



DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

[Docket No. NHTSA-2016-0127; Notice 2]

**Toyota Motor Engineering & Manufacturing North America, Inc.,
Grant of Petition for Decision of Inconsequential Noncompliance**

AGENCY: National Highway Traffic Safety Administration (NHTSA),
Department of Transportation (DOT).

ACTION: Grant of petition.

SUMMARY: Toyota Motor Engineering & Manufacturing North America, Inc., on behalf of Toyota Motor Corporation (collectively referred to as "Toyota"), has determined that certain model year (MY) 2016-2017 Lexus RX350 and RX450H motor vehicles do not fully comply with Federal Motor Vehicle Safety Standard (FMVSS) No. 302, *Flammability of Interior Materials*. Toyota filed a noncompliance information report dated November 3, 2016. Toyota also petitioned NHTSA on November 23, 2016, and provided a supplement to their petition on December 12, 2016, for a decision that the subject noncompliance is inconsequential as it relates to motor vehicle safety.

FOR FURTHER INFORMATION CONTACT: Abraham Diaz, Office of Vehicle Safety Compliance, National Highway Traffic Safety Administration (NHTSA), telephone 202-366-5310, facsimile 202-366-5930.

SUPPLEMENTARY INFORMATION:

I. Overview: Toyota has determined that certain MY 2016-2017 Lexus RX350 and Lexus RX450H motor vehicles do not fully comply with paragraph S4.2 of FMVSS No. 302, *Flammability of Interior Materials* (49 CFR 571.302). Toyota filed a noncompliance information report dated November 3, 2016, pursuant to 49 CFR part 573, *Defect and Noncompliance Responsibility and Reports*. Toyota also petitioned NHTSA on November 23, 2016, and provided a supplement to their petition on December 12, 2016, pursuant to 49 U.S.C. 30118(d) and 30120(h) and 49 CFR part 556, for an exemption from the notification and remedy requirements of 49 U.S.C. Chapter 301 on the basis that this noncompliance is inconsequential as it relates to motor vehicle safety.

Notice of receipt of the petition was published, with a 30-day public comment period, on April 7, 2017 in the **Federal Register** (82 FR 17076). No comments were received. To view the petition and all supporting documents log onto the Federal Docket Management System (FDMS) website at: <http://www.regulations.gov/>. Then follow the online search instructions to locate docket number "NHTSA-2016-0127."

II. Vehicles Involved: Approximately 102,075 MY 2016-2017 Lexus RX350 and Lexus RX450H motor vehicles manufactured between September 29, 2015 and October 21, 2016, are potentially involved.

III. Noncompliance: Toyota explains that the noncompliance is that the front and rear seat covers and rear center armrest assemblies, in the subject vehicles, were manufactured with needle punch felt material that does not meet the burn rate requirements as specified in paragraphs S4.2 and S4.3 of FMVSS No. 302.

IV. Rule Requirements: Paragraphs S4.2 and S4.3(a) of FMVSS No. 302 includes the requirements relevant to this petition:

- Any portion of a single or composite material which is within 13 millimeters (mm) of the occupant compartment air space shall meet the requirements of paragraph S4.3.
- When tested in accordance with paragraph S5, material described in paragraphs S4.1 and S4.2 shall not burn, nor transmit a flame front across its surface, at a rate of more than 102 mm per minute.
- The requirement concerning transmission of a flame front shall not apply to a surface created by cutting a test specimen for purposes of testing pursuant to paragraph S5.

V. Summary of Toyota's Petition: Toyota described the subject noncompliance and stated its belief that the noncompliance is inconsequential as it relates to motor vehicle safety.

Toyota provided the following description of the construction of the front and rear seats related to the subject noncompliance. The front and rear seats in the subject vehicles are constructed of several layers of soft material mounted on a steel seat frame. The layers of soft material include a leather or synthetic leather seating surface with a cover pad laminated or laminated and sewn underneath, and a needle punch felt

material attached to a seat cushion foam pad. The leather or synthetic leather surface, the cover pad, and the needle punch felt material together are referred to as the cover subassembly. The needle punch felt material is used to attach the cover subassembly to the foam pad. Depending on the vehicle specification, the seat assembly may or may not contain a seat heater, which is constructed of a urethane pad and attached light gauge wire acting as the heating element. The seat back construction is identical to the construction of the seat cushion. The rear seat assembly also includes a center armrest assembly that is covered with an armrest cover sub-assembly. Depending on the vehicle's specification, the armrest may or may not include a storage bin inside the center armrest. The needle punch felt is the only material that does not comply with FMVSS No. 302 requirements.

In support of its petition, Toyota submitted the following reasoning:

1. The needle punch felt material complies with FMVSS No. 302 when tested as a "composite" as installed in the vehicle, i.e., along with the surrounding FMVSS No. 302 compliant seat cover, cover pad, foam pad, seat heater, carpet, and storage bin.

