

## **Product Spotlight – Why You Should Know How Frames Are Made**

Learn how to make the frame sale alive!

By Mark Mattison-Shupnick, ABOM

### **Course Description**

The technology of lenses makes it easy to have a conversation about them with the customer. In fact, it's that techno talk that we love but often gets us in trouble by not connecting with the customer in the language that they find meaningful. For frames, we think of styling and the fashion aspect and in some cases hope that it takes care of itself. I suggest that understanding frames and their manufacture can significantly improve your average sell price, improve the number of quality frames sold, better satisfy the customer and better answer the question, "why so expensive?" This course teaches the art and technology of frame making. But, by learning it, you can transfer the fascinating process used to make a frame and impart the emotion and appreciation for the way that final product is achieved. It's also an opportunity to put the right words in your mouth to describe that valuable and gorgeous frame. Who benefits... the customer does.

### **Objectives:**

By the end of this course, you will be able to:

1. Understand the steps in the process of frame making.
2. Know the technology, detail, steps and precision used to create final frames in the combination of materials used.
3. Be better at communicating the advantages and benefits of each kind of frame to customers to improve your practice while each customer benefits most.

### **Content**

The technology of lenses makes it easy to have a conversation about them with the customer. In fact, it's that techno talk that we love but often gets us in trouble by not connecting with the customer in the language that they find meaningful. For frames, we think of styling and the fashion aspect and in some cases hope that it takes care of itself. In fact, for some offices, it's almost as if the customer is left to choose a frame on their own.

I suggest that understanding frames and their manufacture can significantly improve your average sell price, improve the number of quality frames sold, better satisfy the customer and better answer the question, "why so expensive?" Understanding and using the art and technology of frame making can help you say those critical 2 or 3 things that make a difference in which frame is chosen. Be able to transfer the fascinating process used to make a frame and impart the emotion and appreciation for the way that final product is achieved. Let's look at why you should know about how eyewear frames are made.

Our Objectives are simple. First, we'll outline the process of how eyewear frames are made starting from sketches and finishing with factory quality checks. Next, it's important to show the relationship between individual craftsmanship and the automation of manufacturing that is necessary for producing eyewear at scale. In each of these parts, we'll pull out words that can become part of your new lexicon of "frame-speak". These words help bring to life the way that we could be talking about frames, if you already aren't.

### **BRAND IDENTITY AS PART OF THE STORY**

Brands, their philosophies and aspirations help tell the story of a frame. By knowing why companies make design or material or value choices, sound bites can be learned that resonate with customers. It might be heritage, giving back, personalities or born of need.

For example, from the MODO website, the company providing the educational grant for this course, "was born in 1990 in SOHO, New York, under the entrepreneurial spirit of its founder, Alessandro Lanaro." They go on to state, "Since its' beginning, MODO has evolved into a company that designs, manufactures, and distributes a successful portfolio of house, designer, and contemporary lifestyle brands – all under the common denominator of design and innovation."

"Brands include MODO, ECO, Derek Lam, and several others. MODO is a global company, with offices in New York, Milano, and Stockholm."

"Today, MODO drives the eyewear industry's effort in sustainability and social responsibility. With initiatives such as producing frames with 95% recycled content or bio-based materials (our ECO brand), planting a tree for every frame a customer purchases (ECO's "One Frame – One Tree"), or giving free spectacles to those in need (MODO's "Buy A Frame – Help A Child See"), MODO is a pioneer in merging style and purpose."

When reading this, what does this teach you to say to customers when showing a frame... from this or perhaps another vendor whose story you know? Say, "We carry this company's frames because apart from their choice of designers with whom they work, they have one of their frame lines that are made with recycled or Biobased content. They also give back to our world by planting trees and making glasses for kids when their frames are purchased. We know that "Doing Good" is an important part of today's consumer's choice of brands so we choose our vendors carefully."

### **THE WHOLE PROCESS MATTERS**

To make a quality product, one must start with quality materials. Then, the craftsmanship of the actual pieces is the result of a design team whose inspiration comes from contemporary trends, a color palette married to material and brand identity, for new or vintage style, and new manufacturing technologies. Then, one must tell the story so marketing develops the right positioning and words to best describe the frames

and the plans to share the story. Your sales rep helps make product visible and a company's service ensures they are there, when expected.

