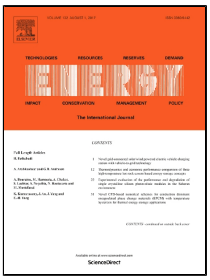
# Accepted Manuscript



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| PII: | S0360-5442(17)31465-2 |
| DOI: | 10.1016/j.energy.2017.08.090 |
| Reference: | EGY 11459 |
| To appear in: | *Energy* |
| Received Date: | 10 June 2017 |
| Revised Date: | 14 August 2017 |
| Accepted Date: | 19 August 2017 |

Please cite this article as: A. Behbahaninia, S. Ramezani, M. Lotfi hejrandoost, A Loss Method for Exergy Auditing of Steam Boilers, *Energy* (2017), doi: 10.1016/j.energy.2017.08.090

# A Loss Method for Exergy Auditing of Steam Boilers

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**Abstract**

This paper presents a new method for exergy auditing of steam boilers. The presented method is based on developing ASME ptc4.1. The ASME ptc4.1 presents a method to estimate energy loss terms and the first law efficiency. This work presents a similar method to estimate exergy loss terms and exergitic efficiency. The method determines the inappropriately-working components. The identification of the components enables the auditors to improve the system's performance. Using this method the different terms of irreversibility including exergy destruction in the boiler, exergy loss through the boiler's wall, exergy destruction in GAH, the loss related to the flue gas exhaust, loss due to the emission of not-burnt hydrocarbons and loss due to formation of CO can be calculated. In order to examine the performance of the method, a boiler of a power plant is chosen and by measuring the temperature and the flue gas analysis, the boiler's wall temperature and some other required parameters, the components of the irreversibility are calculated. Results indicated that the largest amount of the irreversibility is related to exergy destruction inside the boiler that is more than 38% of the total exergy input. Results also revealed that the exergy efficiency of the boiler is 53.70%.

Key words: energy audit, exergy, boiler, power plant, loss

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