Atlanta Marble Manufacturing
Plant Employee Training Manual

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Welcome to Atlanta Marble Manufacturing Inc.! Atlanta Marble is a family owned business which has served the Southeast region for over 35 years. Our quality products made by a professional staff have allowed us to grow and rise above others in the cultured marble industry.

Atlanta Marble Mfg. Inc. has been instrumental in the introduction of new ideas to the Atlanta market. These ideas include cultured granite, cultured onyx and the development of several new cast edges which help distinguish our cultured products from the competition.

Part of your training will include reading this training manual which will give you a thorough understanding of the cultured marble industry and how it operates. In no way does this manual complete your training nor is it a complete guide to all the responsibilities that may be expected of you. Additional training provided by your supervisor and hands-on training and working with other in the plant will develop the skills necessary for you to become a trained and skilled developer of cultured marble. As you read through this training manual you will notice various words in bold print. These words and their meaning can be found in the back of this manual under Glossary. We encourage you to become familiar with all the words in bold print.

A cultured marble plant can be dangerous. Interacting with chemicals, sanding and buffing equipment, mixing machinery, spray machinery, working around loud machinery and heavy lifting will be an everyday occurrence while working in the plant. Personal Protective Equipment (PPE) such as eye protection, breathing masks, hearing protection, clothing protection must be worn at all times to ensure your safety. Failure to wear provided safety equipment may result in your separation from the company. Atlanta Marble takes safety very seriously and expects its' employees to treat safety in the same manner. With that being said, let's get started!

Chapter 1
Introduction to Cast Polymer Products

Cast Polymer products include cultured marble, cultured onyx and cultured granite among others. Cultured marble specifically, has over the past 30 years, become the product of choice for vanity tops, standard and garden bath tubs, walk-in shower stalls, tub and shower surrounds and others. The popularity of cultured marble can be attributed to its' unique high strength, low cost, durability, relatively light weight, long term resistance to its' environment, and its' unique beauty that is now demanded by customers who choose cultured marble for their homes and businesses. However, the most unique characteristic and ultimate reason for the success of cultured marble is found in the inherent design flexibility of the product.

The cultured marble process was first developed in the early 1960s by a tile distributor in Southern California. **Resin** was mixed with **calcium carbonate** to form a thick paste called **matrix**. This new product called **matrix** was poured onto **molds** made of plate glass and allowed to dry or **cure**. By 1967, a process was developed to permit the casting of cultured marble to form an intragal vanity part consisting of a vanity deck, vanity sink, and vanity back splash plate all molded into one piece. There have been many innovations over the years in mold design, automated casting machines, resins, and filler technology. But the basic process of creating cultured marble remains the same: Molds are cleaned, prepared and sprayed with a gel coat. Resin, initiators, pigments and fillers are mixed together to form a matrix and then spread or poured on to the gel-coated mold. The part is allowed to chemically react and cure. Once the part has properly cured, the mold is removed from the cast part and set aside to be cleaned prepared and used again. The cast part is carefully inspected, sanded (and sometimes repaired), buffed and prepared for shipping. From there, it is loaded on a truck and shipped to the consumer where the part is installed by a qualified installer.

Chapter 2
Mold Set Up Process

The mold set-up process begins when the plant receives a work order for a specific part to be manufactured. These work orders are delivered from salesmen, who work in the field and obtain part type, measurements, finishes and colors. This information is written on a work order and passed to the plant supervisor. The plant supervisor then determines which parts will be set-up for that particular day.

Work orders are reviewed and set up begins by the set-up department. Measurements, colors, bowl sizes and types, and other information is taken from the work order and transferred to the mold.

Proper mold preparation is by far, the most critical step in the process of manufacturing cultured marble products. The finished part will replicate every detail of the mold including every defect, scratch, dust particle, or foreign object. Therefore, the proper care and cleaning of the mold is critical in order to obtain quality results. Proper mold set up always begins with a clean, defect free mold.

Most mold damage occurs during the de-molding process when parts do not properly release and aggressive measures are taken to free the part from the mold. When parts stick to the mold, it is usually attributed to improper preparation procedures.

