The effect of boronizing on commercial H320LA steel sheets of 1 mm and 2 mm thickness was evaluated. The boronizing treatments were carried out in a solid medium at 1173 K for 5 h using the powder pack method. The boride layers formed on the surface were characterized and microhardness measurements were conducted on the borides and the substrate. Mechanical properties and deformation behavior were compared by bending, tensile, deep drawing and ballistic tests. The ballistic behavior was evaluated impacting against lead alloy core projectiles of 358 ± 12 m/s velocity at normal impact angle. The microhardness of the boride layers was approximately 1225-1455 HV0.1. Bend tests revealed a sharp decrease in flexural strengths of the boronized specimens. Deep drawability was impaired, while ballistic properties of the plates were improved with boronizing treatment due to improved surface hardness.