

Dichrolam™ Textures (Molded)

Dichroic, clear, or metallic pigmented glass or resin panels with 3D topographic textures within #2 surface

PRODUCT IDENTIFICATION AND LIMITATIONS

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PRODUCT DESCRIPTION

Composition – Dichrolam decorative surfacing / window glazing / lighting diffractor sheet product is a structural (glass) and semi-structural laminated sheet product of glass and/or plastic composite consisting of substrate, 3D topographic resin layering applied to #2 surface with clear Abrasion Resistant (AR) PET overlay or other custom colored performance overlays like dichroic films. These custom constructions in dichroic films exhibit transmissive and reflective color-changing characteristics. All constructions / patterns of Dichrolam Textures in dichroic films or pigments create color from the interference principles of *thin film physics*, therefore they do not have any pigments or dyes, and will not fade in color over time or heat loads up to 240°F. Non-dichroic, monochromatic pigments can also be used for solid color specifications. Additionally, our unique, proprietary texturing process produces textured glass that is more geometrically perfect and refractively uniform than cast, slumped, or kiln-formed glass because our process does not distort and defect the base glass panel with waviness, kiln marks, and pock-holes common to hot glass casting techniques. Our molded textures result in high distinctness of image, and the perfect flatness of float glass.

Texture Patterns available:

Long Wave - large radius sine wave with 2" shift alternating each row, 12" on center.

Short Wave - smaller radius sine waves, parallel to each other, 6" o.c.

Verge Wave - tight, shifted wave effect

Bubbles - random circles of various sizes - no pattern repeat.

Dune - random, somewhat parallel "sand dune" ripples, where our molds were designed directly from photos of actual sand dune ripple patterns on the planet Mars, (using photos from the Mars Reconnaissance Orbiter) with converging ripples, the way real dune ripples converge.

Category II Safety Glass Certification:

The 1X and 2X laminated glass version of Dichrolam Red and Green with any "Texture" pattern (like 2X Short Wave or Cobblestone), uses SGCC approved interlayers and passes CPSC 16 CFR 1201 Category II Safety Glass certification, whether annealed or tempered according to American National Standards Z97.1975. Penetration resistance from the 2.5 KG Ball Drop Test prove equal or higher resistance than standard PVB laminated glass at 48" drop height.

Heat, humidity, and UV light resistance have all proven to equal and/or exceed that of standard PVB laminated glass.

The 1X "Texture" Series of Dichrolam (texture on one side, exposed with AR coating) can be specified as safety and / or sloped glazing (skylights) for insulated exterior glass when its construction is a standard Insulated Glass Unit utilizing tempered and/or laminated glass. This safety glazing construction uses tempered glass as outboard lite, with standard HS laminated glass with .060" innerlayer as inboard lite with the Dichrolam texture pattern inside, on #3 surface. Total IGU passes sloped glazing codes by the use of code compliant tempered outboard lite and conventional safety laminated inboard lite, and the addition of the Dichrolam layer onto the face (#3) can only add to the safety/strength/integrity of the total composition. The humidity resistance is controlled through dessicant filled spacers in IG unit construction.

Fire rating:

ASTM E-84 smoke density rating – Dichrolam Red and Green in safety laminated glass has identical fire retarding properties as standard safety laminated glass with PVB innerlayers. Plastic based Dichrolam can utilize PETG sheet for better fire ratings instead of Acrylic, when plastics are specified (Class B), although the textures have NOT been ASTM certified for fire rating, and is likely Class B or C due to EVA content.

Basic Uses – Available in laminated glass plate form, and possible in plastics in vertical and horizontal non-wear grades. It is recommended for interior, as well as most exterior general glazing applications as well as lighting diffractors / louvers, light sculpture, curtainwalls, decorative tiles, signage, point of purchase displays, bar tops, desks, conference tables, occasional furniture, displays or whenever a visually dynamic, 3D effect, full spectrum color shifting appearance is a desirable part of the design concept, whether backlighting or using for opaque surfacing.

1X laminations are our most economical lamination construction, which is available in our largest sizes, as well as all patterns. Our 1X sample labels do not state "1X", but are easily discerned as they are one pane of glass with the **texture exposed** on one side of the glass pane, with either an AR hardcoat over the texture in the translucent products, or backpainted with felt for opaque products like our "Dune" pattern.

