

EDS

Engineering,
GM DAEWOO Auto & Technology
Standards

METHOD OF CARBURIZED AND CARBONITRIDED DEPTH MEASUREMENT FOR STEEL

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1. PURPOSE

This standard aims at helping test personnel perform the test in an appropriate way by describing the method of measuring case depth by carburizing and carbonitriding heat treatment for steel.

2. SCOPE

This standard specifies the methods of carburizing and carbonitrided depth measurement for steel.

3. DEFINITIONS

3.1. Carburization

The work of increasing carbon contents on the surface of steel by heating low carbon steel, low Ni steel or Ni-Cr steel placed in carburizer at a temperature of about 850~900℃ for 8~10 hours.

3.2. Carbonitriton

Surface hardening method by penetrating C(about 0.8%) and N(about 0.3%) into the steel at a temperature of about 800~900℃ in a gas state after heating the steel beyond transformation point. Generally, N is not contained in carburized layer and C is not contained in Nitride layer.

3.3. Effective case depth

The distance from the surface of a case, as quenched or as quenched-tempered under temperature not exceeding 200℃, to the position of critical hardness (See Fig 1). The critical hardness varies according to carbon content of the raw material and is as shown in Table 1. When specified in drawings, a separate critical hardness may be used.

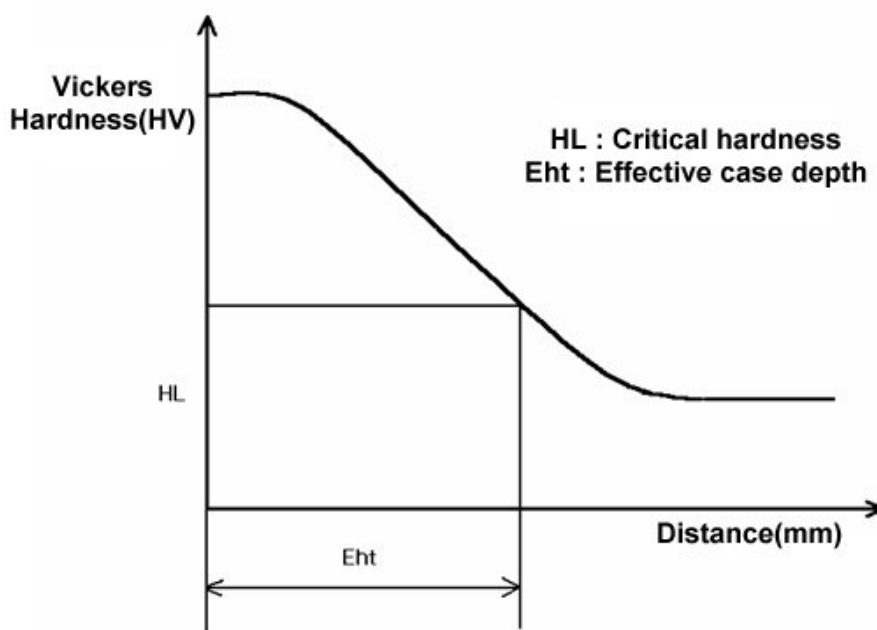


Fig. 1. Definition of Effective Case Depth

Table 1. Critical hardness and internal hardness according to carbon content of the raw material

Nominal carbon content of raw material	Critical hardness	Maximum allowable hardness of core
MAX. 0.25%	550 HV	450HV
0.26 ~ 0.32%	600 HV	500 HV
MIN. 0.33%	650 HV	550 HV

3.4. Total case depth

The distance from the surface of the hardened case to the point where the difference in chemical or physical properties between the carburized layer and the core material is no longer determinable. Physical properties shall be determined by the hardness and chemical properties by the macro-structure.

4. TEST SPECIMEN

4.1. For the test specimen, the carburized product or carbonitrided product itself shall be used. If not possible, the separate test piece of the same material treated under the same method as applied to the carburized product and the carbonitrided product may be used.

4.2. Be careful lest decarburizing should occur on the product when quenching after carburizing and carbonitriding.

4.3. More than three pieces for primary approval and more than one test piece for routine quality control shall be tested.

4.4. Unless specified otherwise, the test sample shall be cut in the following method and its cut surface shall be polished to serve as the inspection surface

4.4.1. Helical and Spur Gear Teeth

The hardening depth shall be measured at right angle to the surface along the pitch diameter by vertically cutting the tooth flank face at its mid point of width. In cases when the pitch diameter is not clearly defined, as with bevel gears, it shall be measured perpendicular to the surface at the mid point between the gear tooth apex and root.

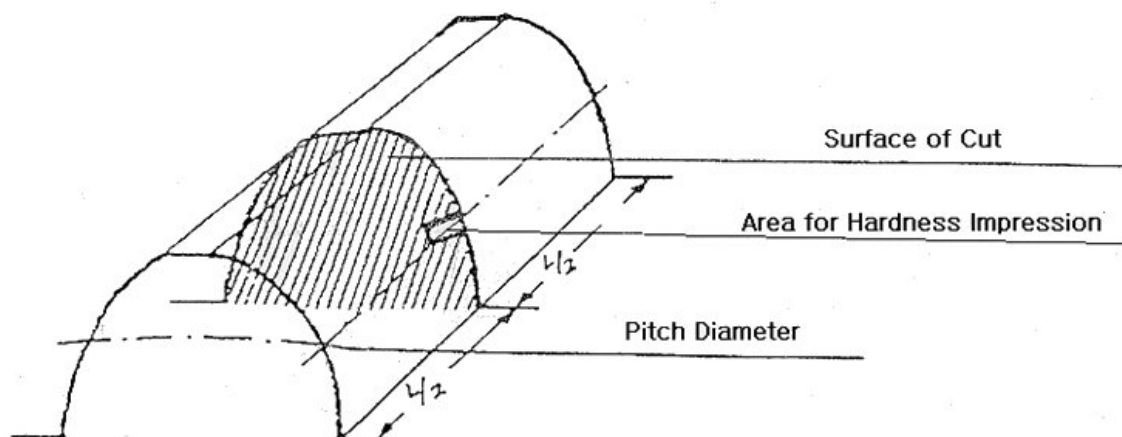


Fig 2. Hardening depth measuring point for gear teeth