

## **PLASTICS**

**ZYL** - Made from a sheet of cellulose fibers and plasticizers, Cellulose Acetate (also known as Zyl) is a popular material with a long history in the eyewear field. It is easy to adjust and is available in endless colors. The down side is that it may cause skin allergies, excessive heat can melt it, and Zyl can lose its elasticity as it ages.

Cellulose Acetate is durable, comfortable and can be laid out in a variety of colors and patterns (COOKIE SHEET). It holds its adjustment, is long lasting and can be processed by machine or by hand. GREAT LAMINATE

Handle - Easy to work with, use moderate heat

Recommend this popular frame material to almost everyone.

**CELLULOSE PROPIANATE** - This lightweight plastic that can be made thinner than cellulose acetate. It is made by injection molding process and is extremely light in weight. Cellulose Propionate has limitless color options but unfortunately may fade over time. High heat can shrink this material so it's best to use cold insertion of the lenses. GREAT WRAP FRAMES – MOLD INJECTED

Handle - Easy to work with, use moderate heat. NO ACETONE/ALCOHOL

Recommend this popular frame material to those who require light weight eyewear.

**OPTYL** - Optyl is produced from epoxy resin. It is hypoallergenic, very light, chemical resistant and scratch resistant and possesses memory (returns to its original frame shape with heat). There are endless color options too. While it takes a little skill to properly adjust, Optyl holds its shape well and is durable. VACUUM INJECTED

Handle - Use high heat and hold in place until cooled to keep the desired shape.

Recommend this popular frame material to almost everyone who enjoys lots of color and light weight eyewear.

**NYLON** - Nylon is produced by injection molding and is a durable, lightweight material that's virtually unbreakable and extremely impact resistant. The colors are opaque due to the nature of Nylon. In other words the colors are dark like black, burgundy, deep blues, green and grey.

Handle - Easy to work with, use high heat or hot water (preferred) to adjust.

Recommend this popular frame material to active people like kids and athletes.

**POLYAMIDE** - Polyamide is a blend of nylons and plasticizers, is durable, impact-resistant, chemical resistant and hypoallergenic material. The beautiful colors range from translucent to opaque. This tough material is challenging to adjust (bend) and requires little to no heat. It is best to use cold insertion of the lenses.

Handle - Use little or no heat.

Recommend this plastic material to those who enjoy light weight eyewear and have skin allergies.

**CARBON FIBER GRAPHITE** - Adding carbon fibers to Nylon for extra strength makes Carbon Fiber Graphite (CFG). It is made by injection molding and is strong and lightweight. It is also commonly used in state-of-the-art golf clubs, skis and tennis racquets. CFG allows for thinner designs. Due to the dark carbon fibers, colors are darker and generally muted. Most CFG frames use an eye wire screw like a typical metal frame.

Handle - Heat small areas at a time.

Recommend this material to almost everyone.

**POLYCARBONATE** - Although polycarbonate is used primarily in lens fabrication, it is now being used in safety eyewear. It is extremely light and strong making it ideal for sports frames or other "at risk" activities. The original color of polycarbonate is clear and color can be added by use of dyes. Polycarbonate hardens with heat making it difficult to adjust and the use of certain solvents like acetone and gun cleaner must be avoided.

Handle - Allows for no adjustments.

Recommend this durable and impact resistant material to all who require safety eyewear.

**GRILAMID** - Nylon based material by adding grilamid to the mix. This lightweight plastic MOLD INJECTED = less waste and not as brittle as zyl. Strong, good stability (adjustments hold). Designs limitless. , colors last the life of the frame, manufacturing with ease. Extremely strong, durable, corrosion resistant, flexible and lightweight. It can be manufactured in many colors too.

Handle - Easy to work with, use moderate heat

Recommend this popular frame material to almost everyone and to those who spend a great deal of time outdoors and enjoy a lighter more comfortable fit.

**MEGOL** - Megol may be a less recognizable material, yet is great for water activities because it is made of a rubberized hydrophilic material that absorbs moisture.

Handle - Easy to work with, use medium to high heat

Recommend this material to those who spend a great deal of time outdoors and enjoy a lighter more comfortable fit.

**KEVLAR** - Developed by DuPont, this strong material is made of synthetic fibers and is five times stronger than steel. This amazing woven material is commonly used in bullet proof vest linings, lightweight racing canoes and windsurfing sails. Kevlar is durable and light, and doesn't stretch or shrink much. Colors are limited however due to the natural amber color of Kevlar. - Eyeglasses, eyeglass cases and eyewear retainers make up the list of optical products that incorporate the mighty Kevlar® material.

