

## **EFFECT OF OXYGEN ENRICHMENT IN SPECTRAL THERMAL RADIATION IN AN UNCONFINED TURBULENT BLUFF-BODY FLAME**

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**ABSTRACT.** Oxy-fuel combustion is a modern technique to improve the efficiency and reduce environmental penalty of many combustion systems. In the present study, three different approaches of skipping radiation, weighted sum of gray gases (WSGGM), and spectral line based weighted sum of gray gases (SLW) have been used in simulation of an unconfined turbulent bluff-body flame. The model is first validated against existing experimental data and then used to study the effect of oxygen enhancement and different spectral radiation models. Due to small optical thickness of the studied system, predictions of all three different approaches are close. However, by increasing oxygen concentration in the oxidizer that increases concentration of CO<sub>2</sub> and H<sub>2</sub>O, the optical thickness of system increases and therefore non-grayness of gases gets more important. Hence, accurate calculation of gas radiative properties would be more important.