All of our translucent 1X laminations (clear or dichroic) utilize a 10 mil hardcoated polyester film (Mylar) film overlay on the textured side called ARPET (Abrasion Resistant Polyethylene Terephthalate). This is outer surface of the textured side, in which the hardcoat allows this to be an exposed surface. It can be wiped with dirty rags or any solvent, and will not leave any marks or haze scratches. Steel wool will not even mark it. Tech data sheets can be provided, but its Taber Abrasion resistance measures 5 using the TM 10.13 test.

2X laminations are unique "impossible" constructions, in that they have the texture pattern locked inside between a fully laminated double pane construction like common laminated glass utilizing our proprietary process. We say impossible, because heavy 3D textures are never seen inside laminated glass as these laminations cannot be made the same way that common, laminated glass is made, nor with liquid systems due to adhesion loss from shrinkage and bubble formation. Our system is highly proprietary because we get excellent interlaminar adhesion, AND virtually bubble free. These 2X laminations create better light refraction of the textures, and eliminate the need for IGU construction in exterior applications. They also waterjet beautifully into tiles or shapes.

The 2X laminations are only possible in Short Wave, and Long Wave. The max size is 30 x 120, using special dedicated molds. The Wave textures in 2X can only have the waves running across the 30" width, not along the length.

PET / ACRYLIC LAMINATIONS

The Dichrolam Textures Patterns can be made into machineable, laserable, semi rigid or flexible laminates utilizing PET (polyester film like Mylar) and AR (Abrasion-Resistant) PET, as the face and back layers instead of glass. These laminations cannot be used outdoors, or on floors, countertops, etc. but are great for display panels, hanging sculpture, frame captured panels in lightweight wall partitions, lighting shades / diffusers etc.

PET versions have all the same limitations, but are not warranted against delamination from shock and corner / edge impacts.

PET versions may have slight bow and warp common to sheet acrylic, and texture may have more potential for bubbles locked into lamination layer. Due to the 2 stage lamination process, there may be micro-wrinkling within grooves of texture and / or near perimeter due to shrinkage from laminating.

LIMITATIONS

All Dichrolam™ Textures dichroic or metallic laminates installed in areas that are subject to constant moisture should be edge sealed with a waterproof sealant such as silicone or butyl type sealants. Any moisture damage due to sealant failure voids warranty and is the risk of buyer. In the case of bar tops, in which the sealant will usually fail somewhere at some point in time, moisture damage may occur, but will likely not be noticeable, if at all, and is still not covered under warranty due to various solvents and alcohols that could seep into a sealant failed seam.

Glass based Dichrolam Textures are custom made to specified sizes and are never meant to be cut or fabricated after sold, otherwise warranty is void.

Due to the unique hand made lamination procedure, optical thin film dichroic core or metallic backpaint uniqueness, its high reflectivity and said reflectivity's ability to disguise and hide minor imperfections, the following minor visual aberrations are allowable in the dichroic or metallic layer core of these laminates, not covered under warranty:

- Occasional bubbles up to ¼" DIA or air pockets in lamination layer, particularly within 2X laminations.
- Microbubbles may be present throughout, though undetectable at six foot viewing distance.
- Occasional dust specs, small hairs, or foreign matter within lamination layer due to manual, "hand made" nature of the manufacture.
- Air / delamination fissures within 1/2" from edge. This is accelerated in exterior or moist conditions, but generally will not "creep" beyond ¼" from edge. Low - solvent sealants applied to edge reduce this occurrence. High - solvent adhesives at edge accelerate this occurrence. Air / delamination fissures may creep beyond this margin, but is almost impossible to see, even upon close inspection, and does not affect visual or structural properties.
- Color uniformity. Transmitted and reflected colors are subject to the uniform thickness of the dichroic films or metallic / borosilicate pigments used in creating these exotic laminates, and there will always be minor bands of color or intensity deviations that are impossible to prevent, as the films and pigments are very high - tech and are the only ones of their kind.