Handling – Allows for very little adjustability.

Recommend this virtually unbreakable material to those who require additional impact resistance in their sunwear.

## IN ORDER OF HYPO - METALS

**Ti** Greek for Titan - Not all titanium frames are one 100% pure.

**Pure titanium** consists of 99.5% titanium, with .5% oxygen and nitrogen and no nickel plating or coloration and can be anodized or ionized to add natural color through the metal. Pure Titanium is a light, fairly rigid and virtually unbreakable. Because of these features, it can be difficult to adjust and is often used in certain parts of the frame (such as the bridge and temples).

Handling Titanium - Pure 100% Titanium – Can be challenging to adjust, use pliers with care  
Recommend this combination of materials to everyone. Especially those who have skin allergies.

**Beta titanium** When very small amounts of vanadium 20% HARDNESS and aluminum 10% ALUMINUM LIGHTNESS - are combined with titanium 75%, an alloy called **beta titanium** is formed. Commonly used on such parts as the bridge, temples, and endpieces, beta titanium is extremely flexible and remains nickel free. Aluminum is the only element that is lighter than titanium and vanadium and is used in the steel industry to "harden" raw steel.

Combining these elements with titanium creates an extremely lightweight, flexible, durable, corrosion resistant, and nickel-free material that can be color plated in a rainbow of colors. Beta Titanium eyewear high tensile - can be made thinner and is an excellent choice for rimless and for anyone wanting light, comfortable eyewear.

Handle - Beta Titanium – Easy to adjust, use pliers  
recommend this type of titanium to everyone.

**Surgical Grade Stainless Steel** is used for eyewear and is stronger than its cousin stainless steel. Chromium, nickel, molybdenum "mo lieb diem (mineral) = greater hardness - chromium = scratch resistance and nickel = smooth polished finish.

Handle - Very difficult to adjust, use pliers with strong pressure  
Recommend this combination of materials to everyone. Especially those who have skin allergies.

**Memory titanium** is basically an alloy of 40-50% titanium in combination with nickel. Because memory titanium contains nickel, it is not hypoallergenic and will not have the same corrosion resistance as 100% pure titanium. It is, however, extremely flexible, can be carved out thinner and offers excellent durability, though its flexibility will diminish some over time.

Memory Titanium is also lightweight and can be colored or plated. Memory Titanium is an ideal choice for those who are rough with their eyewear.

Handle Memory Titanium – Can lose the adjustment, hold adjustment in place, use heat on small areas, use pliers with care  
Recommend this strong and flexible material to kids and those who are active and less "gentle" with their eyewear.

**Gold** - Once the backbone of eyeglass frames (now highly sought after in antique stores and flea markets), Gold is durable, corrosion resistant, retains its luster, is relatively hypoallergenic, and is easily adjustable. The content of most gold frames is limited to plating over a base metal and is measured in microns. Gold content is indicated by a stamp mark on the product:

GEP (gold electroplate) or RGP (rolled gold plate) denotes plating. NO MARKINGS

GF (gold filled) indicates a layer of gold wrapped around a core of base metal. 1/20 12K G.F.

Solid gold frames are extremely rare and expensive. VCPN

Handle - Use care, this soft metal can mar easily, cover frame parts with microfiber cloth.

Recommend this high-end and highly sought after metal to those who would like to afford it.

**Bronze** is made from 92% Copper, 6% tin, and 2% miscellaneous metals. It is light and corrosion-resistant. High luster. STRONG.

Handle - Easy to adjust with pliers

Recommend this strong alloy metal to almost everyone.

**Silver.** A soft, white, lustrous [transition metal](#), it has the highest [electrical conductivity](#) of any element. Silver has long been valued as a [precious metal](#), and it is used as an investment, to make ornaments, [jewelry](#), high-value. Silver is a very malleable (slightly harder than [gold](#)), silver is a poor reflector of [ultraviolet](#) – High polish.

Handle - Use care, this soft metal can mar easily, cover frame parts with microfiber cloth.

Recommend this combination of materials to everyone. Especially those who have skin allergies.

**Stainless Steel** is a light, durable, corrosion-resistant, hypoallergenic metal alloy of approximately 67% iron, 20% chrome, and a mixture of other metals. This lightweight material is flexible, strong, lightweight, durable, corrosion-resistant and great for three-piece rimless designs. Stainless Steel can be buffed to a matte or polished finish. Slim lines, accents, screws.

Handle - Very difficult to adjust, use pliers with strong pressure.

Recommend this strong material to those who do not have skin allergies.