Proper mold preparation always begins with a clean mold. Dust, tape, wax or clay residue is carefully removed with a plastic or wooden scraper so as not to damage the smooth mold surface. The mold is wiped with a clean, soft cloth being careful not to trap foreign particles in the cloth causing scratches to the mold surface that will later transfer to the part being cast. Never use a hard or sharp object on the mold surface. Residual mold release and tape residues are removed from the back gate at the back splash as well to ensure a good and proper release of the part from the mold.

Remember: High quality parts are a direct result of well maintained and properly prepared molds. Molds are made of fiberglass and provide a high-gloss surface to the finished part. They are repairable, low cost and the most commonly used mold in the industry. Atlanta Marble Mfg. mainly uses fiberglass molds for all the parts cast at the plant however glass mold are occasionally used to create shower surrounds.

A mold cleaner (usually mineral spirits) is applied to clean the mold and remove residual mold release material. The mold cleaner is then removed using a clean soft cloth. A mold release material is then applied to the surface of the mold.

There are generally two types of mold release: Waxed based and polymer based mold release. Wax is low cost but labor intensive because wax must be applied at every set-up. And wax builds up on the mold which requires periodic stripping.

Be sure to follow label instructions when using mold release waxes.

After the coat of mold release is applied, the mold release should be tested by applying a strip of masking tape to the mold surface and checking how it releases from the mold surface. The use of a masking tape peel test is very effective in determining the condition of the mold release surface. Use a good ¾ or 1 inch wide general purpose masking tape for your release quality testing. Keep with the same tape so the “feel” of its removal becomes familiar to you.
This feel “experienced” during tape testing of the release surface should occur by lifting a corner of the tape, allowing it to stick to your index finger and pulling it up at 90 degrees, without it coming off your finger and without hearing or feeling a “zipping” sound as it peels off the mold surface. Several tape tests should be taken around the mold to insure application of the mold release product has been consistent.

A good mold can produce many castings during its life through good mold preparation, maintenance and proper use.

Chapter 3:
Mold Spray Up Process

Controlled Spraying

An important objective in the spraying process is known as controlled spraying. Controlled spraying reduces styrene emissions by increasing material transfer efficiency and reducing overspray. There are three elements of controlled spraying which work together to reduce emissions:

a. Operation of the spray gun at the lowest fluid tip pressure.
b. Operator training that teaches proper spray gun handling techniques.
c. The use of close containment mold flanges to minimize overspray off the mold.

Controlled spraying can reduce gel coat emissions by 42%. The goal of controlled spraying is to reduce spray gun pressure and wet resin surface area. Controlled spraying involves:

1. Reducing spray gun pressure
2. Training spray gun operators
3. using wide flanges or masking

Higher fluid tip pressures on the spray gun increases atomization. More atomization creates a greater surface area that is covered with overspray. More surface area that is covered causes higher emissions.

Pre-Gel Coat Spray Checklist

1. Product Code Number – Will you be using the proper gel for the job and parts you're planning to spray?
2. Batch Date – Check the batch date on the product. Do not use a gel coat that has an expired date. Discard and use gel with a valid date.
3. Visually check product to verify consistency and proper gel
4. Check gel coat, initiator and mold is at an acceptable temperature – 70-85 Degrees F. Gel coat will not cure properly at temperatures below 65 Degrees F.
5. Verify or mix the drum containing gel coat with an air powered mechanical mixer. Gel coat should be mixed for 10 minutes for every 24 hour period.
6. Check and clean the in-line gel coat filter, check the pickup tube screen. Be sure screen is free of build up.
7. Verify size and fan angle of the spray gun tip.
8. Activate the spray gun system. Check for leaks, loose fittings and kinks in the hosing.
9. Check and verify pressure setting
10. Spray a test shot one some craft paper. Observe the quality of the fan pattern. Adjust pressure, nozzle as necessary.
11. Check the integrity of the seals around the bowl and divider bar if the part you are spraying has them.

12. Use filtered air to blow off mold just before spraying to remove dust and other foreign debris
13. Use personal Protection equipment including respirator, eye goggles or mask, hand protection, and clothing protection.

Spray Equipment

Spray equipment is a major variable in the gel coat application process. Handling of equipment as a direct impact on quality and productivity. Clean, dry compressed air is essential for gel coat spraying. Moisture, oil or dirt in the air system will cause a multitude of problems. Always use filtered and and verify that the filters are clean.