- Occasional, small, shallow scratches in substrate used for laminating (glass or acrylic) that are commonly acceptable in architectural grade glazing products, that are not noticeable beyond a six foot viewing distance.
- Minor, non-uniform waves present in the textured pattern of Dichrolam. Major waves, ripples, or wrinkles inconsistent with the mold pattern are always rejected by JBD, and those panels are remade, but micro-sized waves are often present, and only viewed at skew angle reflection viewing, and are acceptable.
- Micro-wrinkling of the textured pattern where the resin layer contacts the mold (in the sharp valleys of any texture). These micro-wrinkles occur most often at edge and corners of large panels.
- Minor pattern / texture inconsistencies due to hand made patterns and textures required to make the 3D topographic texturing. Make sure to approve larger samples and / or photos of full panel patterns that may not be evident in small 3" x 4" hand samples.

All storage, handling, and final applications / mounting of any construction of JBD dichroic laminates must be protective of surfaces from scratching. The following limitations must not be exceeded:

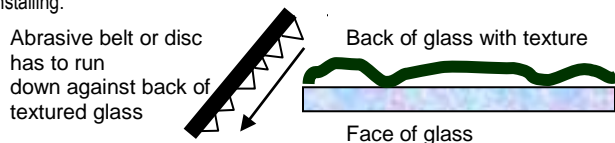
- Storage: Indoor, vertical storage is recommended, not excessive leaning, not flat.
- Be sure to protect edges and surfaces during transport. Aggressive banding, strapping and tying down of sheets without corner protectors will damage sheets
- Overtightened fastening through sheets

APPLICATION / INSTALLATION

JBD Dichrolam Textured laminates must be sufficiently supported, through encapsulation in a frame, edge only bonding, or point hold like standoffs through holes (spider fittings, etc.). Opaque Dichrolam Textures (like our "Dune" Gold Boro over White for example) can be bonded like common ceramic tile to a wall or non-floor horizontal surface with type 1 tile or polyurethane mastic adhesive with a toothed trowel onto cement/concrete, tile backer board, drywall or other substrate with similar expansion / contraction and no movement, warpage or shrinkage potential over time (like non-glued, nailed plywood, which will warp and subsequently delaminate and/or lose adhesion to the Dichrolam). Smaller tiles of Dichrolam Textures may be bonded to less stable substrates like plywood, as long as the tiles are less than 12" x 12". Large panels should be bonded in center area only, and on dimensionally stable substrate.

All Dichrolam tiles are supplied with a felt backing so that the bond to the substrate imparts the least amount of interlaminar stress **inside and within the backpoint** of the textured lamination. This means that if the felt were not on the back and adhesive were applied in single spots, there could be delamination at those glue spots, visible through the clear glass face. Therefore the felt is NEVER to be removed prior to installation with adhesive. The permanency of the bond to the substrate is shared by the seam sealant or gROUT between seams or frame / mechanical capture.

Large, custom sized tiles may be toughened glass (HS or Temp), which cannot be cut in the field, but smaller tiles may be annealed glass (check the spec for the Dichrolam glass type), and can be cut in the field similar to ceramic tile with glass cutters, diamond blades and bits, or waterjet. The rubberized vinyl/paint/felt backing of Dichrolam opaque textured glass may need to be removed or scraped off in order to cut effectively without clogging the blades. Straight cuts can be made by razor slitting through this backing, then turning tile over, and scoring with a glass cutter over the slit line, then snapping the run. The backing will need to be back beveled with coarse sanding abrasive systems (belt or disc) in a down shearing cut against the underside of the glass to prevent delamination prior to installing.



Templates and field dimensions provided to JBD for fabrication of Dichrolam must be accurate, and warranty is void if provided templates are inaccurate and / or field grinding is required.

MAINTENANCE

Surfaces should be cleaned using a clean, soft cotton cloth with normal glass cleaners. Isopropyl alcohol is strongest solvent recommended for plastic based Dichrolam – no MEK, acetone or similar solvents. Abrasive cleaners, strong ammonia or alkaline solutions should always be avoided unless glass based products are used.

SIZE AVAILABILITY, COLOR AND COST

Available in lengths up to 96 inches x 48" wide and cut to specified size lists or shapes within these max sizes (as well as special order extended lengths / widths for all textured products).

