

Indian Standard IS 4431:1978- Specification for carbon and carbon manganese free cutting steels

When buying the steels, consumers expect that these steels to possess specific qualities to ensure effective machining and desired mechanical properties. The standard specifies requirements for chemical composition, including limits for elements like carbon, silicon, manganese, sulphur and phosphorous to ensure the desired properties are achieved. Additionally, it defines acceptable ranges for tensile strength and elongation to guarantee the steel's strength and ductility under different conditions such as hot-rolled, normalized, cold-drawn, and quenched and tempered conditions.

This standard IS:4431-1978 defines the requirements for carbon and carbon-manganese free-cutting steels supplied in various forms like blooms, billets and bars. Free-cutting steels are known for their good machinability, which stems from the presence of elements like sulphur and selenium, that create chip break up during the machining process. The standard covers steels suited for machining in the cold-worked condition, hot-rolled and normalized condition, the cold-worked and tempered condition, and the refined and quenched condition.

The standard addresses the consumer's expectation by outlining the permissible variations in chemical composition during analysis. It also specifies the sampling procedures for both chemical and mechanical tests, enabling verification of the material's compliance with the stipulated standards. Moreover, it outlines the retest procedures if the initial test results do not meet the standard's requirements. Detailed dimensional tolerances are also provided, ensuring the final product adheres to the required dimensions. Finally, the standard includes recommendations for heat treatment procedures, guiding manufacturers in achieving the desired mechanical properties through appropriate heat treatment processes.