The flow rate of the spray gun is critical. Flow rate is determined by:

1. Tip Size
2. Gel Coat Viscosity / Temperature
3. Pump Pressure (minimum pressure for maximum performance)

Spray Pressure Calibration Procedure

How to set-up the spray gun to operate at the lowest possible pressure.

1. Set atomizing air pressure to 10 – 30 p.s.i.
   A pressure of 15 p.s.i. is a good starting point
2. Turn the pump pressure down to 0 p.s.i.
3. Hold the spray gun at 90 Degrees and 12" – 18" from a disposable covering on the Floor.
4. Pull the spray gun trigger and slowly increase pump pressure until a fan pattern begins to develop. Do not increase the pressure past this point.
5. Adjust the atomizing air to fine tune the fan pattern shape. Keep pressure as low as possible.
6. Record the pressure setting on the standard form provided.

Spraying Technique is Critical

Always begin spraying the section of the mold nearest you. Avoid triggering the gun. The spray gun should always be full-on or full-off.

One important factor in spraying is the proper gun angle at which the gun is held while spraying. Always hold the spray gun 90 Degrees to the surface being sprayed. This allows for an even mil thickness of the gel coat, less sags, runs or streaking, and creates less overspray.

When the gun is held at any other angle, the mil thickness will be uneven, more sags, runs and streaks will appear, and the spray gun will have more overspray. Keeping the spray gun parallel to the surface will maintain the proper spray angle.

Spray in even stroking motions. Do not use an arcing motion as each spray angle will be different with each stroke.

Spray internal corners and 90 Degree angle back splashes at a 45 Degree angle.

Gel Coat thickness is critical. You must mil gauge every part you spray. Optimum thickness of the gel coat should be 18 mils sprayed in three separate coats of 6 mils each.

Once the mold has been properly sprayed and has a mil thickness of 18 mil, the part is moved to the oven where the gel coat is baked and allow to cure.

In preparation of casting a vanity bowl mold, a polly collar is placed in the drain hole and faucet knock-out rings are set in place.

Chapter 4:
Mold Pouring Using Auto Caster Mixing

The Autocaster automates the production of polymer matrix for cast polymer manufacturing. The machine replaces manual mixing which significantly increases productivity, cuts material costs and improves quality.
At the heart of the Autocaster is a graphics based touch screen control panel which is monitored by the machine operator. The control panel gives access to all functions including metering calibration, recipe definition, totals, diagnostics, alarms, set up and cleaning operations. The autocaster is capable of storing 100 recipes of different color matrix choices.
Specialized training must be given to operate the machine however, once the matrix is dispensed from the autocaster, the application remains the same.

Mold Pouring Using Spin Pot Mixing
Before resin is introduced into a clean mixing pot, the operator must tear or “zero-out” the scale with the pot resting on the scale. This will allow for an exact weight of the mix without the weight of the pot. Always use an accurate scale that is calibrated regularly.

Transfer resin from the holding barrel to a clean bucket. Pour the resin from the bucket into the mixing pot until the desired weight is achieved.

The initiator (or catalyst) amount is determined by the above formula and added to the resin. The initiator is what will initiate the polymer chemical reaction to form the finished part.

The Matrix
Matrix is a term used to describe the combination of materials that create cultured marble, cultured onyx and cultured granite. Matrix is a combination of resin, fillers and initiator that transforms from a liquid state to a solid state by the process of a chemical reaction.

After checking the work order, product weight and color to the part to be cast, a formula is used to calculate the correct amount of resin, initiator, filler and pigments to be blended together to obtain the desired matrix.

Marble Matrix Formula
(100 lb. Batch)
25 lbs. Resin
155 ml MEKP
454 gms Titanium Dioxide
75 lbs. Calcium carbonate
The formula may also specify special mixing instructions for secondary pigments, pot rotations which is for the veining found in cultured marble.

It is important to follow the formula precisely to achieve predictable results on every batch.

Temperature affects volume of resin. Warm resin takes up more volume than cooler resin.

Matrix is poured onto the mold via an automated machine and spread by hand. Once the mold has been poured it moves down the conveyor where it is allowed to rest and cure. While resting, the part is vibrated to allow any air bubbles or voids to rise.

