

11.D10 We are asked to determine the maximum diameter possible for a cylindrical piece of 4140 steel that is to be quenched in moderately agitated oil such that the microstructure will consist of at least 80% martensite throughout the entire piece. From Figure 11.14, the equivalent distance from the quenched end of a 4140 steel to give 80% martensite (or a 50 HRC hardness) is 16 mm (5/8 in.). Thus, the quenching rate at the center of the specimen should correspond to this equivalent distance. Using Figure 11.17(b), the center specimen curve takes on a value of 16 mm (5/8 in.) equivalent distance at a diameter of about 50 mm (2 in.).