

## Abstract Details

**Title:** Second law analysis of waste heat recovery heat exchanger using supercritical carbon dioxide

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**Abstract** The purpose of this study is analysis of second law of the helical coil heat exchanger for research in the field of waste heat recovery. by the second law analysis we can combine both the effects of heat transfer and pressure drop in a single equation to know the exact irreversibilities occurring in the system. The performance parameters used for the analysis are entropy generation number and second law efficiency. The parametric study has been carried out to know the behaviour of the systems by varying the tube diameter, length, mass flow rate of sco<sub>2</sub> (supercritical carbon dioxide) and inlet temperature of sco<sub>2</sub>. The second law efficiency or rational efficiency is having a maximum value at optimum diameter which is 0.015 m; it decreases with mass flow rate but increase with inlet temperature of sco<sub>2</sub>. Entropy generation number is also having minimum value at optimum diameter which is 0.015 m. It increases with mass flow rate of sco<sub>2</sub> but decreases with inlet temperature of sco<sub>2</sub>.

**Keywords:** waste heat recovery, supercritical carbon dioxide, second law analysis, parametric analysis, entropy generation minimization.