2. Toyota testing and design review of the seat heater and its components indicate that the chance of fire or flame induced by a malfunctioning seat heater is essentially zero.
3. The non-complying needle punch felt material would normally not be exposed to open flame or an ignition source (like matches or cigarettes) in its installed application, because it is installed within or completely covered by complying materials that meet FMVSS No. 302.
4. The needle punch felt material is a very small portion of the overall mass of the soft material portions comprising the entire seat assembly and is significantly less in relation to the entire vehicle interior surface area that could potentially be exposed to flame. Therefore, it would have an insignificant adverse effect on interior material burn rate and the potential for occupant injury due to interior fire.
5. Toyota is not aware of any data suggesting that fires have occurred in the field due to the installation of the non-complying needle punch felt material.
6. In similar situations, NHTSA has granted petitions for inconsequential noncompliance relating to FMVSS No. 302 requirements.

Toyota provided details of the above reasoning which are described below.

1. Composite Test Conditions

To emulate the potential real world conditions that could occur to the relevant soft material portions of the front and rear seats as they are assembled into the subject vehicles, Toyota conducted FMVSS No. 302 burn testing of the seating materials when assembled as a "composite." Toyota chose locations to evaluate that were judged to potentially be the least flame resistant to be the most conservative in determining material performance.

Toyota determined synthetic leather to be the least flame resistant surface material to test based on review of the material construction as well as "composite" FMVSS No. 302 evaluations performed on the cover subassembly itself. According to Toyota, natural leather made from cow skin contains collagen fibers which are a non-flammable material. Synthetic leather is constructed of flammable urethane resin and polyester fibers which are treated with a flame retardant to achieve flammability requirements.

To identify the potentially least flame resistant "composite" sample locations to evaluate, Toyota did a thorough design review and "composite" testing of the cover assemblies according to FMVSS No. 302 procedures. Toyota tested the cover subassembly for the seat back and cushions at 21 different locations where needle punch felt is used. All locations met FMVSS No. 302 criteria; however, the three locations with the fastest burn

rate were selected for further testing as assembled in the subject vehicles. These locations were tested under various conditions simulating open flame exposure inside the vehicle. The conditions examined included those where the top leather and cover pad layers of the cover subassembly are torn and where the needle punch felt is exposed to direct flame. The samples were tested in their installed condition; however, in locations where the seat foam is part of the "composite," only the portion which is within the 13 mm of the occupant airspace specified by the standard was tested. When applicable, the seat heater was included in the "composite" in its "OFF" condition.

Toyota provided test results under eight different test conditions. In all test conditions, the samples exhibited burn rates well within the FMVSS No. 302 S4.3(a) requirements (i.e., no more than 102 mm/min), therefore meeting the FMVSS No. 302 criteria. Toyota provided the following table summarizing the test results.

Table 3. "Composite" Test Result Summary

Part	Location	Seat Heater	Test Condition Burn Rate, mm/min								FMVSS 302 Result
			1	2	3	4	5	6	7	8	
Non F-Sport Fr Cushion & Back	C	without	25	29	N/A	22					ALL PASS
		with	23	56		59					
	K	without	46	53		40					
		with	38	68		59					
All Rr Back	U		37	33	45	N/A					

F-Sport Fr Cushion	C-C	N/A		0	5		
All Rr Armrest	A-A					34	N/A
	B-B					N/A	42

[] = Test condition is not relevant to the "composite" sample

Toyota stated that based on the test results shown in the table above, the needle punch felt material complies with FMVSS No. 302 when tested as a "Composite" as installed in the vehicle, i.e., along with the surrounding FMVSS No. 302 compliant cover sub-assembly parts, foam pad, seat heater, or storage bin. Toyota stated that the non-complying needle punch felt material would not be exposed to open flame or an ignition source (like matches or cigarettes) in its installed application, because it is within or completely covered by complying materials that meet FMVSS No. 302. Toyota further opined that given that the purpose of FMVSS No. 302 is to "reduce the deaths and injuries to motor vehicle occupants caused by vehicle fires, especially those originating in the interior of the vehicle from sources such as matches or cigarettes," it believes that the noncompliant needle punch felt material as installed in the vehicle does not present a safety risk, and the chance of fire or flame propagation is essentially zero.

