptions in the professional nail industry is that products don't stick unless you "*rough up*" or '*etch*' the nail plate. This is absolutely false and very harmful to clients. Heavy abrasives strip off much of the natural nail plate, leaving it thin and weak. This leaves no supporting structure for the enhancements. Rough filing also damages the nail bed; it promotes allergic reactions and causes painful burning sensations, infections, loss of the nail plate, product lifting, and breakage. Thin nails are more flexible. This extra flexibility allows the enhancement to bend too easily, and creates invisible, hairline fractures that lead to breakage.

Highly magnified microscopic crack in the surface of a polymer. This crack is approximately ten microns wide or 1/10 the thickness of a human hair.



Heavy abrasives and high-speed drills generate lots of heat which is produced by friction. This heat leaves the nail bed sore and damaged; heating the nail bed to over 150° F. Need to rough up the nail plate to get good adhesion? Then something is wrong! Many nail technicians have great success without roughing up the nail plate. Why? The answer is simple; they properly prepare the nail plate, use correct

application techniques, and high quality products. Lifting problems can always be traced back to one of these three areas.

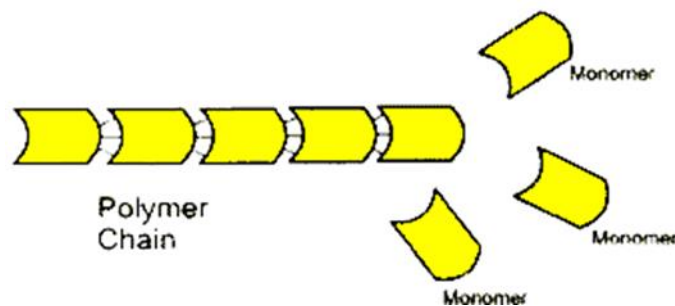
Monomers and Polymers

Monomers are like Tinker toys; they can be arranged and rearranged into almost unlimited combinations. Monomers can hook together into extremely long chains; each chain containing millions of molecules. Very long chains of molecules are called polymers. Polymers can be liquids, but they are generally solids.

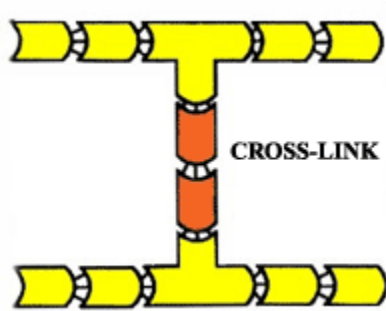
Chemical reactions that make polymers are called polymerizations. Sometimes the term cure or curing is used, but it has the same meaning. A monomer is a molecule that makes polymers. It takes an initiator molecule to begin this chemical reaction. The initiator molecule touches a monomer and excites it with a boost of energy. Monomers prefer the quiet life; they don't appreciate too much excitement, so they look for ways to get rid of the extra energy. They do this by attaching themselves to the tail of another monomer, passing the energy along. When this reaction begins, monomer chains sprout up everywhere. They grow longer and longer, becoming knotted and tangled until they are a teeming mass of microscopic strings.

This game of 'tag' continues the chain of monomers becomes longer and longer until the growing polymer chain can't find anymore monomers. Once the monomer is all gone, the chain reaction stops and the polymer are formed, although the chemical reaction is not finished. The surface may be hard enough to file, but it will be days before the chains reach their ultimate lengths.

Cross-linking Monomers



A cross-linker is a monomer with 'arms'. Normal monomers can join only head to tail. Cross-linkers also join head to tail, but their extra 'arms' grow new chains. These cross-linking monomers join with other nearby chains and can link three or more chains. Cross links are like rungs on a ladder; creating strong net-like structures. Cross-links can also join many other layers of cross-linked nets. The result is a three-dimensional structure of great strength and flexibility. This is how many types of artificial nail enhancements are made.



A polymer with too much cross-linking is brittle and easily shattered. However, cross-linked polymers can be made stronger with IPN's (Interpenetrating Polymer Network). Imagine weaving a strong polymer rope through the holes of the cross-linked net. This rope will add strength to the net without causing brittleness.

Shrinkage

All polymers shrink when they form, there is no exception in any nail product. Monomers don't normally touch each other and bounce around the container at high speeds trying to avoid other monomers. They join only when the conditions are right, and then they embrace very tight. Imagine billions of monomers suddenly coming closer together -- the effect is very noticeable. In fact, nail enhancement polymers shrink between 3-20% with some shrinking more than others. Excessive shrinkage (above 12%) causes many problems, such as lifting, tip cracking, and other types of service breakdown.

Tightly woven nets shrink more than loose weaves. The effects of shrinkage can usually be seen. Too much shrinkage may cause product to lift in the center of the nail plate and can often look like a 'bubble'. One way to control shrinkage is by following the manufacturers' directions. Improperly mixing (too wet a consistency) and incorrect curing polymers may cause excessive shrinkage and other more serious problems.

Initiators

Energy is the final key to understanding how monomers become polymers. All monomers need energy to make polymers. Initiator molecules control everything. They are the starting gun that begins the

monomer race. Some initiator monomers get their energy by only absorbing light energy while others absorb only heat energy.

Gel Nail Chemicals and Property Reactions

Product Types

Light-cured products are energized into polymerizing by absorbing light energy, usually UV (ultra-violet) light. Not all light-curing products use UV light -- some have initiators that use visible light. Sunlight and even artificial room lights can start polymerization in the container.

