

Heat Treatment of Steels

11.D6 A 38-mm (1-1/2 in.) diameter steel specimen is to be quenched in moderately agitated oil. We are to decide which of five different steels will have surface and center hardnesses of at least 50 and 40 HRC, respectively.

In moderately agitated oil, the equivalent distances from the quenched end for a 38 mm diameter bar for surface and center positions are 5 mm (3/16 in.) and 12 mm (15/32 in.), respectively [Figure 11.17(b)]. The hardnesses at these two positions for the alloys cited (as determined using Figure 11.14) are given below.

<u>Alloy</u>	<u>Surface Hardness (HRC)</u>	<u>Center Hardness (HRC)</u>
1040	40	24
5140	53	42
4340	57	55
4140	56	53
8640	55	48

Thus, alloys 4340, 4140, 8640, and 5140 will satisfy the criteria for both surface and center hardnesses.