Fresnel lens - lab report example

Science, Physics

Fresnel Lens

Fresnel lens Fresnel lens is a thin plastic lens that is flat on one side and has ridges on the other; it is thick inthe middle and reduces in different zones gradually tapers to the edges (Miller & Agnes, 1). The lens was created by Augustin Jean Fresnel in the early 1800s for lighthouse lamps; Fresnel lens capture light from its source enhancing its visibility to considerable distances (Miller & Agnes, 2).

In comparison to the conventional lenses, Fresnel lens is much lighter as it reduces the amount of material required. Nowadays, the lens is made of plastic in a bid to reduce its manufacturing cost and its general weight. On the other hand, Fresnel lens is disadvantaged in that its images are not as clear as those of conventional magnifying glasses and they are had to mount (Leutz & Akio, 56).

Fresnel lenses have varied applications, but they are majorly used as sunlight concentrators for multiple uses such as:

1. High concentrated photovoltaic (HCPV); this enables the concentration of sunlight to intensities of 300 suns or more by the uses of Fresnel dish reflectors. This can be aided by either linear Fresnel reflector dish or refractive circular lens array.

2. Solar cookers: this is a device that uses concentrated sunlight as its only energy source for cooking. This cooker is very environment friendly.

3. Stirling Engine: this is a heat engine that works by alternating compression and expansion of air. It uses Fresnel lens to concentrate light as a heat source for heating the working fluid.

4. Solar lighting systems; it is used for providing interior illumination using

the light concentrated by Fresnel lens and optic fibers to supplement electricity, which makes it possible to use approximately 72-80% of the received sunlight.

Works Cited

Miller, F. P. & Agnes F. Vandome. Fresnel lens. New York: VDM Verlag; (2010). Print.

Leutz, R. & Akio Suzuki. Nonimaging Fresnel lenses: design and performance of solar

concentrators. New York: Springer; (2001). Print.