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## NOTABLE

### What You Need to Know About Hot Forming

Over the past few years, there has been a tremendous growth in the amount of advanced high-strength steel and ultra high-strength steel in the auto industry driven primarily by a need to achieve lighter weight structures without sacrificing strength. However, one of the issues related to these materials—especially UHSS—is that forming them can be troublesome due to springback issues. Consequently, as Antonio Rotunno, director of Technical Services, Prima North America ([prima-na.com](http://prima-na.com)), points out that there is the use of hot-forming to ameliorate this problem on boron steels. This process is performed, he says, at temperatures above the austenitic region (1,652° to 1,742°F) and that the material achieves tensile strengths above 1,300 MPa following quenching in the die.

According to Rotunno, there are two approaches to hot stamping: direct and indirect. In the former, blanks are preheated in a furnace for approximately 4-10 minutes, then stamped and cooled within the die set. The part leaves the press at about 302°F. It has an ultimate tensile strength of 1,400-1,600 MPa, and a yield strength between 1,000 and 1,200 MPa.

In the indirect process, the part is drawn to up to 95% of its final shape, then heated in a furnace and formed in a second press. This provides the means by which more complex shapes can be achieved. Either way, an issue that exists is performing post-process work on these exceedingly hard parts. Rotunno suggests that lasers provide an ideal means to get the job done. For example, using a 5-kW laser with a nitrogen assist gas provides the ability to achieve cutting speeds of these steels in excess of 780 ipm with a positioning accuracy of 0.001 in., which is certainly well within cycle time and accuracy requirements for parts that are often made with these steels, such as B-pillars. What's more, because nitrogen is an inert gas, there is no oxidation on or at the laser-cut surface, which means the part is ready for welding or painting without any secondary prep operations.



Advanced high-strength steel and ultra high-strength steel parts can be hard to cut—but a laser can handle it.