Underpinning the frame, to meet these goals is manufacturing excellence. Without it, the quality invested and designs envisioned, cannot be realized. In today's modern frame process, companies can use any combination of ownership, joint ventures, distribution centers and factory sourcing based on the best products or designs by material. Regardless of where made, the company's brand promise must be upheld.

### **BEHIND THE SCENES**

How do you see yourself in the frame that you might choose?

How would you like to be seen?

Advertising suggests the appeal of a design, its color and its shape – look at it on a number of models and you ask yourself – is that me and shouldn't I try that one?

Video and imaging makes us love a frame, its style and the way it makes me look, I think I'll buy it.

To sell the best of frames, look for those companies that help to give consumers a sense of that style and design on them or people they want to look like.

### **HOW FRAMES ARE MADE**

Let's take a look behind the scenes at an overview of the process, and then we'll look at each step individually.

The process starts with sketches that are turned into CAD drawings. The precision of a CAD drawing provides the detail that drives the multi-axis milling machines that can make each frame's cuts and sculpting unique yet from frame to frame, virtually identical.

#### SKETCHES

Frame style starts with a designer's sketch; designers are artists that combine their creativity with their knowledge of eyewear dimensions, effects of shape, a want to use a particular material and the inspiration or ideas for new design.

#### COMPUTER AIDED DESIGN (CAD)

Those sketches are converted into a 3 dimensional drawing using computer aided design (CAD design) tools. Now the designer can see the effects of the nose pad positions, angles or endpiece positions, placement of hinges, overall looks in all angles of view.

You know what these kinds of drawings or images are capable of – you have looked at products online that you can rotate in any direction or magnify to see every detail. This gives the designer absolute control to complete the design or make minute changes.

It also allows the addition of coloring and textures. Once approved as worth next steps, the sketch will be converted into an actual architectural drawing of exact dimensions.

### THE DETAILS, AS IF AN ARCHITECT

Architects deliver plans for houses defining exact dimensions, angles, radii of curves and material used. It's the same for frames. Look at the blue arrow... every aspect of the frame is dimensioned to tenths of millimeters, angles and radii are defined.

For example, the angle between the butt of the temple (the red arrow) and the way it hits the front inside of the endpiece. If there is a metal attachment that also provides accent or a design feature, its dimensions are specified. In addition, if there are branding elements, they are added to the specifications. Look at the drawing, what else do you see? The green arrow illustrates the cross section dimension of the frame so that one can know the intended fineness or bulk intended in the design.

Dimensions are also defined as we define frames using the boxing system i.e., A, B, DBL and temple length.

### FINAL DIRECTIONS FOR THE COMPUTER NUMERICALLY CONTROLLED (CNC)

The final directions of size and shape are then converted to a machine language that can direct milling and cutting machines. The mills are directed by a computer using mathematics to control what the CNC machine will do. CNC is short for Computer Numerically Controlled.

For example for frames made from acetate or metal sheet, these CAD files will direct the dimensions cut for the eye size and shape, as well as temple shape and length.

It teaches the position of the temple bend, the angle, and pantoscopic angle of the frame front to the temple and the natural faceform or wrap angle of the frame. It is the final frame plan that directs manufacturing and will be the blueprint from which frames produced will be measured.

### **ACETATE**

Look at the acetate sample chips. That's what the design team will be doing i.e., testing, discussing and choosing the acetate from which the frame will be made.

Acetate is made of cellulose powder (derived from cotton) combined with pigmentation made of colored powder plus solvents like acetone and plasticizers. It typically takes 45 days to make the acetate due to the need for extended time for material to dry after being colored.

Colors with textures and tortoise patterns are created by blending pebbles of different acetates, melting the pebbles together and rolling them into new sheets of acetate. The

folks that make acetate sheet are artists, knowing how to blend the colors or the pebbles to produce those beautiful random patterns or to create a color mixture of layers that gets noticed so the frame is purchased and evokes comments to the wearer from those that see them.

## **METALS**

Metal such as stainless steel is made into spools of eye wire or flat sheets of steel at steel mills. The spools of wire are then reduced in diameter to match the dimensions specified in the CAD drawing. During that last size reduction, the bezel is also shaped as part of the eyewire. Metal sheet is rolled to the correct thinness and the final shape is stamp cut or milled to the necessary size and shape.

