Case Depth in Steel Gears

Effective case depth is the most important parameter for a carburized component, and a consistent understanding of its meaning across various functions (e.g., design, heat treating, quality engineering) is equally important. The effective case depth is defined as the distance from the finished tooth surface to a specific subsurface hardness value. It has been defined for a carburized and hardened gear in American Gear Manufacturers Association (AGMA) Information Sheet 923-B05. The effective case depth is measured normal to the finished gear surface up to a location where the hardness number is 50 HRC, measured by converting from microhardness test results.

Case depth is a very important parameter in producing a gear that can withstand a sustained applied load. The optimum case depth is a fine balance between pitting propensity at the lower case depth to brittle tooth cracking/fracture at the higher case depth. Variations in hardness and effective case depth (measured at 50 HRC) at the pitch line, root land, and root fillet for an 8620H steel gear are presented.