

# Theoretical Determination of Temperature Field in Orthogonal Machining

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## Abstract

In this work, mathematical models were developed to simulate the thermal behaviour of a cutting tool insert in three-dimensional dry machining. Models to determine the temperature rise at the shear plane and tool insert in orthogonal cutting were developed, simulated and validated. The effects of various machining parameters/variables such as specific heat of material of 4400J/kg, Depth of cut (t) of 0.0003m, Density of 7870kg/m<sup>3</sup>, Width of cut (b) of 0.005m, Chip thickness ratio (rt) of 0.42, Tool rake angle of 100, Cutting Velocity (V) of 35m/min and Shear force (Fs) of 1257.6N on temperature rise were well analyzed.

**Keywords:** temperature, machining variables, orthogonal machining

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