Heat-cured products use the heat in the room and body heat to cause polymerization. Many monomers cure at room temperature, 68° - 74° F. Tip adhesives (also monomers) and wraps are examples. A few products require normal incandescent light bulbs -- these are not light-curing monomers. They use the extra heat released from a light bulb and are still heat curing.

Catalyst

Catalysts are used in nail products to make chemical reactions happen faster. They are like the trigger on the starting gun, making the initiator molecules work faster and more efficient. If one of these 'parts' is missing, initiator, energy or catalyst, the chemical reactions will happen much more slowly or not at all.

Exothermic Reaction

When two monomers join, an extremely small amount of heat is released. This is called an exothermic reaction. This happens with all types of nail enhancement products; however, some release more heat than others. One normally cannot feel the heat released from two monomers, but remember -- it takes billions of monomers to make a nail enhancement. Can you feel the heat from this exothermal? The answer is definitely yes! Under certain conditions it can be quite noticeable, especially for monomers used to make wraps and light-cure products. Unless the heat causes your client to become uncomfortable, you should not be overly concerned. However, exotherms that burn the clients' nail beds can cause damage to the tissue and weaken the enhancement.

1. The warmer the monomer, the faster it will cure. If the room temperature is too warm or the table lamp is above 60 watts, the extra heat makes monomers react faster. Sometimes, your client will feel their nail beds become very warm, even hot!
2. It takes time to do things right; faster isn't always better. Faster means more heat in a shorter time and can lead to uncomfortably warm exotherms. It may also cause enhancements to lose some flexibility and lower toughness. An exotherm can reach in excess of 170° F!

3. Unhealthy or damaged nail beds may be the reason for clients complaining of burning sensations, as they are very sensitive to heat. Even tiny exotherms are easily felt on these overly sensitive tissues. Generally, the primary reason for unhealthy nail beds is over filing and over priming. The heat from heavy abrasives and high-speed drills are usually the culprits. Drill bits use friction to cut away the surface. Friction creates heat, and a lot of it! Even light abrasive files and drill bits can cause nail bed damage. Filing too hard, too often, or for too long makes nail beds sore and sensitive.
4. Metal forms can act as a catalyst and cause extra exotherms, but rarely will it cause burning.
5. Nipping lifted material will literally 'rip up' good tight layers of product along with vital nail plate layers, making them more sensitive to exotherms.

Primers

Primers act much like double-sided sticky tape by making the nail plate more compatible with certain liquids. One end of the primer chain is a perfect match to the nail plate. The other end of the primer chain is a perfect match to the monomer and polymer chain. Fig. 1

Acid-based primers dissolve molecules of residual oils from the natural nail. These microscopic traces are not removed during normal scrubbing procedures and may lead to service breakdown. Fig. 2

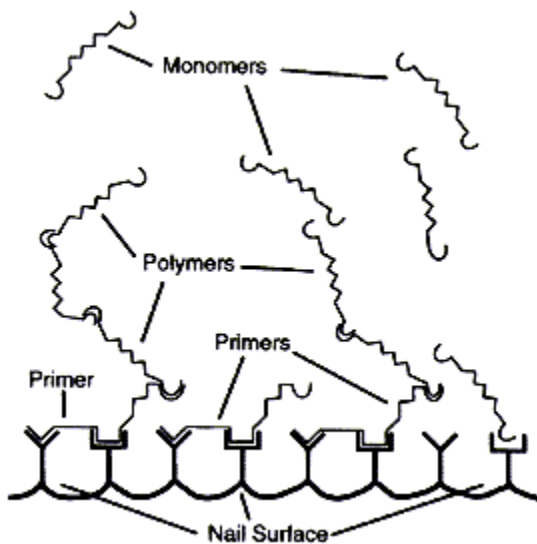


Fig. 1

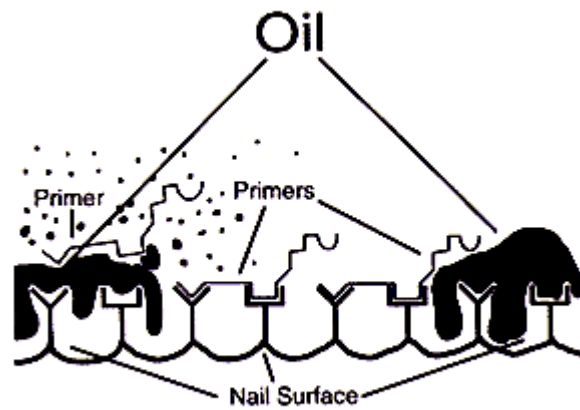


Fig. 2

Nail primers must be used with caution as some are very corrosive to skin. Nail primers, like most professional nail products, should never touch the skin. To do so can cause painful burns and scars.

Dehydrators

Nail dehydrators (Prep) are extremely important. Moisture can interfere with the adhesive bond which leads to delamination or lifting. To ensure proper adhesion, always scrub the nail plate, dry thoroughly and dehydrate. Skipping one step will lead to delamination and may also contribute to infections. Some preparation products contain pathogen fighters that remain on the nail plate to aid in the prevention of nail infections. The effects of dehydration are apparent for up to 30 minutes before the natural moisture levels are restored by the body.

