A Common Denominator

Did you know solar heating, televisions, jelly jars, and lasers were inspired from one material? The exploration of astronomy and nocturnal zoology was also made possible by this material. This millennial old material is glass. However, all glass does not have the same composition. Since the first form, this material has been engineered into numerous variants. Through this manipulation and development, glass has evolved into many applications and new scientific disciplines.

The two earliest forms of glass, which were made by nature, are fulgurite and obsidian. Obsidian is a product of volcanic eruptions and was carved into knives, arrowheads, jewelry, and money. Glass manufacturing began about 3000 BC for glazing ceramic vessels. Whole glass artifacts were designed around 1500 BC in Egypt and Mesopotamia. In the first four centuries of the Christian Era, transparent glass was developed. Venetian glass blowers in the Middle Ages perfected cristallo, a nearly colorless, transparent glass that could be blown to extreme thinness. In 1608, glass manufacturing in America commenced at resourceful Jamestown, Virginia. Prior to the mid 17th century, glass was primarily made for windows and various sorts of containers. However, in 1674 George Ravenscroft changed the glass processing formula and made lead glass. Lead glass is especially suitable for optical instruments. In the 19th century, glass became highly demanded and the mirror was also fabricated. Over the past 110 years, many new compositions of glass were created and engineered.

This engineering development of glass has resulted in thousands of applications and promoted discoveries. Optical glass, one of the various glass compositions, is utilized in microscopes, telescopes, and photographic lenses. Without this special composition, the vast field of micrology would not exist. The four largest moons of Jupiter would never have been

discovered by Galileo if not for the optical glass in his telescope. Glass lenses precisely focusing light on a plane began the production of photographic images.

Up to the 19th century, the realm of darkness was lit by candles. However, candles in the home were fire hazards, soot engendering, poor lighting, and a nuisance to handle. These problems promoted the design of the incandescent light bulb. Transparent, heat resistant, and non-conductive glass was the perfect component to make the necessary vacuum chamber. Darkness could now be investigated like never before.

Glass has also been engineered into fiber optics. This glass composition is used for imaging, lighting, and data transfer. Fiber optics have many advantages over metal cables: greater bandwidth, less prone to interference, thinner, and lighter. In addition, data can be transmitted digitally rather than analogically.

What does an airplane, an auto bumper, a surfboard, and the insulation in your home have in common? They were all engineered from fiberglass. This fine composition of glass is made into a wool or cotton like form and can be used as a thermal and sound insulator. Boats are designed with a 95% composition of fiberglass. This engineered material from glass has thousands of applications that utilize many integrated properties: corrosion and fire resistance, strength over steel, thermal, electrical, and audile insulation, light weight, and durability.

Glass is a very versatile material. The applications stated don't even cover one-fourth of its uses. For many centuries, material engineering has grown, but the engineering feat of glass development has surpassed all others. Thanks to these glass-developing engineers, we live in the modernized world of the twenty-first century.