When casting vanity sinks, a vanity hat is placed over the bowl mold which already has a first coat of matrix already applied to it. Once the hat is in position and stabilized, it is back-filled with additional matrix to strengthen the bowl. The hat will become a permanent part of the vanity sink as the matrix cures.

Once filled with the matrix, the part is moved to a holding area and allowed to cure. The curing process generates heat called exotherm. Once exotherm has occurred, the part will have sufficient strength and the de-molding process can begin.

Chapter 9: Patch and Repair

A successful repair begins with proper preparation. Proper preparation of the area to be patched is a vital part of the restoration process. Items you will use include:
Eye Dropper
Measuring Cup calibrated in CCs or mls
Spatula or Stir Stick
Toothpicks
Dremel Tool
220 Grit Sandpaper
400 Grit Sandpaper
600 Grit Sandpaper
Buffer
Buffing Compound
Paste Wax

1. Sand the affected area with 220 grit sandpaper. Be sure to feather the edges surrounding the repair area to assure the patch will blend in with the surrounding area.
2. Clean the sanded area with a clean cloth and mineral spirits to remove all traces of wax and sanding dust.

*NOTE Acetone does NOT cut wax well and could result in poor adhesion between the patch and the part thus allowing the patch to fall out at a later time.

3. Locate and use same batch number of gel coat as is on the part if possible. In order to obtain the very best results possible, and to achieve a nearly "invisible" patch, it is important to use the same batch of gel coat used to produce the part.

4. Carefully measure a small amount of gel coat, sufficient to repair the damaged area in a container graduated in cc's or ml's. Using an eyedropper add one drop of catalyst for each cc or ml of gel coat.
5. Apply the catalyzed gel coat to the prepared area to be patched using a small spatula or mixing stick. Allow the gel coat to "roll off" stick into the patch area.
6. Using a toothpick, work air bubbles to the surface. It is not necessary to pop the bubbles – just work them to the surface where they will be sanded out later.
7. Allow the patch to cure overnight – usually 16 – 24 hours – before proceeding with the patch.

Matrix and Veining Repair

1. Prep and clean the damaged area of the part as directed above. Using the same color used to color the matrix, dip end of toothpick into color and stir into patching gel coat. Add sufficient amount to achieve color similar to the matrix. Keep slightly lighter in color as the gel coat will add some color. Repeat for veining.
2. Add enough patch material to the matrix area to fill the patch to just below surface level, allowing for the gel coat to be added.
3. Using a toothpick, dab in the veining patch, again allowing room for the gel coat.

4. Immediately add the gel coat to cover the entire patch area, slightly overfilling the patch area to allow for shrinkage and sanding.
5. Add the gel coat using a spatula or stir stick allowing gel coat to “roll-off” applicator into the patch. Be careful not to disturb the veining or matrix repairs.
6. Using a toothpick, work air bubbles to the surface. It is not necessary to break the bubbles – just work them to the surface where they will be sanded out later. Be careful not to pull colors from the matrix and veining repairs up through the gel coat.
7. Allow the patch to cure overnight – usually 16 – 24 hours – before proceeding with the repair

8.After the patch has cured overnight, using a single edge razor blade, wrap 1 layer of masking tape around each end of the cutting edge of the blade. Space the masking tape just wide enough to bridge the patch.
9. Holding the razor blade as close to perpendicular to the patch as possible, start at the end of the patch away from you. Begin to “shave away” the bulk of the patch.
10. Using 400 grit sand paper and a soft sanding block, wet sand (using lots of water) to remove the halo around the patch area. Sand in one direction only.
11. Using 600 grit sandpaper and a soft sanding block, wet sand (using lots of water) in the opposite direction of the 400 grit sandpaper.
12. Stop and dry the area occasionally. Continue sanding the patch until all marks are gone from the 400 grit sandpaper.
13. Follow up using 800 grit sandpaper by sanding the area until are marks are gone from the 600 grit sandpaper.
14. Buffing should be accomplished using a power buffer and selecting grit sizes of buffing compounds. If sanding is completed to a 600 grit finish, begin buffing using a 1,000 grit buffing compound.
15. Continue buffing changing your buffing compound to 2,000 grit (or 3,000 if desired) and buff the patch area.
16. Complete the repair by applying a final coat of high quality Carnuba wax. Polish and seal the patch with a clean soft cloth to bring it back to its original appearance.