Nail Polish Chemistry

Modern nail polish has been in use since the 20's. Although the basic chemistry remains the same, many things have changed since the original product was introduced. A typical formulation consists of four major ingredient types: polymers, plasticizers, solvents and pigments.

Type of Substance	Chemical Name	Use by %	Reason For Use
Polymer	Nitrocellulose	10%	Strengthens TSF Resin and makes it hard and shiny.
Polymer	TSF Resin	10%	Improves adhesion and toughens the coating -- sticks strongly to the nail plate, but is soft and dull looking.
Plasticizer	Dibutyl Phthalate	5%	Increase flexibility and wear of the polymer base.
Solvent	Ethyl Alcohol	5%	Solvents make spreadable liquids, and keep the polymer and additives dissolved. After the polish is applied, the solvent slowly evaporates, leaving the remaining ingredients.
Solvent	Ethyl Acetate	20%	
Solvent	Butyl Acetate	15%	
Solvent	Toluene	30%	
Pigments	Various Colors	5%	Titanium dioxide (a white pigment) is frequently added with other colored pigments to reduce the number of coatings.

Nail Hardeners

"Contains no Formaldehyde" is seen on some nail enamel or polishes. Should formaldehyde be a

concern for nail enamel users? In most cases, no! The negligible amount found in enamel is extremely safe. One exception is the prolonged use of products with more than 1% formaldehyde. At these levels, formaldehyde may cause severe allergic reactions. Fortunately, most nail enamels contain less than 0.0015% formaldehyde. This tiny amount comes from an important ingredient called toluene sulfonamide formaldehyde resin (TSF resin). This resin is very different from formaldehyde in that it will not cause problems unless the client is already allergic to formaldehyde, i.e., from the use of formaldehyde nail hardeners.

Nail hardeners may legally contain as much as 3% formaldehyde. Concentrations above 1% will cause the natural nail to stiffen and lose flexibility. Clients usually confuse this stiffness with strengthening. They incorrectly assume that harder nails must be stronger. Although the nail actually bends less, it has actually lost strength. Prolonged use of formaldehyde causes the nails to become split, dry and brittle.

Toluene

Toluene has been safely used in nail enamels since the 30's. In the 90's toluene has become a very controversial ingredient. Paranoid politicians passed a state law in California that basically says that safe is not safe enough. California law requires exposure to be thousands of times below the federal safe-exposure level. Because of a lawsuit, the state of California asked for a study which would determine the level of toluene in the average salon. The study showed that the level of toluene found in salon air is more than 200 times below the federal limits. In other words, the air would still be safe to breathe even if the toluene vapors of 200 salons were put into one salon.

Toluene is used to dissolve other ingredients in nail enamels. Polishes with toluene apply smoother and produce more brilliant colors that resist peeling. No other solvent does as good a job as toluene.

TSF Resin

Toluene sulfonamide formaldehyde resin is a polymer produced from each of the chemicals in its name. This particular polymer is widely used to increase the strength of the primary nail polish polymer, nitrocellulose. Hypoallergenic polishes usually contain a polymer resin which makes the polish about 10 - 20% less durable. Another alternative is toluene sulfonamide epoxy resin. This polymer has slightly better properties than the polyesters; however, polishes that contain this resin suffer from poor shelf life. Neither can it compare to TSF resin for strength and durability.

Acrylics

Nail technicians use many types of products to create artificial nail enhancements. Light-cure gels, liquid-and-powder systems, wraps and no-light gels all seem totally different and unrelated, but nothing could be further from the truth. The monomers used to make each of these are very closely related and, in fact, come from the same chemical family, the acrylics.

Two-part (Liquid and Powder) Systems

The 'liquid' is really a complex mixture of monomers. The 'powder' is a polymer which contains the initiator and other additives. The polymer acts as a carrier, holding other ingredients -- some of which are coated on the outside of the polymer. The mineral **titanium dioxide** is used to create a more natural appearance. This is the same pigment used in white house paint and children's finger-paint. Dyes are added to give the polymer a pinkish or bluish color. Pink dyes will also cover-up yellowing and product discoloration. Blue coloration acts as an optical brightener; whites look whiter when a small amount of blue is added.

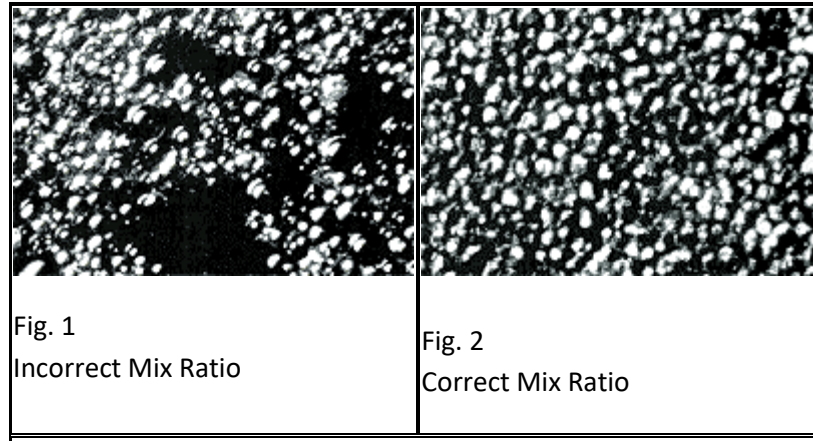
A heat-sensitive initiator is added to the polymer; usually **benzoyl peroxide**. This is the same initiator that is found in acne creams. The heat of the room and hand is enough to break a molecule of benzoyl peroxide in half. Each half is capable of exciting or energizing a molecule. When a molecule breaks in half, it is called a **free radical**. Free radicals also play a role in wrinkling and aging. Many skin care products contain chemicals which eliminate free radicals -- so, as you can see, some free radicals are beneficial while others are not.

