on a continuous basis. The sheet is later bonded to an acrylic superstrate for mechanical strength. This method yields larger draft angles than compression molding and results in slightly lower transmission for flat, point-focus lenses. In contrast, it is particularly suited to the domed linear Fresnel approach of Entech, because when the lens is warped into the domed shape, the facets are deflected to an angle where the draft is out of the ray path.

The reader interested in the details of Fresnel lens design is referred to textbooks on the subject [2]. Modern design usually involves numerical ray-tracing analysis coupled with electronic design transfer to numerically controlled machining for tool making. Commercial programs, such as those available from James and Associates, are available for implementing this procedure.

11.4.7 Secondary Optics

Secondary optical elements are often used to increase concentration, or alternatively to increase acceptance angle. They are applicable with either reflective or refractive systems; however, they are most often used with point-focus Fresnel lenses in which concentration ratios in the range of 200 to 1000 are typical. Three types of secondaries are common: v-troughs, refractive CPCs, and refractive silos. These are described below.

Figure 11.31 shows the case of a Fresnel lens coupled with a v-trough. This design was for a 500X Fresnel module [30]. In this case the lens was designed with multiple

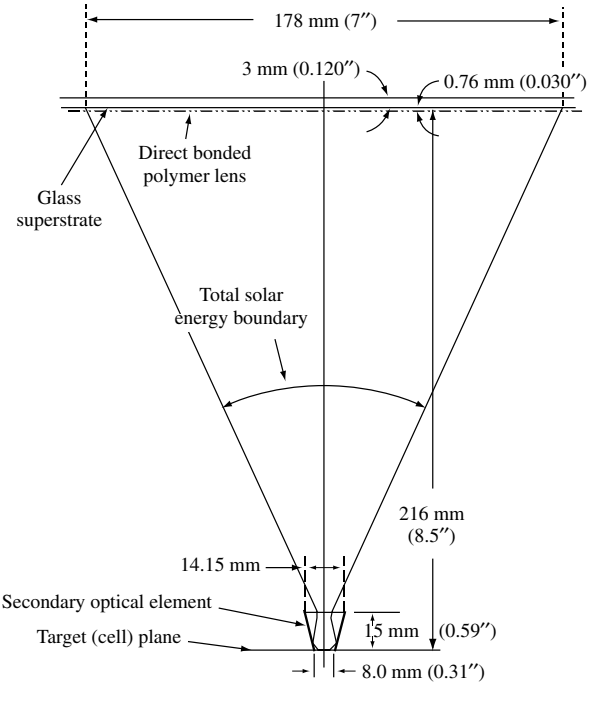

Figure 11.31 Lens cell configuration for a Fresnel lens with v-trough secondary [30]. Copyright © 1984. Electric Power Research Institute. *AP-3263. Conceptual Design for a High-Concentration (500X) Photovoltaic Array*. Reprinted with permission