- Colors are clear, clear or opaque with metallic or borosilicate pigment, or dichroic "Red" and "Green" in the textured pattern. Color spec for dichroic is based on reflection color at perpendicular viewing with dark background, so the transmitted color is not part of the labeled "color" and is always complimentary (opposite) to reflected color – all the way through the color shift.
- Reflection color for "Red" at right angle viewing will be copper / red shifting through yellow / gold and into green at skew angles, and transmission color will be aqua blue/green, shifting through deep blue, then magenta at skewed angle viewing.
- Reflection color for "Green" at right angle viewing will be yellow green shifting into deep blue at skew angles, and transmission color will be navy blue / purple, shifting into magenta, then through orange, then yellow at skewed angle viewing.
- "Caribbean" backing has a white, opaque backing, and exhibits the teal and coral colors of the Caribbean when backing our "Red" dichroic color. Black opaque backing is also possible on our dichroic colors to bring out rich reflections in opaque specs only
- Color-matching to designer specified colors are possible in non-dichroic opaque applications, as long as they are applied with metallic or borosilicate pigments, and not just solid colors, unless subtle texture is desired. Solid colors can be used, but they will obscure most of the texture, not showing the reflective highlights that metallic pigments do. We can often spray a "tracer" coat of silver (or colored) metallic or borosilicate flake over the custom solid color to show the texture while keeping the color match, as the color will mostly show through the metallic sparkle.

All costs are by custom quote only, although it is roughly 50% of the cost of common dichroic glass. Call authorized representative.

TECHNICAL SERVICE

For technical service, please contact John Blazy at 216 272 3948.

DICHLORAM LIMITATION OF WARRANTY & LIABILITY

Seller warrants that the products sold hereunder shall be of merchantable quality and shall conform in all material respects to Seller's standard specifications shown herein. Buyer assumes all risks as to the results of the use of the products purchased, whether used singly or in combination with other materials or in any process. Manufacturers who resell Dichrolam as their own products to third and fourth party etc. users forfeit all warranty rights due to original manufacturer's (JBD) loss of control over final engineering, application, fabrication, and installation specifics.

Limitations of Claims

At Seller's option, Seller will replace, without additional charge, products which do not comply with the warranty or, upon return of the products at Seller's expense, refund the purchase price up to three full years from date products are received by buyer. Reinstallation of replacement products are at buyers expense unless due to breach of warranty or as otherwise noted.

SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, BASED ON ANY COURSE OF DEALING OR USAGE OF TRADE OR OF FITNESS FOR PARTICULAR USE OR OTHERWISE, OTHER THAN THAT STATED HEREIN OR REQUIRED BY APPLICABLE LAW. SELLER'S LIABILITY FOR ANY LOSS OR CLAIM WHATSOEVER, INCLUDING A CLAIM FOR BREACH OF THE WARRANTY OF MERCHANTABILITY, SHALL BE LIMITED SOLELY AND EXCLUSIVELY TO REPLACEMENT OF DEFECTIVE OR NON-CONFORMING PRODUCTS OR, AT THE ELECTION OF SELLER, TO RETURN OF THE PRODUCTS AND REPAYMENT OF THE PURCHASE PRICE. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY OTHER ACTUAL DAMAGE OR EXEMPLARY DAMAGES.

Any course of dealings between the parties to the contrary notwithstanding, buyer is responsible for inspection of the product upon receipt and prior to any cutting, fabrication, or installation. Any claim by Buyer for breach of warranty shall be deemed waived to the extent it could have been determined by such inspection, unless presented in writing to the Seller within thirty (30) days from the date of receipt of the products to which such claim relates. In all events, such claims not made within two months after receipt are deemed waived.

Some products are shipped with a protective film to protect product during transit and storage. All such products must be inspected for defects prior to cutting, fabrication, or installing. Surface must then be protected during cutting, fabrication, and installation. Failure to remove the protective film to inspect for defects prior to cutting or fabrication is at Buyer's risk.

Seller shall have no liability for defects or other failures caused by failure to fabricate, install, use or maintain the products in accordance with John Blazy Designs' instructions or damage to product occurring after shipment to the initial purchaser.

Buyer assumes all risk and liability for loss, damage or injury to the person or property of Buyer or others arising out of use or possession of any products sold hereunder. Any questions concerning this warranty or requests for service should be to: **John Blazy Designs Attn: John Blazy.**