Free radicals are very excited molecules that cause many kinds of chemical reactions and can be found almost everywhere. Once a free radical excites the monomer, it is completely eliminated. Monomers are mixed with polymers containing benzoyl peroxide. Heat will break the initiator in half, and each free radical will energize a molecule. The energized monomer will attach to another monomers tail, passing the energy along until all the monomers are hooked together into a teeming mass of long chains. Only the monomer can make a new polymer. The growing chains of monomer wrap around the polymer. The polymer powder does NOT react; it is only a carrier for the initiator to the monomer.

So where does the polymer powder come from? As you might suspect, the polymer powder starts out as monomer. The monomer is placed in a large mixer which may hold over 1000 gallons. Solvent is added to dilute the monomer, initiator and catalyst are added and the blend is mixed rapidly. After several hours, the monomer polymerizes into tiny beads, the solvent is drained away, and the beads are dried and packaged.

Consistency (Mix Ratio)

Consistency is determined by the amount of polymer powder used. The polymer powder gives the enhancement much of its strength. When the monomer polymerizes, it surrounds each tiny bead which reinforces the entire enhancement. Nail Technicians sometimes use extra monomer to smooth the surface of the enhancement, or use too wet a consistency during application. Too much monomer lowers consistency and reduces strength which results in excessive breakage. (Fig.1) The highest strength is obtained by using the correct ratio of monomer to polymer. (Fig. 2)



Too dry a consistency causes breakage and lifting, but too wet a consistency is worse. If the mixture is too wet, the enhancements may seem strong, flexible, and adhere well to the nail plate, but don't be fooled. Too wet a consistency is one of the leading causes of allergic reaction in clients and nail technicians. Wet consistencies may give better adhesion, but they lower strength. Dry consistencies have equal amounts of monomer and polymer and offer the best strength, but less adhesion. Medium wet consistencies give the best of both worlds; they are strong, flexible and offer good adhesion.

A medium-wet consistency is a mixture of 1 1/2 parts monomer to 1 part polymer. To determine if your consistency is correct, make a bead in your normal fashion. Carefully lay the bead on top of a clean, unfiled tip, placing the bead directly on the center or the apex. Do not pat or press the bead -- it should form a small mound or dome. Watch the bead for 15 seconds and note what you see. Does the bead begin to settle or flow out almost immediately? Does the height of the bead drop halfway or more in 15 seconds? Does the bead seem to lose most of its original shape? Can you see a ring of monomer around the base of the bead? If you answered yes to any of these questions, your bead is probably too wet. If you answered yes to all of these questions, your ratio is probably greater than 3 parts monomer to 1 part polymer.

Wrap Systems

The monomers used to create wraps are called cyanoacrylates and are members of the acrylic family. They are the same monomers used to create many fast setting adhesives such as Krazy Glue. Professional nail products are specifically designed for use on fingernails and are far superior for this application. These monomers are sensitive to alcohol, water, and weak alkaline substances, and in large amounts they can cause almost-instant polymerization. A drop of water or alcohol on wrap monomers will cause 'shock cure'. They will harden quickly and turn cloudy white. They turn cloudy because shock curing causes thousands of microscopic cracks. They are invisible to the eye, but the cracks will scatter light reflecting from the surface. Small amounts of these substances cause slower, controlled reactions

which result in polymers which are clear, flexible and strong. Wraps, however, do not have the advantage of being cross-linked.

Water-sensitive monomers must be protected from moisture in the air which is why they are sold in containers with small nozzles. This prevents air molecules from gelling or thickening the product. As with other monomers, inhibitors are used to prevent gelling. Even so, leaving a container open for too long will thicken the product fairly quickly. You might think this moisture sensitivity is a negative, although it actually is a positive. The nail plate contains enough moisture to polymerize wrap monomers, and just touching the nail plate is often enough to react the monomers. (This is one reason why cyanoacrylates so easily adhere ones fingers together.)

Catalysts speed up the polymerization and reduce cure time from minutes to seconds. Spray or brush-on catalyst causes an almost-instantaneous reaction. The catalysts in wrap systems are generally weak alkaline substances which may be listed as "aromatic amines". Rapid reactions cause rapid heat build-up. Incorrectly used, these catalysts may heat the nail plate to a blistering 170° F. A small amount of warming is beneficial and will improve strength; however, pain-causing heat may cause serious burns to the nail bed. To avoid over-heating, some catalysts must be sprayed from a distance. Always wear the proper mask when using these systems to protect you from the vapors of mists and sprays.

Tip Adhesives

Cyanoacrylates

Certain types of cyanoacrylates are used as tip adhesives and are formulated differently. They are sensitive to moisture and work best when there is no air. Most set slowly or turn to a rubbery gel in the presence of air. When the air supply is cut off, the adhesive quickly sets. This feature is beneficial for the nail technician, allowing maximum working time and a quick set once the tip is properly placed. Thinner adhesives set faster, but this is not always good because extremely fast setting adhesives give lower strength. If you have a client whose tips just don't seem to hold or they separate in a few weeks, try a slower-setting thicker adhesive.

