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Eliminate your customer complaints with VINYL CLAD METAL

Does your quality department receive numerous dealer and customer complaints that your appliances or equipment cannot maintain their appearance? Does your product easily get nicked, scratched, scuffed, and stained after a few month's use? If the answer is "yes", I'm guessing that the exterior is manufactured from pre-painted steel, post fabricated powder coat, or uncoated stainless or aluminum.

Your solution to this problem could be Vinyl Clad Metal or VCM - a very durable pre-coated metal that offers hundreds of finish options. There are many appliance manufacturers participating in various markets that are realizing the benefits of vinyl laminated metal for the exteriors, as well as interior components of their product lines.

VCM is one of the best kept secrets in the appliance industry. Why? VCM is only produced by a few manufacturers domestically and a handful overseas. There are hundreds of pre-painted and powder coated metal suppliers in every major industrial area. It is no big secret that one of their largest targeted markets is you, the appliance manufacturer.

VCM has been used in appliance manufacturing since the 1960's and was originally used for television side panels. The early microwave ovens were predominantly designed with wood grain cases, which were made from vinyl clad metals. In the past, other appliances that were manufactured using VCM included vending machines, juke boxes, slot machines, and cable boxes.

BENEFITS OF VINYL CLAD METAL VS. PAINTED METAL

- **DURABILITY** – VCM has 6-12 mil thick coating as opposed to 1-4 mil coating with painted metal. Extremely difficult for base metal to become exposed even after heavy abuse.
- **CONSISTENT COATING** – Uniform thickness. No heavy or light areas from uneven paint application.
- **SOUND DAMPENING** – VCM acts as an insulator to noise and vibration, allowing products to run quieter.
- **FINISH OPTIONS** – Hundreds of vinyl films are available in colors, patterns, woodgrains, leathers, natural stones, geometrics, abstracts, and metals – a product designer's dream.
- **EMBOSSABLE** – After laminating in the flat, sheets can be mechanically embossed for a deep, textured effect. <http://cladrex.com/finish-samples/>
- **FORMABILITY** – VCM can be bent, hemmed, toggle-locked, punched, louvered, roll formed, waterjet, laser cut, etc. with no delamination or finish degradation. The vinyl will follow the metal.
- **CORROSION RESISTANT** – The non-porous surface is impervious to liquids, chemicals, body fluids, etc. In addition to steel, VCM can be laminated to aluminum or stainless, providing even greater corrosion resistance.
- **CLEANABLE** – VCM can be cleaned with the strongest industrial solvents and chemicals with no degradation of the surface finish.

- ANTI-BACTERIAL – Custom vinyl runs can be formulated with a biocide additive and includes test data for anti-bacterial properties. Excellent for hospital and healthcare appliances and equipment.
- FIRE RATED – Vinyl Clad Metal carries an ASTM E-84 Class B fire rating, in addition to U.S. Coast Guard fire certification for inland and ocean vessels.
- LESS REWORK – VCM’s resistance to handling defects will mitigate a vast majority of exterior surface rework – both in-house and warranty claims from your customers.
- SUPPLY CHAIN FLEXIBILITY – Vinyl Clad Metal can be produced from 1 sheet to 1000 with short delivery times. Manufacturers can realize the benefit of less raw material inventory, shorter production runs, and quicker lead times.

MANUFACTURING METHODS AND ADHESION

Vinyl Clad Metal makes an excellent appliance product because of the superior adhesion of the film to the metal. This bond allows VCM to be configured to any shape the metal can withstand - with no delamination nor deterioration of the surface.

A strong bond is created by one of three methods of manufacturing: Hot laminating, polyurethane (PUR), or a pressure sensitive adhesive tape system (PSA). All of these processes require that the metal sheets be brushed and thoroughly cleaned for good adhesion. The brushing process roughens up the surface, creating peaks and valleys, and more surface area for the glue. The metal is then run through an elevated heat and high pressure wash system that removes all of the metal powder residue created from the brushing operation along with any dirt and oils that are a byproduct of sheet processing.

