

NHTSA Adopts a Final Rule for Ejection Mitigation, FMVSS 226

By Bradley W. Petersen

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Twenty-two years after beginning rulemaking efforts to reduce ejections of occupants in side impact and rollover crashes, the National Highway Traffic Safety Administration (NHTSA) adopted FMVSS 226, which the agency estimates will result in 373 fewer deaths per year at a cost of more than \$500 Million. 76 Fed. Reg. 12, 3212 (2011). To put this in perspective, NHTSA estimates that increasing seatbelt usage rates to 90 percent would result in 1,652 fewer deaths per year—more than four times as effective as FMVSS 226—with a cost of \$0. DOT HS 811 140. Further, the technology manufacturers will use to meet FMVSS 226 already exists: side-impact- and rollover-initiated side curtain airbags, which Ford Motor Company introduced in 2002 and have spread to other manufacturers and models.

Background

In 1988, NHTSA initiated efforts regarding ejection mitigation by issuing proposed rulemaking under the hypothesis that advanced glazing, combining layers of glass and plastic or polymer, could be a countermeasure. 53 Fed. Reg. 161, 31712 (1988). NHTSA found that more than 90 percent of all ejection fatalities were unbelted occupants and grew concerned that advanced glazing could increase injuries to belted occupants. “Ejection Mitigation Using Advanced Glazing,” NHTSA Final Report (2001). So, after a decade or more of work, NHTSA terminated rulemaking, stating, “there is no reasonable possibility of proposing

regulatory requirements for advanced glazing in the foreseeable future due to safety and cost concerns.” 67 Fed. Reg. 117, 41365 (2002). NHTSA noted that the advent of side curtain airbags would shift its focus to “more comprehensive, performance-based test procedures.” *Id.* Then, in 2009, NHTSA issued new rulemaking, focusing on performance requirements and side curtain airbags. 74 Fed. Reg. 230, 6310 (2009). After another year of research and analysis, NHTSA adopted FMVSS 226.

FMVSS 226

FMVSS 226 applies to the side windows in the first three rows of seats (and part of the cargo area) in most passenger vehicles up to a certain weight rating, except for exempt modified vehicles and convertibles. Because FMVSS 226 is a performance, not a materials, standard, it does not require a specific countermeasure. However, NHTSA anticipates manufacturers will meet the standard with side-impact- and rollover-initiated side curtain airbags, possibly supplemented with advanced glazing. Advanced glazing cannot be used alone in moveable windows.

As to testing, NHTSA rejected dynamic testing in favor of laboratory testing stating, “Rollover crashes can be complex and unpredictable. At this time there is no conventional rollover scenario or test representative of real-world rollover crashes that can be used in a dynamic test to the agency’s satisfaction to evaluate the performance of ejection

mitigation countermeasures.” FMVSS 226 testing uses a 40-pound impact device with a headform on the end to impact the countermeasure at up to four points around the perimeter of each window opening. The specific test points depend on the geometry and may be eliminated if there is overlap. For each point, there may be two tests at different times and different speeds to account for long duration rollover crashes, wherein occupants can be ejected early or late.

In the first test, if the manufacturer chooses, glazing may be left in place but must be pre-broken because NHTSA assumes glass will break early in a crash. Then, at 1.5 seconds after deployment of any airbag, the countermeasure must be impacted at 12.5 MPH. Assuming the manufacturer uses an airbag, the manufacturer must remove moveable glazing for a second test because NHTSA has no confidence it would survive a multiple impact crash. Then, at 6 seconds after deployment, the airbag

must be impacted at 10 MPH. If a manufacturer uses glazing without an airbag, an option only for a fixed window, the performance standard is less demanding and simply requires passing the first test with the glass pre-broken. To pass FMVSS 226, the countermeasure must be robust enough to pass all impact tests without allowing more than 4 inches of excursion beyond the window plane.

NHTSA has not tested the full population of countermeasures. Of those tested, many passed in some but not all locations. Later models performed better than early models. Results indicate that technology is advancing on its own but will need to advance further to meet FMVSS 226.

Manufacturers also must provide monitoring systems and written information relevant to countermeasures. FMVSS 226 requirements will be phased-in, requiring full compliance by 2017 except for certain modified vehicles.



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