Metal frames are plated only after they are produced so it takes less time to start producing metal frames than it does acetate frames. Often, there are dedicated plating factories that complete this step.

It's a good thing to talk about automation in frame making also. The consumer perhaps thinks that frames are easy to make and that machines just "spit them out" However, that automation occurs in multiple machines each doing a unique kind of job for the final frame, each costing hundreds of thousands of dollars. The variety of machines is used for milling, processing, finishing and production of each of the eyeglasses' components like frame fronts, temples, bridges, bridge bars and even the lenses used for Plano sunglasses or for prescription. Each machine could be capable of completing 250 milling jobs per day. One person may be needed for each machine in some operations or an operator can manage multiple machines at once.

## **CUTTING AND MILLING**

One of the fascinating steps of the manufacturing process is the milling and cutting of frame parts. This is an image of laser cutting. The CNC machine directs the laser.

Placed on a table, sheets of acetate or metal are precisely cut into the required shapes, rectangles from which fronts will be milled, metal inserts placed within acetate. The sheets are aligned in a known position on a table. Mathematics controls the robotic holder of the laser by determining the position of the laser using an X/Y positioning matrix.

This process can be used to cut temples, many from a sheet of acetate.

In other cases, a milling tool can cut either frame materials or to produce the mold housings that hold parts in precise positions during the manufacturing process. Fronts can be cut from Titanium, stainless steel or other specialty metals.

## **METAL CORE ACETATE**

We are familiar with the metal wire core of acetate temples. That is done to ensure that the temple holds its adjustments and provides the optician with the flexibility of adjusting for whatever is needed.

In this case, a metal core is added in a unique way to the frame's front. Here are the steps.

Look at the illustrations, it shows a transparent acetate block, highly polished, with a fine flat shape, milled into the form. The block is cleaned. A metal front core will be placed into the milled depression.

The shape and thinness of each of the parts of the metal core is designed for both function and fashion. Portions of the metal may be flat or rounded, a result of the designer's vision and the final way that the frames will fit the wearer. Because of CNC precision, the exact depth can be milled from the thinness of the metal core. A cover plate of the same acetate is placed on top encapsulating the metal core and the block is laminated together. In this special manufacturing technology, this final form provides wearers the visible combination of beautifully colored acetate and a delicate metal core.

### **FORMING THE FRONT**

At this point, the acetate block for the frame front is flat. Have a look at an acetate frame – the bridge has a bend and an indentation to it. That's both a design feature and one of functionality. The curve of the bridge is molded into the frame front using heat and a press of two molds, one concave, and the other convex. Under pressure, this forms the bridge.

Now, look at the nose pads of an acetate frame. They are higher than the thickness of the eyewire. To get that extra thickness, two blocks of acetate are fused to the front block. Look at the three photos of the process. In this case, the nose pads are clear, they could also be of the same color or pattern of the acetate used for the rest of the frame front.

Once the nose pad blocks are attached a milling blade can be used to create the front, the blade and CNC mill carves the inner eye shape, size and lens bezel. Then it can carve the outside shape including the nose bridge opening.

Then, with an automatic change of blade, the front can be sculpted. Look at the curve cut at the bridge and the nose pads. Changing blade configuration and position, the blade forms the shape of the frame front.

The precision of the cut makes the designer's goal take shape. In this and the next illustration, the nose pads curve and sweep is completed. Look at the smooth shape of the nose pads, angles of the endpieces. However, note that the edges are pretty square, only slightly rounded

Next, the front is removed from the CNC mill and, after tumbling, given the smooth faceform or wrap angle curve that will be its signature for the way that it will be delivered to your office.

### **THE TEMPLE**

Temples are cut by laser or by blade from a sheet of acetate. As many temples as can be cut from the sheet are prepared using mathematics and an understanding of the geometry of the temple's shape and size. The use of CNC mills improve speed, accuracy, efficiency and makes it possible for the same pattern to be cut from the sheet of acetate.

Acetate, as we learned, is wonderfully adjustable. So, for stability and to ensure that adjusted temples stay adjusted, and regardless of the thinness of some temples form, a metal core is inserted into the temple's center. The temple, held in a rigid steel form, is softened and a high-pressure ram pushes a metal core from end to temple tip. This core also usually has the temple's hinge attached.

### **SMOOTHING AND POLISHING**

Final steps – smooth the edges and polish the frame front and temples to as bright a luster as was originally determined for this style.