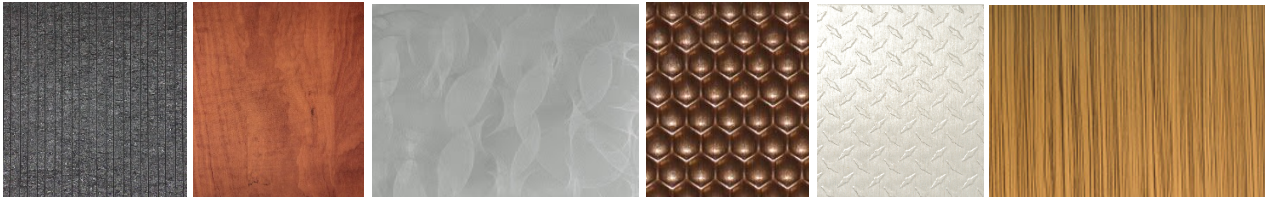
HOT LAMINATING PROCESS – Uses a thermoplastic adhesive applied with a coating head to the cleaned metal. The sheet travels on a conveyor through a furnace where the metal is heated to 385 degrees F. The high heat cures and activates the glue and creates an extremely tacky surface. The vinyl is applied from a roll onto the metal sheet and pressure applied through a pinch roller. A quick water quench sets the glue immediately – no cure time is needed. <http://cladrex.com/vinyl-clad-manufacturing/>

PUR PROCESS – This is a hot melt glue system where vinyl is applied onto ambient temperature metal sheets. The vinyl film is applied from a roll and pressure applied with a pinch roller. No water quench is needed and cure time is very quick. PUR is a versatile system that allows other films such as high pressure laminates (HPL), cloth, and papers to be applied to wood, MDF, plastic, and other substrates.

PSA TAPE SYSTEM – Of the 3 processes, PSA does not offer the same level of adhesion as Hot laminating or PUR. The bond is strong, but there may be some limitations when the metal is fabricated after laminating. Depending on the rigidity and memory of the vinyl, some creep back can occur from the metal edges on severe bends. PSA is a 2-sided roll of tape that is pressed onto a sheet by a pinch roller. The release liner is pulled off leaving a soft glue on the sheet. The vinyl is applied from a roll and again pressed down using the pinch roller. This process is more labor intensive and the tape is costlier than either thermoplastic or PUR glues.

A few condensed case studies of vinyl clad metal vs. painted metal

- A manufacturer of food tray delivery carts for hospitals and healthcare facilities received complaints that their powder coated products did not hold up to the constant bumps in the kitchen and hallways. This cart needed a stainless interior for food proximity along with a durable exterior that would show no signs of wear and tear after constant use. To stay ahead of their competition, this company developed a cart that utilizes stainless sheet laminated with a woodgrain vinyl. The vinyl laminated stainless complies with NSF standards, is extremely durable compared to other coatings, and also provides a rich, pleasing appearance.
- A company that manufactures glass door refrigerated display cases was using a pre-painted steel strip for the strike plates. Strike plates are the strips on the door frame that grab the magnetized rubber gaskets on the glass door for a tight seal. The painted strip would get scratched down to the bare metal after constant use in stores. The strike plates are now made with galvanized steel laminated with durable black vinyl and the scratching problem has been eliminated.
- A manufacturer that produces a variety of cages and accessories for lab animals had a few issues with the enclosures that housed the air supply blowers. The painted cases would get scratched and scuffed from use and a tougher, more durable product was needed. Also, this electronic blower system needed to produce minimal sound around the animals. Vinyl clad metal resolved the problem as the vinyl has superior scratch resistance as well as better sound dampening qualities when compared to painted metals.



This is a small sampling of hundreds of vinyl finishes available – flat and embossed



VCM's strong bond of vinyl to metal allows for a variety of fabricating options



These are a few products that utilize Vinyl Clad Metal for appearance and durability

Rejections, returns, and reworks can cause a huge sucking sound coming off your bottom line. It is also difficult to get repeat orders from unhappy customers complaining of surface finish defects, blemishes, and imperfections. In addition to superior durability, VCM offers a vast array of finishes that can be a designer's dream. Vinyl Clad Metal should be included for consideration for your next new product or redesign.

By Bill Emery

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