

***FEASIBILITY ANALYSIS OF F1 HORIZONTAL MILLING
MACHINE BASED ON GEOMETRIC ACCURACY TESTING
REFERRING TO ISO 1701***

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ABSTRACT

This study aims to evaluate the static geometric accuracy of the F1 Horizontal Milling Machine based on ISO 1701 standards to determine its operational feasibility at the Manufacturing Laboratory of Politeknik Negeri Bengkalis. Tests were performed using a dial indicator, test bar, and spirit level through a quantitative experimental method with a comparative descriptive approach. The measurement results indicate that the linear translation parameters remain within the safe tolerance limits of ISO 1701 (status: FEASIBLE), including Z-axis vertical motion straightness (0.011 mm), table-to-column squareness (0.017 mm), and table surface-to-vertical motion squareness (0.013 mm), all of which are below the maximum limit of 0.020 mm - 0.025 mm. Conversely, the spindle rotation system is declared UNFEASIBLE due to major deviations in the main spindle rotation (0.069 mm) and spindle centering rotation (0.038 mm), both exceeding the 0.020 mm tolerance threshold. These deviations strongly indicate spindle bearing wear, assembly looseness, or taper surface defects. In conclusion, the F1 Milling Machine is still suitable for general rough machining practice but is highly not recommended for high-precision operations prior to a comprehensive inspection and overhaul.

Keywords: *F1 Milling Machine, Geometric Accuracy, ISO 1701, Feasibility Analysis, Spindle.*