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I. Executive Summary

The starter interlock requirement of Federal Motor Vehicle Safety Standard (FMVSS) No. 102 (presently at S3.1.3) states “the engine starter shall be inoperative when the transmission shift lever is in a forward or reverse drive position.” The purpose of this requirement is to prevent injuries and death from the unexpected motion of a vehicle when the driver starts the vehicle with the transmission inadvertently in a forward or reverse gear. Two recently introduced vehicles, the Toyota Prius and the Honda Insight, are powered by hybrid/electric systems (the Toyota Hybrid System (THS) and Honda’s Idle-stop Technology (IST)) that permit their gasoline engines to stop and restart automatically while the

transmission shift lever is in a drive position.

Each manufacturer requested us to interpret S3.1.3 as it applied to these new vehicles. In interpretation letters to Toyota (November 1, 1999) and Honda (January 17, 2001), we concluded that S3.1.3 would not prohibit either system. In each case we based our interpretations on a finding that the system met S3.1.3’s underlying purpose of ensuring that the vehicle will not lurch forward or backward during driver activation of the engine starter because driver activation of the engine starter is inoperative when the transmission shift lever is in a drive position. We also noted that these new systems were more complex than those on vehicles that existed when S3.1.3 was first adopted, and that we planned to conduct rulemaking to update the requirements of FMVSS No. 102. Pending completion of the rulemaking, we stated that we would interpret S3.1.3 as requiring that *driver activation* of the engine starter must be inoperative when the transmission shift lever is in a forward or reverse drive position.

This notice proposes to amend S3.1.3 to accommodate these new technologies, while preserving the safety purpose of the standard. With respect to vehicles with automatic transmissions, the agency proposes that, after activation of the vehicle’s propulsion system by the driver, the engine may stop and restart automatically when the transmission shift lever is in any forward drive gear.

We also propose to permit the engine to start and stop automatically when the transmission shift lever is in Reverse, but only if the vehicle’s propulsion system provides, at least, a minimum creep force in Reverse when the engine is stopped, the accelerator is released and the propulsion system is activated. In vehicles whose engines automatically start and stop in Reverse, creep force is a force that must be overcome by driver braking even when the engine is not running. Creep force is significant relative to rearward motion in that it serves to warn drivers of impending rearward motion before the driver fully releases the brake (as does an internal combustion engine (ICE) automatic transmission only vehicle with the engine running).

In ICE automatic transmission only vehicles, creep force is the motive force applied to the vehicle by the idling engine and automatic transmission whenever the transmission shift lever is in a drive position. Creep force occurs in the direction indicated by the automatic transmission shift lever position and provides enough force to

cause motion of a vehicle loaded to its Gross Vehicle Weight Rating (GVWR) on a level, paved surface before the service brake pedal is completely released. Although not required by the Federal Motor Vehicle Safety Standards, creep force exists on virtually all vehicles powered by ICE engines and equipped with automatic transmissions.

To measure creep force, we propose a test procedure that will be applicable to any vehicle whose propulsion system provides for automatic stopping and restarting when the transmission is in Reverse.

II. What Is the Safety Need for This Rulemaking?

This rulemaking addresses the starter interlock requirement in S3.1.3 of FMVSS No. 102, which currently states that the engine starter shall be inoperative when the transmission shift lever is in a forward or reverse drive position. The requirement was adopted as part of the original standard in 1968 for the purpose of preventing injuries and death from the unexpected surging of a vehicle forward or rearward in cases where the driver starts the vehicle while its transmission is inadvertently in a forward or reverse drive gear.

The development of the Toyota Hybrid System (THS) used on the Prius introduced a low emission, fuel saving propulsion system that, by design, allows the engine to stop and restart automatically while the transmission shift lever remains in a drive position. The design of the THS satisfies the concern addressed in S3.1.3, that the driver not be able to activate the engine starter when the transmission shift lever is in a forward or reverse drive position; however, the THS design is not in compliance with S3.1.3’s literal meaning. Until the development of the THS, it was not necessary for S3.1.3 to differentiate between driver activation and automatic activation of the engine starter as the driver always activated the starter.

In response to a request by Toyota regarding the Prius, NHTSA issued an interpretation letter of November 1, 1999, in which we ruled that S3.1.3 applied to the driver’s activation of the engine starter when the transmission shift lever is in a forward or reverse drive position, not to automatic activation of the engine starter. The THS raised no other FMVSS No. 102 issues. From a driver’s perspective, the THS/Prius operates like an ICE automatic transmission only vehicle. The engine stopping and restarting mode is in effect in both forward and reverse drive gears, and regardless of whether the gasoline engine or the electric motor is powering