Chapter 10:
Warehouse Procedures

The plant and warehouse encompasses over XXXXX square feet of production and storage space. An intragle array of conveyors allow parts to be moved from one area of the plant to another with having to lift and carry them. The production line starts in the set-up area of the plant. This is where

First Aid
First-aid supplies are available in our facilities for treatment of minor on-the-job injuries. In the event of a serious injury, you will be taken to a doctor or hospital for prompt medical attention. It is extremely important that you report any injury, regardless of how small, following the reporting procedure above. Employees who remove company first aid supplies from the premises without authorization will be subject to disciplinary action, up to and including termination.

Machinery
The company's operations require various types of heavy machinery and equipment, which can be dangerous if not used properly. Subsequently, ther are rigid rules regarding the use and operation of this equipment. The primary rule states, "No one who is not regulary and specifically authorized by the company to operate this machinery may do so at any time." Under no circumstances will any equipment, machinery, saws, trucks or fork lifts be operated by minors. No one is authorized to operate a powered industrial vehicle without being trained and certified by the Company. Our written Lockout Tagout program complies with OSHA regulations and describes step-by-step procedures required for authorized employees to safely service our equipment. Again, loose clothing, jewelry and long hair worn loosely can pose a serious hazard when dealing with machinery and should be avoided.

Personal Protective Equipment
Employees may be required to wear certain items of personal protective equipment (PPE) depending on the job being performed. Most of these items (e.g. safety glasses, ear plugs, gloves, face shields) will be provided by the Company on a one-time basis, and, if lost, the replacement cost is the employee's responsibility. Other items (e.g. steel-toed shoes) are not provided by the Company but may be required.

Hazardous Communications (Right To Know)
The Company complies with all of the regulations set forth in OSHA's Hazard Communication Program. Included in our written program the following items are available for your protection:

1. A written plan describing the policies and procedures of the program including a list of hazardous materials

2. Material Safety Data Sheets (MSDS) on every hazardous material for your review.
3. Labels and other forms or warning to let you know if hazards exist in the workplace and how to protect yourself from exposure.
4. Employee information and training on the program.

Housekeeping

A clean work area makes for a pleasant, as well as a safer place to work. Employees in all departments are expected to help keep the surroundings as neat and orderly as possible and to ensure their work area is clean before leaving at the end of the day.

Emergency Response Plan

The Company has a written Emergency Response Plan that covers situations such as fires, medical emergencies, severe weather conditions and hazardous spills. The plan includes the following items: information on flammable materials, fire extinguishers, a posted evacuation route including designated exits, meeting area after evacuation, and shelter areas during severe weather conditions. It also includes emergency phone numbers such as the poison control center, the police department, the fire department, and precautions to take when dealing with blood borne pathogens. You are encouraged to familiarize yourself with our written OSHA and safety programs. The information is available in written formats, through monthly safety meetings, at new employee orientation, and in on-going safety awareness and compliance training.

Training Manual Glossary

ACCELERATOR
An additive that reduces or speeds up the gel or curing time of thermosetting plastics such as polyester gel coat and resin. Also called promoter or activator.

ACETONE
In cast polymer context, acetone is primarily useful as a cleaning solvent for removal of uncured resin from equipment and clothing: a very flammable liquid. Its current usage should be evaluated to see if it can be reduced due to its flammable nature and fire hazard potential.

ACTIVATOR
A chemical additive used to initiate the chemical reaction in a specific mixture. Also called the catalyst.

ADDITIVE
Substance added to the cast polymer mix to impart special performance qualities, such as ultraviolet absorbers, flame retarding materials.

AIR DRY
To cure at room temperature with the addition of catalyst but without the assistance of heat and air movement.

AIR RELEASE
Rate at which air bubbles, introduced during the processing of cast polymer, come to the surface and break.

ALUMINA TRIHYDRATE
May also be known as aluminum hydroxide, a white crystalline powder used as a fire and smoke retarding filler in marble quality polyesters. Also used to produce onyx parts.

