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Key Mechanism

Efficient keying requires that keys function with minimum adequate force and with sufficient displacement to provide muscular feedback to the user. Key forces for current high production keyboards are in the range of 0.40 to 1.25 newtons with key displacements of 3 to 5 mm.

Key spacing, key travel, force and key feedback are keyboard characteristics generally agreed on by most manufacturers and are specified by ISO 9241-4:1998(E) "Ergonomic requirements for office work with visual display terminals (VDT)- Part 4", published by the International Organisation for Standardization (ISO) in 1998.

ISO 9241-4:1998(E) states:
 "Key displacement shall be between 1.5mm and 6.0mm and the preferred key displacement should be between 2.0mm and 4.0mm. For displacement keyboards the initial resistance shall be between 25% and 75% of the force at the character generation point (for ramp action) or at the snap point (for snap action). The force at the character generation point or at the snap point should be between 0.5N and 0.8N and shall be between 0.25N and 1.5N. The switch make action in the snap action shall occur after the snap point but before the key force has returned to the snap point. The activation should occur around the minimum force point after the snap point".

Force Displacement curve for a key with Tactile Feedback

The American National Standard Institute (ANSI) recommendations are very similar: "...preferred displacement is between 2.0 and 4.0 mm (0.08 and 0.16 inch)... the maximum force to depress the keys, expressed in Newtons (N)...shall range between 0.25 N and 1.5 N. The preferred key force is between 0.5 N and 0.6 N."

From the user point of view, the more proficient the user, the lighter the touch can be. If too little force is required, however, extra keys may be struck accidentally, and if too much force or displacement is required, some keys may fail to be actuated because the user did not press hard enough. Also, excessive force induces finger fatigue. There is evidence that optimum force/displacement characteristics of a key require a steadily

increasing force as the key is depressed until contact is made. Immediately beyond that point, the force is sharply changed so that users can easily "feel" when the key has been pressed sufficiently.

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