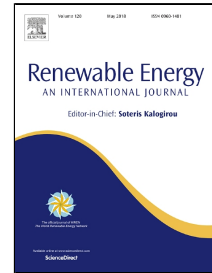


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Experimental study and thermal analysis of a tubular pressurized air receiver

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1 Experimental study and thermal analysis of a tubular pressurized 2 air receiver

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13 Abstract

14 Pressurized air receivers potentially used in concentrated solar power plants are being developed and studied
15 to achieve higher systemic efficiency from solar to electricity. In this article, a novel receiver with double spiral
16 tubes coiled into conical type was proposed and fabricated. The design shows a bending limitation of a diameter
17 of 60 mm in the bottom of the receiver. Some experimental tests were conducted under a solar furnace in the
18 real weather condition. The results reveal that this kind of receiver could obtain high-temperature outlet air at
19 908°C with relatively low direct normal irradiation (DNI) of around 785 W/m². Based on the comparisons of the
20 outcomes of 9 test cases, it could be concluded that the outlet air temperature is mainly dominated by the value
21 of DNI, while the pressure drop is determined by both DNI and mass flow rate of the air. Besides, the thermal
22 inertia of the receiver demonstrates benefits for stable output and quick recovery induced by small adjustments

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