**Aluminum** is a soft, light, and strong, material that works well for frames. It's often found engraved, sometimes as trim, and in pleasing colors. Artcraft and Liberty frames. – Heat and electric conductor. SG 2.69 - 1/3 THE WEIGHT OF NICKEL, COPPER, - HALF THE WIEGHT OF Ti.

Handle - Adjust carefully, can mar or kink, hand adjust or cover pliers with microfiber cloth.

Recommend this material to those who appreciate a unique look.

**Magnesium**, a new metal frame material, claims to be six times lighter than titanium. Due to its softness, it is less likely to break.

Handle - Be sure to ask supplier for tips on adjusting this metal

Recommend this material to those who enjoy light weight eyewear that is more durable.

**Cobalt** hard silver grey metal often mistaken for nickel and used in ancient times for jewelry and paints. Cobalt blue is more recognizable. Acts like Ti yet not hypoallergenic. Great \$price point. Cobalt is used in the preparation of [magnetic](#), wear-resistant and high-strength [alloys](#).

Handle - Can be difficult to adjust; try one or two pliers when adjusting.

Recommend this high-end material to those who appreciate a unique look.

**Copper Beryllium** - NASA developed Beryllium so it's not surprising that it is light, strong, and non-corrosive. It is used as an alloy with copper when creating ophthalmic frames thus creating Copper Beryllium.

- Copper Beryllium - Use pliers to adjust

Recommend this strong material to almost everyone.

**Platinum**, Ruthenium, Palladium, Osmium, Iridium and Rhodium make up a category known as **Platinum Group** Metals. They are dense, have a high resistance to tarnish and wear, temperature and chemical resistant and are used for making a variety of jewelry pieces. PGM are considered premium metals are used in high-end frames.

Handle - Be sure to ask supplier how to adjust this semi-precious metal

Recommend this high-end material to those who appreciate a unique look.

**Nickel Silver** is an alloy of approximately 62% copper (corrodes), 20% zinc (brittle), and 18% nickel (high polish). Many metal frames use it or have it as their base metal. It is durable and flexible with many color possibilities, although its high copper content is susceptible to corrosion that may create a skin allergic reaction.

Handle - Easy to adjust, use pliers.

Recommend this strong material to those who desire affordable eyewear and do not have skin allergies.

**Monel** (nickel Monel) is made from approximately 68% nickel, 30% copper, and 2% iron. It is a strong metal alloy that adjusts well and is used in a wide variety of designs in many colors. It is less corrosive than nickel silver yet may still cause allergic reactions. Can be flattened, molded, shaped, crushed. It is has been a very popular frame material for many years. \$Low price point.

Handle - Easy to adjust, use pliers

Recommend this strong material to those who desire affordable eyewear and do not have skin allergies.

## **PRECIOUS MATERIALS**

**Wood** Natural materials like exotic woods are rich in look and smooth to the touch. Precious woods like, Coco Bola, Bloodwood, Padauk, Goncalo Alves, Snakewood and Purpleheart primarily come from Brazil. Such exotic woods may be seasoned for a minimum of two years and oven-dried before it is handcrafted into eyewear. Eyewear crafted from wood is usually combined with metal for adjustability. Treat these frames like fine-crafted furniture.

**Buffalo Horn** is another natural product that is warm to the touch and is hypo-allergenic. They originate from the horn of buffalos in Africa and are not removed from the animal until after its natural death. There are no two frames alike. Buffalo Horn frames are generally hand crafted and each piece is hand tested for impeccable workmanship and quality.

**Skin** Frames continue to be made with very unique “add-on” skin materials such as snakeskin, lizard skin and leather. Generally these exotic materials are layered over a core of metal.

Recommend these precious materials to those who appreciate high-end and unique eyewear.

## **PRECIOUS ADORNMENTS**

Precious adornments like crystals, stones, gems, and a variety of jewels are added to eyewear to complete a high-end and luxurious look. These fabulous adornments can be inset in the frame, applied to the exterior of the frame and/or applied to the Plano or Rx lenses.

Recommend these precious materials to those who appreciate high-end style and like to accessorize.

## **HANDLING PRECIOUS MATERIALS**

Precious materials like wood, buffalo horn, or snake skin need to be treated with the utmost of care. Adornments like gems, stones, crystals and raised patterns also need to be protected.

- Wrap the jaws of the selected tool with a microfiber cloth or frame sleeve.
- Cover all frame parts that will come in contact with hand tools or hard surfaces.
- Wear lint free white gloves when handling snakeskin, lizard skin and leather
- Use little pressure
- Use as little heat as possible