Thin adhesives work best if the tip to nail plate fit is perfect. If there is a gap between the tip as there generally is with ski-jump nails, nails with missing sidewalls, bitten or broken nails, then the thicker, slower setting adhesives will give the best retention. Thicker adhesives (gel adhesive) will fill in the gaps and irregularities and allow for a tighter bond. With gel adhesives, less is more. These adhesives usually contain dissolved methacrylate powder to give the bond more strength, especially in the gaps. Some adhesives contain special wetting agents which help improve nail adhesion, strength and clarity. Since

these adhesives are not cross-linked, they are affected by moisture. Clients who frequently wet their hands should be warned that all cyanoacrylates are moisture sensitive, and should be instructed to wear gloves whenever possible. This is true of both adhesives and wraps.

Glue

The word "glue" is commonly misused -- especially in the professional nail industry. People often use this term to mean anything that is sticky. Glue is a name for a certain type of adhesive. True glues are adhesives made from animal protein, hide, bones and hooves. No professional nail adhesive is made from animal by-products, so it is incorrect to call them 'glues'. The proper term is adhesive. The professional nail industry uses advanced monomer adhesives, not glue!

Wrap Fabrics

Various types of fabrics are used to reinforce the polymer wrap coating. These fabrics provide support and added strength to the coating. There are three fabrics in wide use: fiberglass, silk and linen. The type of fabric is not as important as the weave. The weave and thickness of the fabric determine its usefulness; the monomer must be able to penetrate the weave, soaking completely through the fabric. If the monomer sits on top of the fabric, it leaves tiny spaces or voids between the monomer and the fabric's fibers. These voids create weak areas where cracks may later develop and grow. If the monomer absorbs easily into the fabric, the coating will be stronger and clearer. Proper wetting allows the monomer to cover the surface more thoroughly, penetrate deeper, and hold tighter.

Fiberglass and silk are very similar in properties. Silk is more easily wetted and creates a more natural appearance. If properly applied, both silk and fiberglass create thin, strong and natural-looking enhancements. Linens tend to be thicker and tightly woven, making it difficult for the monomer to penetrate the fabric. The result is thick, cloudy coatings that must be worn with polish to cover the unnatural appearance. Because the monomer cannot completely wet the linen, these fabrics can lift and peel away (delaminate). Medium-weave silk and fiberglass provide the best overall combination of strength, retention, clarity and wetting.

Skin oil and other contaminants can block wetting. Touching fabric will deposit large amounts of skin oil on the fabric. To eliminate many of the problems associated with wraps, including lifting, peeling and cracking, avoid touching the fabric with your fingers.

UV Gel Systems

UV or visible light-curing gels have been around for many years, but have recently gained popularity. Newer products are beginning to meet the tough demands of the professional nail industry. Since these

systems can use either visible light or UV light to create enhancements, the term "gel" will be used when referring to both types of products.

No-light Gel

This term is misleading and suggests that these are like regular UV gels because they need no light. Not true! These products are wrap monomers that have been thickened to have a gel-like appearance. They should be used and handled as any other wrap product. They have most of the benefit and disadvantages of the other wrap products. Many feel that the gel wrap product is easier to use because it is thicker; however, thicker monomers will not wet fabric as easily.

Gels are often sold as being 'not acrylic', but in fact are based on both the methacrylates and the acrylates family. Polymerizing monomers with UV or visible light is not very efficient as it is difficult to get the UV light deep into the gel. If gels were made entirely of monomers, most of the gel would not turn into a polymer. One way to improve efficiency is to pre-join some of the monomers into short chains. These short chains are neither monomers nor polymers -- they are in between: oligomers.

Oligomers make it easier to create polymers. An oligomer is a single chain that is several thousand monomers long. Joining a few hundred oligomers is much faster than joining a million individual monomers. Why are gels so thick? Nail enhancement monomers are liquids and polymers are solids, so it makes sense that oligomers are in between. This is why gels are 'gel-like' inconsistency. Now you can understand one of the disadvantages of most gel systems. They are more difficult to use because of their heavy consistency and their tendency to be stringy. On the positive side, the thicker consistency reduces evaporation and odor.

Some initiators use heat energy and others use light. It is easy to keep light away from gels so the initiator, catalyst, and oligomers can be combined together into a single product. This is possibly one of gel's greatest advantages. They come premixed and ready to use. Still, no system is perfect. Each has advantages and disadvantages. Curing with UV or visible light is more convenient, but raises special problems that must be addressed. Since initiators are activated by light, they must penetrate completely through the gel to polymerize all of the oligomers. Unfortunately, this does not occur.

Thick coatings of gel allow less light to reach the bottom layers. In Europe where gels are used extensively, they attempt to overcome this with powerful UV lights. These systems use 38-40 watts of UV light. American systems tend to be far lower, usually 8 watts. UV bulbs emit only UV-A, so there is little danger. However, the high-wattage lamps are far more expensive and can cause problems as well. Remember, when polymers cure too quickly, they release large amounts of heat in a short period of time. This can cause serious and damaging burns to the nail beds.

It is much better to use three or four thin coats rather than one or two thicker coats. Thinner coats allow more light to penetrate the layer. Also, the hands will be under the gel light longer if more coatings are used. Another advantage is reduced shrinkage. Gels shrink more than any other type of enhancement. Using thinner coats reduces the effects of shrinkage.

