# The History of Dichroic Glass

*by Howard Sandberg*

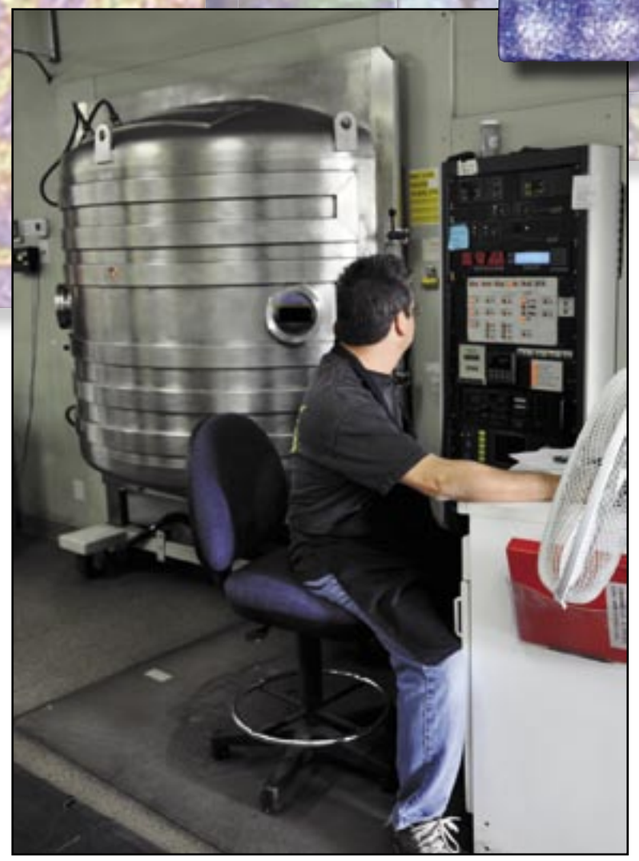
Although the origins of glass are ancient and found in many civilizations throughout history, dichroic-coated glass is a relative newcomer to the glass art world. Many people have heard the story of the artist rummaging through the dumpster looking for cast-off dichroic glass that was being thrown away by the scientific community. So what exactly is dichroic glass and how did it end up in the world of art?

## The Basics of Dichroic Glass

Dichroic glass is actually a coating process that is completed in a vacuum deposition chamber by vaporizing quartz and metal oxides with an electron beam gun and condensing micro-thin layers on the surface of the glass in the form of a crystal structure. This coating that we commonly call dichroic glass today is actually an "interference filter" that is permanently adhered to the surface of a piece of glass. The technology used to manufacture the optical interference filter has been in existence for over forty years. It is known as "vacuum thin film deposition."

The roots of this technology date back to the late 1880s. The significant commercial development of thin-film deposition, however, waited to be spurred on by United States military and aerospace requirements in the 1950s and 1960s. This technology has played a key role in optical coating for a vast variety of optical instruments, lasers and laser systems, fiber communication links, optical recording/storage heads and media, display systems, infrared guidance and detection devices, photoelectric converters, architectural glass, eyeglasses, and many others.

It was forty years ago when Jerry Sandberg of Coatings By Sandberg, Inc., pioneered his first vacuum, vapor deposited, thin-film coatings strictly for art applications. Now when the word dichroic glass is mentioned, the name "Sandberg" quickly comes to mind. The Sandberg Family is the backbone of this high-tech aerospace application reinvented for the art glass industry.



## Chance Beginnings

Back in the early 1970s, Jerry Sandberg was working for a vacuum-coating laboratory in Newport Beach and happened to take notice of an artist digging in the trash for pieces of dichroic out of spec mirrors and started talking with him. This was the first interaction that Jerry had with the artist community and was immediately fascinated with the creative potential of the glass. Jerry then worked with these artists to create the first three dichroic glass colors specifically designed for the art glass industry (Cyan/Red, Magenta/Green, and Yellow/Blue).

It wasn't long before Jerry also started experimenting with the coatings in the kiln. A third generation jeweler as well as a world class engineer, Jerry used his knowledge to create some of the first fused dichroic glass jewelry. His experiences using the dichroic glass allowed him to see, first hand, what other artists were now experiencing for the first time.