AMBIENT TEMPERATURE
The temperature of the medium surrounding an object. The term is often used to denote prevailing room temperature.

ATOMIZATION
In order to create a useful spray pattern, it is necessary to convert a pressurized stream of resin (gel coat) into an elliptical shape as it exits the spray gun fluid tip. This elliptical fluid stream is known as a fan pattern or spray pattern.

BATCH
Identifying for all material produced during one operation possessing identical characteristics throughout. It is very important to run all your raw material batches in the same grouping.

BINDER
A material which acts as an adhesive used for holding particles of dry material together, usually polymeric in nature. Example: marble resins act as binders to hold marble filler together.

BLEND
Mechanical mixture of two or more components.

BLISTER
A raised area on the surface of a cast part caused by the pressure of gasses inside it before the surface had hardened.

BUBBLE
A spherical, internal void within a cast part. Differes from a blister in that it does not protrude at the surface. Marble manufactures refer to this as entrapped air.

BULK DENSITY
The weight of a material per unit volume. This gives an indication of the weight, usually expressed in pounds per cubic foot.

CALCIUM CARBONATE
Grades of calcium carbonate suitable as fillers for plastics are obtained from naturally occurring deposits of limestone (or marble) as well as by chemical precipitation.

CAST
As related to cast polymer, the term means to form a cast part by troweling a soft marble matrix composition into a mold, where it cures into a hard composite which takes the shape of the mold.

CAST POLYMER
Non-reinforced composite (resin used without reinforcing fibers). Combines polymers, fillers and additives as composites to meet specific applications requirements.

CATALYST
In the scientific sense, a substance that promotes or controls curing of a compound without being consumed in the reaction (initiator). Within the composites industry, free radical initiators such as MEKP are often referred to as “catalyst”. This usage is scientifically inaccurate since the initiator is consumed during usage.

COMPOSITE
A mixture in which two or more distinct, structurally complimentary substances combine to produce some functional properties not present in any individual component; sample: marble filler/marble resin.

COMPOUND
An intimate admixture of materials necessary for the finished product.

CONCENTRATION
A figure used to define relative quantity of a particular material. Such as a mixture in air of 5 ppm acetone in air.

CORROSIVE
A material with the characteristic of causing irreversible harm to human skin, or steel by contact. Many acids are classified as corrosive.

CONTAMINANT
Impurity of foreign substance that affects one or more properties of composite material.

CURE

Polymweization or irreversible transformation from the liduid to the solid state with maximum physical properties, including hardness.

CURE TIME
Time required for the liquid resin to reach a solid (the majority of a polymerized state) after the catalyst has been added.

CURRING AGENT
Catalytic or reactive agent that initiates polymerization when added to a resin; also called a hardener.

CYCLE
The cycle or cycle time of a casting operation is considered the time it takes for a mold to move from one point to the corresponding point in the next repeated sequence.

DECOMOSITION
The breakdown of materials or substances into other substances or parts of compounds. Usually associated with heat or chemical reactions.

DENSITY
Weight per unit of volume, usually expressed as pounds per cubic foot.

DILUTE
Diluting (reducing or thinning) agent.

DIMETHYLANILINE (DMA)
Accelerator used in conjuction with BPO catalyst or as a co-promoter for cobalt/MEKP systems. More effective than DEA.

DIMPLES
Small sunken dots in the gel coat surface, generally caused by a foreign particle, air void, or catalyst droplets in the gel coat or laminate.

DISPERSING AGENT
Materials added to a suspending medium to promote and maintain the separation if discrete, fine particles of solids or liquids.

EVAPORATION RATE
The rate at which a liquid material is known to evaporate. The faster a material will evaporate, the sooner it will become concentrated in the air, creating either an explosive/combustible mixture or toxic concentration or both.

EXOTHERMIC HEAT
Internally developed heat accompanying a chemical reaction, e.g., curing.

FILLERS
Relatively inert organic materials which are added to resins or gel coats for special flow characteristics, to extend volume, and to lower the cost of the article being produced.

FINES

In the classification of powdered or granular materials according to particle size, fines are the portion of the material composed of particles which are smaller than a specified size, usually under 100 mesh.

FISH EYE
Circular separation in a gel coat film generally caused by contamination such as silicone, oil, water, freshly waxed mold, or low gel coat film before the matrix is cast.