2. Risk of the Seat Heater Element as an Ignition Source

In order to evaluate any potential risk associated with the seat heater element as an internal ignition source, Toyota stated that it conducted a design review and tests. Toyota provided the following findings of the review and tests:

- a. In all locations, the needle punch felt material never comes in direct contact with a seat heater element wire.
- b. The seat heater system has a self-diagnosis function. At ignition "ON," a system self-diagnosis check is performed to confirm that the switch, which consists of a relay and an IPD (Intelligent Power Device), is operating properly. If the diagnosis detects a fault in the relay and/or the IPD, the system would not allow the seat heater to be turned on. In the unlikely event both the relay and the IPD fail and are stuck in the open position after the self-diagnosis, each seat heater's temperature is still regulated by its thermostat. Under normal design operating conditions, the thermostat restricts the temperature of the element wire in a range of approximately 50°C to 100°C, depending on the specific application. This temperature range is far below the auto-ignition temperature of the needle punch felt, which is approximately 253°C.
- c. The seat heater element wire used in the subject vehicle is of a design which eliminates the potential for

localized "hot spots." The heating element wire is comprised of multiple individual filaments insulated from each other by urethane coating. The filaments are connected to each other in parallel rather than in series. In the event that one or more of the filaments are damaged, there is no change in current through the seat heater wire, and therefore no increase in temperature.

Given the findings from the evaluation of the seat heater and its components, Toyota believes that the chance of an ignition internal to the seat induced by a malfunctioning seat heater is essentially zero, and no safety risk is presented.

3. Exposure of the Needle Punch Felt Material

Toyota stated that the needle punch felt material is one of several layers of the soft material of the seats which is used for securing components together, improving appearance, and reducing noise. Toyota stated that for all seating areas the needle punch felt material is either encased between or covered by other materials which themselves comply with FMVSS No. 302 requirements.

Toyota explained the construction of the seat cover subassembly as follows: In the vast majority of applications, the needle punch is encased by other FMVSS No. 302 materials. A typical construction consists of the leather seating surface on

which an occupant sits. A cover pad is glued to the underside of the leather. The cover and cover pad each comply with FMVSS No. 302. The needle punch felt is sewn to the cover pad assembly, and when so equipped, a layer of seat heater material is attached to the underside, forming a cover sub-assembly. The seat heater complies with FMVSS No. 302 requirements. The cover sub-assembly is then tightly secured over the seat cushion pad foam or seat back pad foam to the seat structure with "hog" rings. The seat cushion and seat back foam each comply with FMVSS No. 302 requirements. When so secured, no portion of the needle punch felt material is visible or directly exposed to the occupant compartment.

Toyota stated that as constructed, it would be highly unlikely that the needle punch felt material would ever be exposed to ignition sources such as matches or cigarettes, identified in S2 of FMVSS No. 302 as a stated purpose of the standard. Toyota stated that because the needle punch felt is completely surrounded by FMVSS No. 302 compliant material, it would be extremely unlikely that a vehicle occupant would ever be exposed to a risk of injury as a result of the noncompliance.

4. Proportion of the Needle Punch Felt Material Relative to the Other Soft Material in the Seat

According to Toyota, the needle punch felt material comprises up to approximately 0.32 percent of the total mass of the soft

material of the front seat assembly, and between 0.48 percent and 0.55 percent of the total mass of the soft material of the rear seat assembly. Toyota noted that the needle punch felt material is only a very small part of the overall mass of the soft material comprising the entire seat assembly and is significantly less in relation to the entire vehicle interior surface area that could potentially be exposed to flame. Toyota stated that therefore, it would have an insignificant adverse effect on the interior material burn rate and the potential for occupant injury due to interior fire.

5. Field Events Involving the Needle Punch Felt Material

Toyota stated that there are no known field events involving ignition of the needle punch felt material as of November 22, 2016. Toyota is not aware of any fires, crashes, injuries or customer complaints involving this component in the subject vehicles.

6. Previous NHTSA Grants of Petitions for Inconsequential Noncompliance

Toyota noted that NHTSA has previously granted at least nine FMVSS No. 302 petitions for inconsequential noncompliance, one of which was for a vehicle's seat heater assemblies, one of which was for a vehicle's console armrest, one of which was for large truck sleeper bedding, and six of which were for issues related to child restraints. (For a full list along with

summaries of the petitions that Toyota references please see Toyota's petition.)

Toyota stated that they have made improvements that were implemented as of October 21, 2016, to assure that any new vehicle sold by Toyota will meet all FMVSS No. 302 requirements.

In a supplemental letter dated December 12, 2016, Toyota notified NHTSA that Transport Canada (TC) had determined this noncompliance to be inconsequential. TC concluded "there is no real or implied degradation to motor vehicle safety" presented by the noncompliance with Canada Motor Vehicle Safety Standard (CMVSS) 302. Toyota Canada, Inc. stated that no further notification or remedy action is required.

Toyota concluded by expressing the belief that the subject noncompliance is inconsequential as it relates to motor vehicle safety, and that its petition to be exempted from providing notification of the noncompliance, as required by 49 U.S.C. 30118, and a remedy for the noncompliance, as required by 49 U.S.C. 30120, should be granted.

