

Technical Report

DKR-AUT-GNR-2020-029

**Uniform Provisions Concerning The Approval Of;
Motor Vehicles Having At Least Four Wheels With Regard To Their Sound Emissions**

Test standard
ECE Regulation 51
Level of amendment
03 Series, Supplement 1
(08.10.2016)

Approval Status	
<input type="checkbox"/>	Granting of a type approval:
<input type="checkbox"/>	Extension to type approval number:
<input type="checkbox"/>	Correction to type approval number:
<input checked="" type="checkbox"/>	Only test report:

1 General

- 1.1 Make: NISSAN
- 1.2 VIN Number VSKCTND23U0027260
- 1.3 Commercial description: NAVARA 4X4
- 1.4 Category of vehicle: N1
- 1.5 Applicant of testing: DELTA Plastik Makine San. Ve Tic. Ltd. Şti.
Sümer Mah. 30.Sokak No:29
TR-Zeytinburnu / İstanbul

1.7 Equipment for measuring and testing

Parameter of the test area 27 °C,
%45 Humidity and clean

1.8 Calibration Equipments

Test Instrument	Type	Manufacturer	ID - No.	
Noise meter	2250	Brel&Kjaer	AUTO-07	<input checked="" type="checkbox"/>
Tape measure	--	FISCO	AUTO-015	<input checked="" type="checkbox"/>
Anomometer	20032316141200	Benetech	AUTO-06	<input checked="" type="checkbox"/>
Tyre pressure	--	CEM	AUTO-10	<input checked="" type="checkbox"/>
Humidity&Temp. Meter	--	CEM	AUTO-08	<input checked="" type="checkbox"/>

LIST OF ANNEXES

Annex	No of Pages	Subject
1	--	--
2	--	--

TEST SPECIFICATION AND WORST CASE RATIONALE

There is not any worstcase scenario. That report had been prepared according to applicant demand. There are engine air filter and that report show how is the result with that product according to regulation rules.

Test required

- Vehicle inspection
- Visual inspection

MANUFACTURER'S DOCUMENTATION

Manufacturer's documentation is complete and reflects the agreed specification for the component tested and covers all variants and versions agreed in the worse case rationale

Not applicable

Vehicle Category	Vehicles used for the Carriage of Passengers	Limit Values (dB(A))		
		Phase 1	Phase 2	Phase 3
M ₁	PMR ≤ 120	72	70	68
	120 < PMR ≤ 160	73	71	69
	PMR > 160	75	73	71
	PMR > 200, no. of seats ≤ 4, R-point height < 450mm from the ground	75	74	72
M ₂	M ≤ 2.5t	72	70	69
	2.5t < M ≤ 3.5t	74	72	71
	M > 3.5t; P _n ≤ 135kW	75	73	72
	M > 3.5t; P _n > 135kW	75	74	72
M ₃	P _n ≤ 150kW	76	74	73
	150kW < P _n ≤ 250kW	78	77	76
	P _n > 250kW	80	78	77
Vehicle Category	Vehicles used for the carriage of goods	Phase 1	Phase 2	Phase 3
N ₁	M ≤ 2.5t	72	71	69
	M > 2.5 t	74	73	71
N ₂	P _n ≤ 135kW	77	75	74
	P _n > 135 kW	78	76	75
N ₃	P _n ≤ 150kW	79	77	76
	150kW < P _n ≤ 250kW	81	79	77
	P _n > 250kW	82	81	79

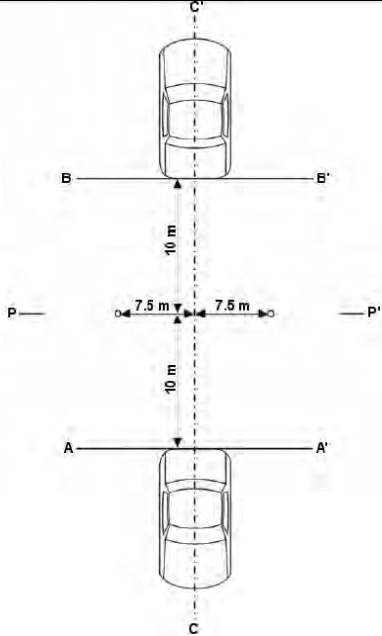
1. Test Report**Test vehicle specification and worst case rationale**

