

Thermal Performance Comparison of Three Integrated Thermal Solar Roof Collectors

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(Abstract)

The integrated solar roof collector system can bring the house year-round energy saving benefit. In heating season, part of the space heating and preheating domestic hot water demand can be met by this integrated system. In the cooling season, cooling load reduction and preheating domestic hot water can be achieved by operating this system. The traditional solar thermal system is an add-on system rather than integrated, which increases the cost-benefit ratio. The current system is integrated with the roof structure. Except for the energy collecting benefit, it will reduce the material cost, labor cost and construction period.

The objectives of this research is to estimate the energy performance of three collector configurations including space heating saving, and preheat hot water saving. This study also compares energy performance for the three collectors on two types of evaluated houses in Roanoke, Virginia.