Bulb condition is vital to the success of gel enhancements. UV lamps become ineffective many months before they burn out. After about 6 months of normal use, a bulb has less than half its original UV energy. UV bulbs should be changed twice per year even if they look fine. If the product seems to set slower than normal, change the bulbs immediately. Clean the bulbs whenever needed or at least once per week.

Finally, the type of oligomer used plays an important role in skin allergy. Since acrylates tend to cure much faster, they are more likely to cause allergic reactions. For this reason, acrylate monomers are rarely used in monomer-and-polymer formulations. The stickiness of gels also contributes to allergies because the sticky gel is more likely to remain on implements and skin. Gels should NEVER be allowed to touch the skin -- NEVER touch your client's cuticles, either. If contact occurs, immediately cleanse the area with soap and water. Keep brush handles, files, containers, and implements free of gel.

As gel ingredients become more sophisticated, the products will improve and many of the problems associated with gels will no longer haunt nail technicians.

Playing it Safe

Most people believe chemicals are dangerous or toxic substances. Ask someone about chemicals and they might mention toxic waste dumps or factories dumping poisonous waste into streams. Actually, everything we see and touch is a chemical, except for light and electricity. Air is a combination of many chemicals; oxygen, hydrogen and nitrogen. Clean, pure mountain stream water is a chemical. A newborn baby's skin is 100% chemical.

No chemical in the world can be harmful unless you overexpose yourself. Every chemical substance has a safe and unsafe level of exposure. Simply touching, inhaling, or smelling a potentially hazardous substance can't harm you. Exceeding the safe level of exposure is the danger we must learn to avoid!

Some chemicals are dangerous even in tiny amounts and are not suited for salon use. Professional products are formulated to be as safe as possible, though no nail product or other cosmetic product is free from all risks. A normally safe product can become dangerous if used incorrectly. Even gardeners and mechanics must follow safe working procedures.

Reduce Your Exposure

Material Safety Data Sheets provide information to all chemical workers, including nail technicians. MSDS help firefighters deal with chemical fires or clean up large spills, and doctors to treat accidental poisonings. Any professional product that contains a potentially hazardous substance has an MSDS. What can you learn from an MSDS?

- Potentially hazardous ingredients found in each product.
- Proper storage and fire prevention.

- Ways to prevent hazardous chemicals from entering the body.
- The short and long-term health effects of overexposure.
- Early warning signs of product overexposure.
- Emergency first aid advice.
- Emergency phone numbers.
- Safe handling techniques.

There are only three ways that a potentially hazardous chemical can enter the body. If you block these 'routes of entry', you will automatically lower your exposure.

1. *Inhalation* by breathing vapors, mists, or dusts.
2. *Absorption* through the skin or broken tissue.
3. *Unintentional* or accidental ingestion.

The human body is very rugged and complex, giving early warning signs of overexposure. Unfortunately, these symptoms are often ignored. For instance, overexposure to some solvents can make you feel very tired or keep you from sleeping. Overexposure can cause headaches, nausea, angry or frustrated feelings, nosebleeds, coughs, dizziness, tingling fingers and toes, dry or scratchy nose and throat, puffy red and irritated skin, itching, and many other symptoms. Watching for these acute symptoms will help you avoid more serious, long-term problems.

Plan Ahead

- *Accidents happen when they are least expected.*
What would you do if a small child ran up to your table and drank from your bottle of primer?
The MSDS will provide emergency numbers that may save a life.
- *Keep products capped or covered when not in use.* Empty waste containers regularly.
Just because you don't smell anything doesn't mean there are no vapors in the air. Keeping products closed will drastically reduce the amount of vapors released by 'volatile' or evaporating liquids.
- *Avoid pressurized spray cans and use metal waste containers with pop-up lids.*
Surgical type masks (often called dust masks) are completely ineffective against vapors. These masks should only be used to keep dust particles out of your lungs.
- *Never use a dust mask to protect yourself from vapors.* Vapors are far too small to be 'filtered' by dust masks. Use a mist mask if you spray anything.
Some high-quality masks are also effective against mists. These are called mist-rated masks; however, they too are ineffective against vapors.

- *Always wear a dust mask when filing, especially if you use a drill.*
Our lungs can handle a lot of dusts because it has ways of removing and disposing of inhaled dusts. When you inhale more than the lungs can handle, you increase your risk. Drills make much smaller dust particles than files or emery boards. These smaller particles lodge deeper into the lungs, making them more hazardous to your health. Drills spin in a clock-wise direction and will actually 'throw' the dust in your face, and remain in your breathing-zone up to 60% longer than the dusts from hand filing. These smaller particles will settle on every surface and even the slightest breeze will send them back into your air.
- *Never judge product safety by odor.*
What is the most dangerous misconception about chemicals in the salon industry? Many believe that they can tell how safe or dangerous a chemical is simply by its odor! Wrong! A chemical's smell has absolutely nothing to do with its safety. Some of the most dangerous substances known have very sweet, pleasant fragrances.
- *Never smoke, eat or drink in the salon.* Always store food away from salon chemicals and wash your hands before eating or going to the restroom. A cigarette lighter will produce a spark that may ignite flammable liquids and vapors.