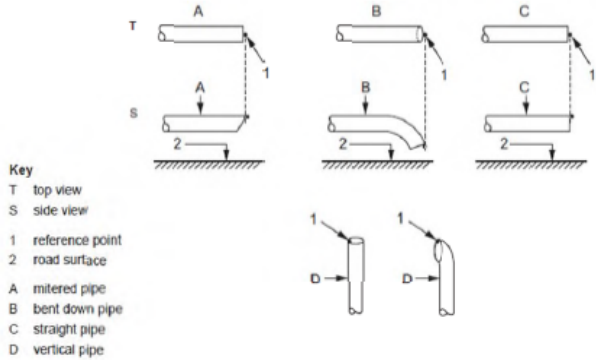
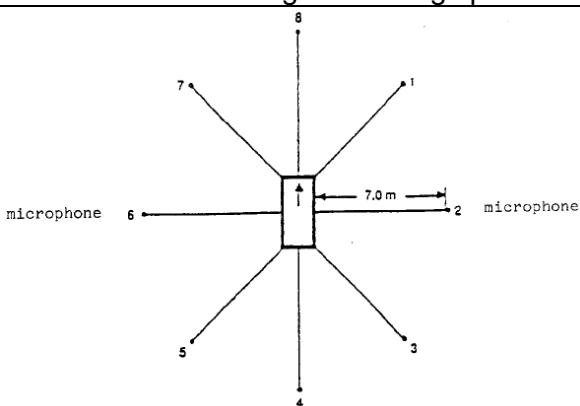
Commercial description:	NAVARA 4X4
Vehicle identification number:	VSKCTND23U0027260
Vehicle category:	N1
Dimension of the tyres:	265/40 16
Number of passenger seat:	5
Engine capacity:	2290 cc

Clause	Requirements	Results
6.	Specifcatons	
6.1.	General Specifications	
6.1.1.	The vehicle, its engine and its sound reduction system shall be so designed, constructed and assembled as to enable the vehicle, in normal use, despite the vibration to which it may be subjected, to comply with the provisions of this Regulation	Fulfilled
6.1.2.	The sound reduction system shall be so designed, constructed and assembled as to be able to reasonably resist the corrosive phenomena to which it is exposed having regard to the conditions of use of the vehicle, including regional climate differences.	Fulfilled
6.2.	Specifications Regarding Sound Levels	
6.2.1.	Methods of Measurement	
6.2.1.1.	In the case of a hybrid electrical vehicle of Category M1 where an internal combustion engine cannot operate when the vehicle is stationary, the emitted sound shall be measured according to Annex 3, Paragraph 4. Vehicles having a technically maximum permissible laden mass exceeding 2,800kg shall be subjected to an additional measurement of the compressed air noise with the vehicle stationary in accordance with the specifications of Annex 5, if the corresponding brake equipment is part of the vehicle.	Not applicable
6.2.2.1.	For vehicle types of Category M1 derived from N1 vehicle types having a technically permissible maximum laden mass above 2.5t and a R-point height greater than 850mm from the ground, the limits of vehicles types of Category N1 having a technically permissible maximum laden mass above 2.5t apply.	Not applicable
6.2.2.2.	For vehicle types designed for off-road(1) use, the limit values shall be increased by 2dB(A) for M3 and N3 vehicles category and 1dB(A) for any other vehicle category	Not applicable

