



IS 5517:1993 Steels for hardening and tempering - Specification

Steels that are well-suited for hardening and tempering typically contain sufficient carbon to form martensite, a hard and brittle phase, during rapid cooling (quenching). The subsequent tempering process then reduces brittleness while retaining much of the hardness. Factors to Consider When Selecting Steel for Hardening and Tempered include Required mechanical properties, Heat treatment requirements, Machinability and Weldability.

The Indian Standard IS 5517:1993 specifies the requirements including delivery conditions for carbon and low alloy grade wrought steels supplied in form of bars, plates, rods, flats, forgings etc. for forgings and machining of parts for engineering components or automobile purposes and generally intended for steels with excellent combination of strength, toughness, and wear resistance. Common Alloying Elements for low alloy steels include Chromium, Nickel, Molybdenum, Vanadium and Tungsten. Steels specified in the standard can be ordered on basis of various delivery conditions either singly or in a combination which include Chemical Composition, Hardenability, as-rolled, Mechanical properties, Special cleanliness and crack testing.

Also, the requirements specified include cleanliness of steel in the form of freedom from defects, inclusion rating both for air melted quality and secondary refined quality. For guidance, recommended temperatures for heat treatment and hot working are also mentioned.

The tests for mechanical properties mentioned in the standard include tensile test, impact test and hardness test. As for enhancing mechanical properties like strength, toughness, and ductility, Fine Grain Structure is desired, the requirement for the same is also covered in the standard. Additional tests mentioned include Ultrasonic test, macro-etch test, hardenability test, cleanliness test, blank hardening and Microstructure for machinability banding and hot-upset test for forgeability.

Testing frequency including re-test and sampling procedures including location of test pieces of samples to be delivered are detailed for consistency and compliance, ensuring that product meet the requirements.