FLASH POINT
The temperature at which a liquid will generate sufficient vapors to promote combustion. Generally, the lower the flash point, the greater the danger of combustion. Lowest temperature at which a substance emits enough vapors to form a flammable or ignitable mixture with air near the surface of the substance being tested.

FLAMMABLE
Any liquid that has a flash point of 100 Degrees F. or below. Also, any solid which can sustain fire and ignite readily.

FREE RADICALS
Highly reactive molecular fragments capable of initiating chemical reactions, such as polymerization of polyester resins. Normally generated by the breakdown of the catalyst.

GEL
A partial cure stage in plastics resin of a viscous, jelly-like state where the liquid material starts to transform into a solid.

GEL COAT
Gel coat is a specialized form of polyester or vinyl ester resin, which is used as an in-mold applied surface coating. Gel coat provides the cosmetic finish and weathering resistance to most composite products.

GEL COAT SAGGING
Relates to gel coat resin that has been applied excessively thick or that was insufficient resin thioxotropy to be retained in position on the mold. It also could relate to gel coat film having excessive thickness.

GEL COAT SURFACE LIFT
A gel coat that lifts from the mold surface; may result from overcatalyzation or high cure temperature. Also known as pre-release.

GEL TIME
The length of time that a catalyzed polyester remains workable after the hardener (catalyst) is added.

HARDENER
Substance that reacts with resin to promote or control curing action. Also known as catalyst.

HAZARDOUS CHEMICALS
Any chemical which is either a physical or health hazard ord both.

HOT POT

Catalyst is mixed with the gel coat or resin in the material container prior to spraying, as opposed to internal or external gun mixing.

HYDROPHOBIC
Moisture resistant capabilities, moisture repelling.

IGNITABLE
A term used to define any liquid, gas or solid which has the ability to be “ignited” which means having a flash point of 140 Degrees F. or less.

INCOMPATIBLE
Materials which could cause unwanted results or dangerous reaction from direct contact with another. (Some gel coats are incompatible with others and cause spray problems.) Term is also used in regards to some marriages.

INGESTION
Taking in a substance through the mouth.

INHALATION
The breathing in of a substance in the form of a gas, liquid, vapor, dust, mist or fume.

INHIBITOR
A chemical added to another substance to prevent an unwanted change from occurring. Or to lengthen the gel time or cure time.

IRRITANT
A chemical which causes a reversible inflammatory effect on the site of contact, however is not considered a corrosive. Normally, irritants affect the eyes, skin, nose, mouth respiratory system.

ISOTROPIC
Arrangement of reinforcing materials in a random manner, resulting in equal strength in all directions.

MASS
The quantity of matter contained in a specific body. In reference to polyesters, mass is measured in terms of weight and/or volume.

MASTERBATCH
Masterbatches are designed for use in appropriate quantities with the base resin or mix so that the correct end concentration is achieved. This relates to a large uncatalyzzed batch of marble mix.

MATRIX

MELTING POINT
The temperature at which a solid changes to a liquid.

MEL (SOLVENT)
Abbreviation for methyl Ethyl Ketone; a colorless flammable liquid commonly used in spray gun clean up procedures. NOT TO BE CONFUSED WITH MEKP.

MEKP

Methyl Ethyl Ketone Peroxide. Catalyst normally used in the marble industry.

MIL
The unit used in measuring film or gel coat thickness and the diameter of fiber strands, glass wire, etc. (one mil = .001 inch)

MOLD RELEASE
A substance used on the mold or in the compound to prevent sticking and for ease of part release from the mold.

MOECULES
Chemical units composed of one or more atoms.

MONOMER
A compound capable of polymerization with itself or with a compatible resin. They are also to be used to dissolve or dilute polyester.

NFPA
An organization which promotes fire protection/prevention. They publish many of the standards used by local fire officials.

ORANGE PEEL
Backside of the gel coat surface that takes on the rough wavy texure of an orange peel.

ORIFICE
An opening, generally referring to regarding spray gun tip size.

OVERSPRAY
Over spray is considered to be that gel coat which is deposited off the mold surface during the spraying process.

OXIDIZER
A substance which yields oxygen readily to stimulate the combustion of an organic material.