Coffee cups can easily collect dusts. Hot liquids, like coffee and tea, will absorb vapors right out of the air. Dusts can settle on your food, and your food can absorb the vapors. Think not? Lay a piece of bread on your table in the morning, and then take it outside with you at the end of the day. What is that smell? Chemical vapors!

- *You should always wear approved safety glasses whenever you work and should give your client a pair to wear as well.*
Your client may love you and think you are the greatest nail technician in the world. But, if you accidentally splash primer or wrap monomer in their eyes, you have lost a friend and gained a lawsuit! You are responsible for the client's safety while in your care.
- *Soft contact lenses can absorb vapors from the air -- never wear contact lenses in the salon, and wash your hands before touching the eye area.*
Wearing contacts while in the salon is risky as vapors will collect in the soft lenses and make them unbearable. Even if you wear safety glasses, the vapors are still absorbed. The contaminated lens can etch the surface of the eye and cause permanent damage. If an accidental spill occurs, the liquid will 'wick' under the lens, making proper cleansing of the eye more difficult.
- *Treat all chemical products with respect. Don't be fooled by marketing terms like "nontoxic", "natural", and "organic."*
Organic simply means the chemical contains carbon in its structure. Most things on earth are organic. Cow dung, poison ivy, and road tar are all 100% organic and natural. Natural simply

means "occurring in nature." Nature is a wicked place; filled with poisonous substances. **Natural** doesn't mean a product is safe, wholesome, or even better.

- Don't judge a chemical by what it CAN do -- what's important is how easily you can prevent the potential hazard.

Alcohol (in beer and wine) CAN cause liver damage -- if you drink a couple quarts a day for 5 years! It won't happen because you have a margarita with lunch. There is no need to fear chemicals, just be careful and wise.

Know your products, read and understand the MSDS, read all product warning labels, and follow the manufacturer's application guidelines for all your salon products.

- To reduce exposure to vapors, ventilate, don't circulate!
Air-conditioning units are designed to circulate the existing air in a room.

A ventilation system will 'remove' the existing air and draw fresh air into the room. Vented manicuring stations will help 'control' dusts and vapors, but only if the charcoal filters are changed regularly.

Salon Safety Guidelines for Nail Technicians

BASIC SALON SANITATION

1. Nail technicians should always clean both their hands and their clients' hands or feet before every service. Some states allow the use of waterless hand sanitizers, but if hands are dirty or contaminated, they should be washed with liquid soap and running water first. Cleaning hands reduces the risk of spreading germs from client to client.
2. All implements (including individual implements that a client brings in or that are left in the salon), equipment, and materials that come in contact with a client must be properly cleaned (sanitized) and disinfected prior to servicing each client. Before any tool can be used on a client, it must be properly cleaned and disinfected.
3. If any metal tool or hard piece of equipment has come into contact with blood, body fluid, infection, or an unhealthy condition, it must immediately be cleaned and disinfected (rather than continuing to use it on the same client). (**Note: All equipment should be thoroughly disinfected, even if it has not come into contact with your client.**) If a nail file or other porous item comes into contact with blood, it must be **disposed** of immediately. (There may be local, state, or federal regulations regarding items that come into contact with blood.)

4. Store clean and disinfected tools in a clean container or lined drawer (labeled “disinfected”) that is separate from soiled or used tools and files (so you never get confused and pick up a dirty implement).
5. In addition to the disinfection protocol, you should keep records of the cleaning and disinfecting of foot spas.
6. Sanitation is an often-misunderstood term. Sanitizing means “cleaning to remove all visible residue or debris.” Proper cleaning is the first step in safety, but it must be followed by disinfection, which involves describes the use of chemicals to destroy germs on non-living surfaces. Salon disinfectants include EPA-registered, hospital-level, liquid disinfectant products that are virucidal, bactericidal, and fungicidal.
7. Use clean towels and/or manicure mats for each client.
8. Products such as creams, lotions, scrubs, paraffin wax, masks, and oils must always be used in a sanitary manner that pre-vents contamination. For example, paraffin and nail oils should not be applied with a brush (or spatula) that has touched the skin. To avoid product contamination:
 - Dispose of used or remaining product between clients.
 - Use single-use disposable implements to remove products from containers for application or remove product with a clean, disinfected spatula and put product into a disposable or a service cup that can be disinfected.
 - Use an applicator bottle or dropper to apply the product.
9. If blood or body fluid comes in contact with any salon surface, the nail professional should put on protective, disposable gloves and clean it with an EPA-registered, hospital liquid disinfectant or a 10% bleach solution. In case of an accidental cut, clean with an antiseptic and bandage the cut.

Product Safety

1. Read and follow manufacturers’ instructions for products used in the salon. Labels include information about how to use the product safely, expiration dates, and safety precautions to be followed in case of a spill or reaction, and proper disposal. Also, be sure to follow local, state, and federal regulations for chemical disposal.
2. Have a Material Safety Data Sheet (MSDS) on file in your salon for every product used in the salon that could cause injury or harm. MSDS include important information about reactions, spills, ingredients, and disposal of chemicals. Make certain that the information on the MSDS is read and understood by all salon workers. Most states require MSDS to be available upon request by an inspector, and a fine might be levied for salons that don’t have them, so keep MSDS for all of your products in an easily accessible location. Many manufacturers have MSDS

on their websites that can be easily downloaded.