Smoothing is fascinating as a tumbling process rounds the corners and edges of the cut acetate fronts and temples. A series of tumbling steps changing the time and fineness of the abrasives smooth's and polishes the edges of the frames you see.

Next step is to add a final luster by hand polishing.

Much of the final work is also done by hand, polishing every part that should be. There's one component of every frame made in this process that we've not talked about. After every step, the operator would inspect the results of their work, for almost every frame produced. That human touch ensures the quality demanded by the designer and the promise made by the brand.

That means that polishing is completed around the outside, within the eyewire and throughout the bridge. Wonderfully sculpted, smooth and shiny nose pads provide long lasting comfort.

Once polished, ensure each of the separate parts is sparkingly clean and...

### **ASSEMBLY AND VERIFICATION**

Assemble the frame – add temples to fronts with the specified screw, tightened with just the right amount of torque and check for the way that the temples open and close – not too tight, nor too loose. If there are adjustable nose pads, add them and of course any decorations not yet already added in the manufacturing process.

Last, before packaging, the frame is verified for shape using that original blueprint. Poorly manufactured eyewear can be received “out of shape” i.e., front propped, temples or endpieces at different angles and when closed, the temples do not fold symmetrically over each other. In quality eyewear, you can expect that the variety of frames that you unpack, in preparation for display, will be straight, clean and ready for your customers to try. Look at them, they have beautiful symmetry. The front and the temples are properly bench aligned (4-point touch), temple pantoscopic angle is the same and when folded, the frame just looks right.

### **FRAMES RECEIVED**

When you now look at an acetate frame, think to yourself... about 50 steps, lots of details thought about in preparation for manufacturing, complex and expensive computer aided design and numerically controlled milling machines, an attention to detail with your customer in mind, materials sourced that can be relied upon and a feel that suggests quality.

What are the words then that you might use when describing why this frame is a good choice for your customer? Telling the story of its manufacture, the time taken, contemporary or vintage inspiration, and the feel when on are a good way to start. Also, read what the manufacturer prints about the frame on paper, on their website and on Facebook. Those comments and those of others about the frames thinness, paper thin lightness or how some rocks the color/shape are words to put in your mouth.

A finished Block Titanium frame uses a clever manufacturing technique that turns a block of Titanium into a frame front, without soldered joints. That means a frame that boasts the strength, lightness and form of Titanium that stays functional as well as fashionable for more than the life of the prescription. It removes the embarrassing problem of a broken weld.

Say to customers, “This is a frame that delivers exceptional value yet in a minimalist form, plus a coloring inlay process that adds the subtlety of color complementary to their minimalist design”. “I’m sure that you’ll come back and tell me how much you enjoy the thinness and especially the lightness of wearing this frame”.

### **MARKETING AND RESOURCES**

The last part of an understanding, of why we want to know how frames are manufactured, is to also be able to translate that knowledge and information to wearers. It’s what can make the frame worth its cost to a customer. It puts the right words ‘in your mouth’.

Marketing provides an organized plan of the ways to describe and position products. The marketing effort then provides a resource of materials that help you, your



colleagues and your customers to know all the benefits of each of the frame collections. Are you using them?

Marketing provides a 360-degree approach to the brand. You should expect your vendor to provide a campaign for the frame collections chosen that gives you a story, from start to finish. The story is based on the brand's identity and as I always say, "What do you know about the brand's promise that you should/could teach, quickly, to every patient".

Then, be sure that this series of messages is available as multi-channel i.e., print (from advertising to brochures), electronic (newsletters to downloadable imaging), social (social media, Facebook, blogs) and the in-store materials that attract customers and/or remind you of what you might say.

### **DOING GOOD**

When choosing a company from which to buy products, most consumers want products from a socially responsible company. It's an important part of this company's aspirations. In a variety of programs, this company provides eyewear to those in need while being environmentally responsible. Details about these programs show a continued commitment of responsibility.

### **CONCLUSION**

Understanding frames and their manufacture can significantly improve your average sell price, improve the number of quality frames sold, better satisfy the customer and better answer the question, "why so expensive?" The art and technology of frame making is a fascinating process to impart the emotion and appreciation for the way that final product is achieved. It's also an opportunity to put the right words in your mouth to describe that valuable and gorgeous frame. Who benefits... the customer does.