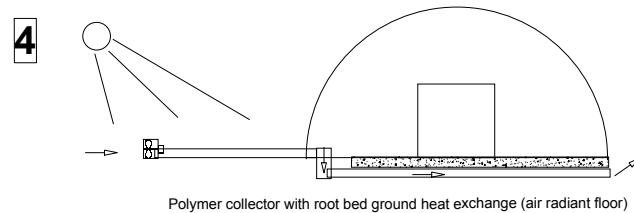
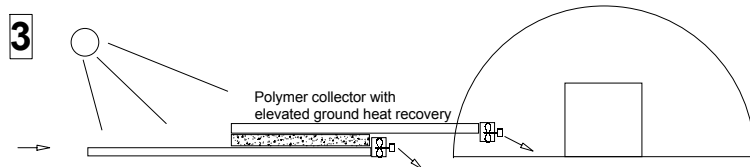
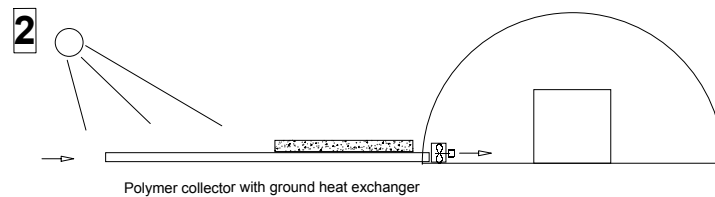
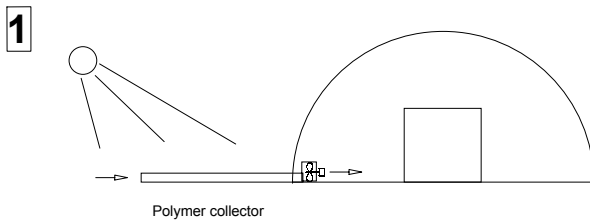


Solar Air Heating Of Greenhouses Using Polymer Air Heating Collectors

The four configurations below show how the polymer air heating collectors can be configured to heat greenhouses.

The four examples show how the system can be arranged along the side of a hoop type greenhouse. The system works equally well for any other greenhouse construction; gutter, high tunnel, low tunnel, glass, polymer film, etc.

The system can be located next to the end wall or any open, un-shaded space near the greenhouse. The collectors can also be located at a distance, up to about 200 feet, from the greenhouse and solar heated air can be carried to the greenhouse through an insulated duct (not shown).



1 In the simplest configuration, the polymer heat exchanger is arranged adjacent to the greenhouse and operates on a differential thermostat to turn on the fan when the collector is warmer than the greenhouse and the greenhouse requires heating. Solar heated air is blown directly into the greenhouse.

3 A more sophisticated example uses ground heat exchange for night time and cloudy day heating. A separately powered collector is installed on top of the ground heat storage bank to maximize heat recovery from the top of the ground heat storage bank.

2 To provide night time and cloudy day heating, a portion of the polymer collector is buried beneath an earth bank (~12" deep). The heated air during the day will heat the earth and be available for heat recovery and delivery to the greenhouse during nighttime hours.

4 Another alternative is to install a polymer collector from any of the previous configurations, coupled with a ground heat exchanger directly beneath the root bed or floor of the greenhouse. This configuration provides warm floor temperatures similar to a more complicated water tube radiant floor system.

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American Solar, Inc.
8703 Chippendale Court Annandale, Va.
(703) 346-6053 www.americansolar.com