3. Proper ventilation in nail salons is essential for client and worker safety and comfort. Make certain that your ventilation system provides fresh air intake as well as exhaustion of stale air. Air control in the salon reduces your exposure to airborne particles and bacteria as well as reduces your inhalation of product vapors, creating a healthier work environment.
4. Use a ventilation system that directs airborne debris (like filing dust) away from the breathing zone (the two foot square area between your mouth and nose and your work area) of you and your client. A mask can also be worn for further protection.
5. Use a metal trashcan with a lid (a self-closing trashcan is ideal) to reduce vapors from soiled material getting into the salon. This also reduces odor.
6. Smoking should never be permitted in a nail salon, nor should lighted candles be used anywhere nail products are used. Store all nail care chemicals in closed containers, always from any sources of heat or ignition.

Items to Dispose or Not

There are two kinds of tools commonly used in the nail salon: non-porous (which can be disinfected and are generally reusable) and porous (which are one-time-use only). Know what each implement you use is, as it directly affects your ability to comply with state laws and keep clients safe.

Porous items are made of cloth, wood, or other absorbent materials. Porous items include most nail files, orangewood sticks, cotton, paper mats, towels, and buffer blocks.

Porous items that are damaged or destroyed by use are single-use items (disposable) and must be thrown away after one use.

- Porous items of any type that are contaminated by blood, body fluid, broken skin (skin that is not intact), infections, or unhealthy conditions must be thrown in the trash.

Items that the manufacturer designs to be disposed of after one use are called “disposable” or “single-use”. These items must be properly disposed of after one use on a single client. Reusing these items is considered an unsanitary, improper and unprofessional practice.

- Towels, chamois, buffing bits and similar items can be cleaned in a washing machine with regular detergent at the end of each day.
- Non-porous items are made of hard materials like metal, plastic, or glass, and include nippers, scissors, combs, metal or fiberglass-backed files, and drill bits.
- All non-porous tools can be (and must be) disinfected even if they do not contact blood or unhealthy conditions. These are all multi-use items.
- To clean a non-porous item, clean all visible debris then completely immerse the tool for 10 minutes in an EPA-registered disinfectant.
- Other items that are not designed to touch skin, and are used in waterless products such as nail polish, acrylic monomer and powder, or light-cured gels, do not spread germs and do not need to be disinfected. Brushes that are used to remove debris from a foot spa, tub, or basin must be properly cleaned and disinfected between each use.
- If you are not sure that a file or tool can be safely cleaned, disinfected, and used again, throw it out. Don't risk your business or your clients' safety to save a few pennies.

What Nail Techs Need to Know About Disinfectants and Detergent Cleaners

You don't have to be a scientist to stay compliant on salon sanitation (although it seems like it). This is a simplified guideline for understanding the product claims and terms used with salon disinfectant products.

- 1) Any EPA-registered liquid disinfectants used in the salon must have these qualities:
 - Must have the words "bactericidal, fungicidal, and virucidal" and "hospital" on the label.
 - Must be mixed, used, stored, and disposed of according to manufacturer's label instructions. (It is against federal law to use an EPA-registered disinfectant contrary to its label.)
 - Must be prepared fresh every day and replaced immediately when the solution becomes visibly contaminated.
 - Are ineffective when proper cleaning is not performed before use.
 - Require complete immersion in the correct amount of disinfectant for 10 minutes after cleaning of all visible residues. Complete immersion means enough liquid to cover all surfaces of the item. Note: If the disinfectant manufacturer's label requires a different immersion time for soaking, you should always follow the label's instructions.
 - Spray disinfectants are for cleaning surfaces only and are not adequate for disinfecting tools and pedicure equipment in the salon.

- 2) EPA-registered hospital “one-step” cleaner/disinfectants may be used for disinfecting pedicure equipment if:
 - They are EPA-registered, hospital, bactericidal, fungicidal, and virucidal and have the words “one-step” on the label.
 - Tools and equipment are first cleaned of large amounts of residue.
 - Are used exactly as described by the manufacturer’s instructions.
- 3) All bottles and containers (other than the original manufacturer’s container) containing any disinfectant must be properly labeled, listing the contents, percentage solution (concentration), and date of mixing.
- 4) Chelating surfactant detergents (this is a type of cleaner recommended for pedicure spa units) break down residue from pedicure products and are effective in hard water. Hard water contains calcium and magnesium ions, which can inactivate disinfectants and create residue films that are difficult for ordinary detergents to remove.
- 5) You must record the time of each cleaning procedure in the salon pedicure cleaning log. Keep a log available to show clients. It demonstrates that you regularly clean and disinfect your pedicure equipment to ensure the customer is protected. Read and follow the instructions provided with the pedicure equipment to ensure proper use.

Your Professional Responsibility

1. Recommend that clients seek medical advice if they have any questionable nail conditions. Never be intimidated by a client who wants a service done against your professional recommendation. It’s helpful if you have a professional referring relationship with a local dermatologist, internist, and podiatrist.
2. Inform your clients of their responsibility for proper nail care between salon visits. [NAILS Magazine’s website has Client Handouts that can be downloaded and shared with clients. The topics range from how to care for their acrylic nails to how to deal with aging skin.]
3. Observe proper hygiene and grooming yourself, and maintain a professional attitude at all times.
4. Strive to obtain continuing education annually from manufacturers and/or generic industry sources, regardless of whether it’s required in your state.