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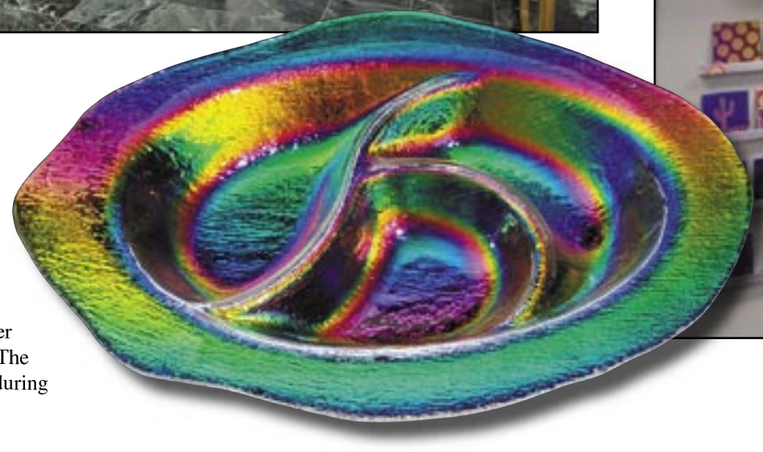

For the next twenty-five years Jerry continued to supply the glass art market and continually expanded the pallet of colors at the request of his ever-growing group of artists. A few other coating houses soon started to offer similar vacuum-deposited coatings due to the buzz that Jerry had created and nurtured for many years. For Jerry, customer service and a quality product were paramount. The first distributors started selling dichroic glass during the ’80s as it became more and more popular.

## Developing the Company

In 1996 Nona and Jerry formed Coatings By Sandberg, Inc. (CBS). Their mission was to supply the glass art market with reliable, consistent, uniform, and durable dichroic glass coatings at a reasonable price. Customer service as well as customer support were key and still are to this day. Before Nona and Jerry were able to finish building their own custom vacuum deposition chamber with a price tag of one million dollars, the two had thousands of dollars in artist orders waiting to be produced. The first CBS dichroic glass was created in November of 1996. CBS had to sell directly to the end user, since distributors were not familiar with the company and were unwilling to carry its product. Within the year, some distributors were already requesting to open an account with CBS due to the multitude of artists requesting it by name.

As the demand for dichroic glass grew, CBS also began to expand. Not only did the company expand production, it also expanded its product line and developed new coatings and patterns. We invited well-known artists to come teach at our plant and learned about fusing, slumping and manipulating glass. This all helped keep us in touch with what our clients were doing and allowed us to offer extensive technical support to our valuable customers. At this point we coined our slogan “The Art of Dichroic Glass,” since our products are specifically made with the artist in mind. In fact, the Sandberg’s specifically designed their chambers for the optimization of art glass as well.

## Setting the Standard

By the new millennium CBS had single-handedly created the standard in dichroic glass coatings. Our colors were understandable. The color shifts during hot working was predictable. The coatings were stable, and most of all CBS was reliable. All of the top distributors were onboard with CBS and carrying inventory. As the leading manufacturer of dichroic glass, CBS has a commitment to the well being of the struggling artist, on up to the world-renowned master, in the supply of quality dichroic coatings.

In recent history we have created many more patterns, specialty rainbows, stripes, and images. Imagine, we started out with ten patterns and sixteen solid colors and now have 25 patterns, 23 colors, and over 130 combinations of the two! We have also coated a multitude of glass including: architectural glass, stained glass, blown glass, fused glass, castings, bevels, rods, stringers, tubing, gems, jewels, drusys, cabochons, buttons, earplugs, ceramics, glass block, tile, and more. We have coated premade items such as sculptures from Milon Townsend, handblown bowls by James Nowak, beads from Sharon Peters, and Swarovski and Waterford crystal, and have even worked with The Walt Disney Company.

Dichroic glass coatings have come a long way in forty years but have many more years in store. Thanks to so much excitement in the art market, dichroic glass is now used for construction in the form of tile, decorative skylights, mood lighting, lighting fixtures, mosaics, sinks, sconces, and sculpture. We realize that the future of dichroic glass is very dependent on CBS and its practices. We are constantly in a state of analysis, research, and development, and we now have distributors all over the globe. We have also hired in-house artists to help test and provide vital input for future products. We have expanded our sample department in an effort to offer smaller amounts at lower price points. Most recently we have designed a new dichroic surface texture know as Crinklized Dichroic. In the future, CBS will be experimenting with additional surface texture, shadowing techniques, new deposition materials, unique patterns, and more.

In addition, in 2005 the Museum of Dichroic Art (MODA) was created, and it now houses the largest known dichroic glass collection in the world. It is currently located in our lobby in Orange, California, and is available by appointment for guided tours throughout our facility on a daily basis.

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