OXIDIZING AGENT
A chemical or substance which brings on oxidation reaction, by providing the oxygen to promote oxidation.

PEROXIDES
Category of compounds containing an unstable O-O (or O-OH) group: Oxygen to Oxygen atoms; used as initiators.

PIGMENT
The ingredient used to impart color, as in gell coats.

PIGMENT SEPARTION
A mottled (varied color) appearance of the gel coat surface.

PINHOLES
Small air bubbles in the gel coat film, few enough to count. Generally larger in size than porosity.

PLASTICS
High molecular wright thermoplastics or thermo-setting polymers that can be molded, cast, extruded or laminated into objects.

POLYESTER (UNSATURATED)
A resin formed by the reaction between dibasic acids and dihydroxy alcohols (glycols), one of which must be unsaturated (typically maleic anhydride) to permit cross-linking.

POLYMER
A large chemical chain compound of many repeating groups such as polystyrene.

POLYMERIZATION
The chemical reaction of linking molecules or chains of molecules.

POSTCURE
Exposure of the cured resin to higher temperatures than during molding; necessary in most resins to attain complete cure and ultimate mechanical properties.

PREMIX
Mixture of resin, pigment, filler and catalyst for molding.

PRE-RELEASE
Premature release of the gel coat or laminate from the mold.

PPM
A unit of measurement for the concentration of a gas or vapor in the air. Usually expressed as number of parts per million parts of air.

REACTIVITY
The term which describes the tendency of a substance to undergo a chemical change with the release of energy, often in the form of heat.

REDUCING AGENT
In oxidation reaction, this is the material that combines with oxygen.

RESIN
The term resin may be used generically to refer to unsaturated polyester casting resin, or gel coat, which is a specialized form of resin used as an in-mold coating. Any of a class of natural or synthetic polymers, solubilized or semi-solid, generally of high molecular weight having no definite melting point. Used in reinforced products to surround and hold fibers also in casting to surround and hold fillers. Most resins are polymers.

SPEC
Specification of properties, characteristics or requirements a particular material or part must have to be acceptable to a potential user of the material or part.

SPECIFIC GRAVITY
The weight of a material compared to the weight of an equal volume of water. Usually expresses a material’s heaviness. A material with a specific gravity of greater than 1.0 will sink to the bottom of water, whereas a material with a specific gravity of less than 1.0 will float on top of water.

SPRAY GUN
A spray gun is a fluid-handling device which converts a stream of fluid (gel coat) into a useful spray pattern. Used in the application of the gel coat to the mold. Several types of spray guns exist including conventional air atomizing, high pressure airless, air-assist airless, and high volume low pressure (HVLP).

SPRAY-UP
The process of applying gel coat to a mold.

STABILIZER
An additive for polymers which aid maintenance of certain properties.

STRESS CRACK
External or internal cracks in a composite caused by tensile stresses; cracking may be present internally, externally or in combination.

STYRENE MONOMER
An unsaturated aromatic hydrocarbon used in plastics. In polyester, it is a reactive diluents.

THERMAL CONDUCTIVITY
Ability to transfer heat.

THERMAL STRESS CRACKING
Crazing or cracking of a composite from overexposure to elevated temperatures or cyclic temperature variation.

THIXOTROPIC
A condition in which material possesses a resistance to flow until it is agitated (mixed, pumped or sprayed).

THIXOTROPIC INDEX (T.I.)
An indication of sag resistance determined by dividing the low shear viscosity by the high shear viscosity.

VAPOR DENSITY
A term used to define the weight of a vapor gas as compared to the weight of an equal volume of air. Materials lighter than air have a vapor density of less than 1.0, whereas materials heavier than air have a vapor density greater than 1.0.

VISCOSITY
A fluid's resistance to flow.

VOLATILE ORGANIC COMPOUNDS (VOC)
Carbon containing chemical compounds (e.g. solvents or liquids) that evaporate readily at ambient or process temperatures. Environmental, safety and health regulations often limit exposure to these compounds, so low VOC content may be preferable.

WAX
A mold release agent or surfacing agent.

WORKING LIFE (POT LIFE)
The period during which a compound, after mixing a catalyst solvent or other compounding ingredients, remains suitable for its intended use.