EMPIRE SERIES SPECIFICATIONS

ENGINEERING SPECIFICATIONS

The following shall be the specifications for the solar collectors. Collectors shall be SunEarth Empire model _____, and shall be of the glazed liquid flat plate type. Collectors shall be tested in conformance with ASHRAE 93-2003 and Solar Rating and Certification Corporation (SRCC)100-05, and have their thermal performance rated according to SRCC Document RM-1. The collectors shall be certified by SRCC and the Florida Solar Energy Center (FSEC), and listed by the International Association of Plumbing and Mechanical Officials (IAPMO).

GENERAL

The dimensions of the collector shall be _____ inches in length, _____ inches in width and 3 1/4 inches in depth. The collector casing shall be an anodized aluminum extrusion (alloy 6063 T5), minimum thickness .060 inch, with an architectural dark bronze finish. The casing shall have notched frame walls for ease of plate removal and reinstallation. Sheet metal screwed fasteners shall be stainless steel (18-8 #10). The back sheet shall be painted textured aluminum not less than .014 inch thickness. A 1 inch vent plug shall be installed in each of the four corners of the back sheet to minimize condensation. An integral mounting channel shall allow the solar collector to be mounted without penetration of the extruded aluminum casing.

GLAZING

The collector glazing shall be one sheet of low iron tempered glass, with a minimum of 1/8 inch thickness (5/32 inch on EC/EP 40), and a minimum transmissivity of 91 percent (89 on EC/EP 40). The glazing shall be thermally isolated from the casing by a continuous EPDM gasket. There shall be a continuous secondary silicone seal between the glass and casing cap strip to minimize moisture from entering the casing.

INSULATION

The insulation shall be foil-faced polyisocyanurate foam sheathing board of a minimum 1 inch thickness, siliconed in place to the aluminum back sheet, covered by low-binder fiberglass of a minimum 1 inch thickness, providing thermal isolation of the foam from the absorber plate. Total thermal resistance shall be a minimum of R-12. The sides and ends of the collector shall be insulated with a minimum of 1 inch foil-faced polyisocyanurate foam sheathing board.

ABSORBER PLATE AND PIPING

The absorber shall consist of a roll-formed copper plate of no less than .008 inch thickness. Risers shall be a minimum of 1/2 inch O.D. Type M copper tubing on no more than 4 9/16 inch centers continuously soldered to the plate utilizing a non-corrosive solder paste with a melting point of 460°F. The risers shall be brazed to 1 1/8" O. D. Type M copper manifolds (1 5/8" O.D. on EC/EP-32-1.5 EC/EP40-1.5) utilizing a copper phosphorous brazing alloy with no less than 15 percent silver content, and conforming to the American Welding Society's BCuP-5 classification. EPDM grommets shall isolate the manifold from the aluminum casing. The absorber plate shall be designed for 160 psig maximum operating pressure.

ABSORBER COATING AND PERFORMANCE CURVE

A) Black Chrome (EC Series): The absorber coating shall be black chrome on nickel with a minimum absorptivity of 95 percent and a maximum emissivity of 12 percent. The instantaneous efficiency of the collector shall be a minimum Y-intercept of 0.735 and a slope of no less than -0.730 BTU/ft2.hr.oF.

B) Moderately Selective Black Paint (EP Series): The absorber coating shall be a moderately-selective black paint with a minimum absorptivity of 94 percent and a maximum emissivity of 56 percent. The instantaneous efficiency of the collector shall have a minimum Y-intercept of 0.726 and a slope of no less than -0.910 BTU/ft2.hr.oF.