NHTSA'S DECISION:

NHTSA'S Analysis: NHTSA has reviewed Toyota's analyses that the subject noncompliance is inconsequential to motor vehicle safety. NHTSA considered several factors specific to this petition and agrees that the failure of the needle punch felt

material to comply with FMVSS No. 302 is inconsequential to safety in this case:

1. The needle punch felt material in the subject vehicles is covered by other materials that do comply with FMVSS No. 302 thus, the needle punch felt material is protected from the occupant compartment where it could directly come into contact with an ignition source such as a match or cigarette.
2. With respect to the ignition risk associated with the seat heater, in the subject vehicles, NHTSA considered several factors before agreeing that the failure of the needle punch felt material, to comply with FMVSS No. 302, is inconsequential to safety. In its evaluation, NHTSA relied on the information Toyota provided about the seat heater. First, the needle punch felt material never comes into direct contact with the seat heater element wire; second, the wire design has multiple built in safety shut off components; and third, the heater element is designed to prevent hot-spots. These design factors restrict the temperature range of the seat heater element wire to 50°C - 100°C. Since this temperature restricted range is far below the ignition temperature of the needle punch felt material, 253°C as cited by Toyota, it is highly unlikely for the noncompliant material to become ignited by the seat heater.

3. When the needle punch felt material is tested as a composite with the FMVSS No. 302 compliant materials (i.e. seat cover, cover pad, foam pad, seat heater, carpet, and storage bin), that cover the punch felt material, in accordance with the procedures of FMVSS No. 302, the requirements for burn rate are met accordingly. Toyota provided composite test data representing eight worst case scenarios for which they collected FMVSS No. 302 test results. The test data provided showed the maximum burn rate was 68 mm per minute, therefore each of the tests performed met the burn rate requirements of 102 mm per minute.
4. The noncompliant material is approximately 0.32 percent of the total mass of the soft material of the front seat assembly and between 0.48 percent and 0.55 percent (less than 1 percent) of the total mass of the soft material of the rear seat assembly. Therefore, the noncompliant material represents an insignificant quantity of material compared to the total quantity of interior vehicle material. In addition, this insignificant quantity of material is covered by other materials, all together forming a composite material that meets the standard.
5. In an e-mail dated February 20, 2018, Toyota stated that they conducted a review of field information and confirmed that as of February 8, 2018, Toyota was still not aware of any fires,

crashes, injuries or customer complaints involving this component in the subject vehicles.

6. As Toyota mentioned, the agency has granted previous petitions with similar noncompliances for FMVSS No. 302.

The agency is providing comments for:

i) Ford (63 FR 40780, July 30, 1998). Vehicle console

armrests: In Ford's petition a non-compliant center console armrest "plus pad" was determined to be inconsequential to safety in that it was located under an exterior cover. Similarly to Toyota's petition, the needle felt punch material is under exterior components covering it that meet FMVSS No. 302 flammability requirements.

ii) Toyota (80 FR 4035, January 26, 2015). Vehicle seat

heaters: The agency had concluded, the noncompliance in certain MY 2012-2014 Toyota Camry, Avalon, Corolla, Sienna, Tundra, and Tacoma motor vehicles to be inconsequential to motor vehicle safety, in part, because the non-complying seat heaters would normally not be exposed to open flame or an ignition source in its installed application and because they were installed within and surrounded by complying materials that meet FMVSS No. 302.

NHTSA's Decision: In consideration of the foregoing, NHTSA finds that Toyota has met its burden of persuasion that the subject FMVSS No. 302 noncompliance in the subject vehicles is inconsequential to motor vehicle safety. Accordingly, Toyota's petition is hereby granted and Toyota is consequently exempted from the obligation of providing notification of, and a free remedy for, that noncompliance under 49 U.S.C. 30118 and 30120.

NHTSA notes that the statutory provisions (49 U.S.C. 30118(d) and 30120(h)) that permit manufacturers to file petitions for a determination of inconsequentiality allow NHTSA to exempt manufacturers only from the duties found in sections 30118 and 30120, respectively, to notify owners, purchasers, and dealers of a defect or noncompliance and to remedy the defect or noncompliance. Therefore, this decision only applies to the subject vehicles that Toyota no longer controlled at the time it determined that the noncompliance existed. However, the granting of this petition does not relieve vehicle distributors and dealers of the prohibitions on the sale, offer for sale, or introduction or delivery for introduction into interstate commerce of the noncompliant vehicles under their control after Toyota notified them that the subject noncompliance existed.

Authority: (49 U.S.C. 30118, 30120: delegations of authority at 49 CFR 1.95 and 501.8)

Claudia W. Covell,

Acting Director, Office of Vehicle Safety Compliance.

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