6.2.2.4.	For vehicle types of Category M3 having a gasoline only engine, the applicable limit value is increased by 2dB(A).	Not applicable														
6.2.2.5.	For vehicle types of Category N1 having a technically permissible maximum laden mass of less than or equal to 2.5t, the engine capacity not exceeding 660cc and the power-to-mass ratio (PMR) calculated by using the technically permissible maximum laden mass not exceeding 35 and a horizontal distance "d" between the front axle and the driver's seat R point of less than 1,100mm, the limits of the vehicle types of Category N1 having a technically permissible maximum laden mass above 2.5t apply.	Not applicable														
Annex 3 Item 2	Conditions of Measurement															
2.1.	Test Site and Ambient Conditions															
	The meteorological instrumentation should be positioned adjacent to the test area at a height of 1.2m ± 0.02m. The measurements shall be made when the ambient air temperature is within the range from 5°C to 40°C.	Fulfilled														
	The tests shall not be carried out if the wind speed, including gusts, at microphone height exceeds 5 m/s, during the sound measurement interval.	Fulfilled														
	The background noise shall be measured for duration of 10s immediately before and after a series of vehicle tests.	Fulfilled														
	<table border="1"> <tr> <td><i>Difference between ambient noise and sound to be measured dB(A)</i></td> <td>10</td> <td>11</td> <td>12</td> <td>13</td> <td>14</td> <td>15</td> </tr> <tr> <td>Correction dB(A)</td> <td>0.5</td> <td>0.4</td> <td>0.3</td> <td>0.2</td> <td>0.1</td> <td>0.0</td> </tr> </table>	<i>Difference between ambient noise and sound to be measured dB(A)</i>	10	11	12	13	14	15	Correction dB(A)	0.5	0.4	0.3	0.2	0.1	0.0	
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Correction dB(A)	0.5	0.4	0.3	0.2	0.1	0.0										
2.2.	Vehicle															
	Measurements shall be made on vehicles at the test mass m_t specified according to the following table.	Fulfilled														
	Target mass, m_{target} , is used to denote the mass that N2 and N3 vehicles should be tested at. The actual test mass of the vehicle can be less due to limitations on vehicle and axle loading.	Fulfilled														

	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Vehicle Category</th> <th>Vehicle test mass</th> </tr> </thead> <tbody> <tr> <td>M₁</td> <td>$m_t = m_{t0} \pm 5\%$</td> </tr> <tr> <td>N₁</td> <td>$m_t = m_{t0} \pm 5\%$</td> </tr> <tr> <td>N₂, N₃</td> <td> $m_{target} = 50 \text{ [kg/kW]} \times P_n \text{ [kW]}$ Extra loading, m_{load}, to reach the target mass, m_{target}, of the vehicle shall be placed above the rear axle(s). The sum of the extra loading and the rear axle load in an unladen condition, $m_{ra \text{ load unladen}}$, is limited to 75% of the technically permissible maximum laden mass allowed for the rear axle, $m_{ac \text{ ra max}}$. The target mass shall be achieved with a tolerance of $\pm 5\%$. If the centre of gravity of the extra loading cannot be aligned with the centre of the rear axle, the test mass, m_t, of the vehicle shall not exceed the sum of the front axle in an unladen condition, $m_{fa \text{ load unladen}}$, and the rear axle load in an unladen condition, $m_{ra \text{ load unladen}}$ plus the extra loading, m_{load}, and the mass of the driver m_d. The test mass for vehicles with more than two axles shall be the same as for a two-axle vehicle. If the vehicle mass of a vehicle with more than two axles in an unladen condition, $m_{unladen}$, is greater than the test mass for the two-axle vehicle, then this vehicle shall be tested without extra loading. If the vehicle mass of a vehicle with two axles, $m_{unladen}$, is greater than the target mass, then this vehicle shall be tested without extra loading. </td> </tr> <tr> <td>M₂, M₃</td> <td> $m_t = m_{t0}$ The mass in running order shall be achieved with a tolerance of $\pm 10\%$. </td> </tr> <tr> <td>Incomplete M₂, M₃</td> <td> If the tests are carried with an incomplete vehicle not having a bodywork, $m_{target} = 50 \text{ [kg/kW]} \times P_n \text{ [kW]}$ is calculated in compliance with conditions above (see N₂, N₃ category), or $m_t = m_{chassisM2M3} + m_{loadM2M3} = m_{t0}$ The mass in running order shall be achieved with a tolerance of $\pm 10\%$. </td> </tr> </tbody> </table>	Vehicle Category	Vehicle test mass	M ₁	$m_t = m_{t0} \pm 5\%$	N ₁	$m_t = m_{t0} \pm 5\%$	N ₂ , N ₃	$m_{target} = 50 \text{ [kg/kW]} \times P_n \text{ [kW]}$ Extra loading, m_{load} , to reach the target mass, m_{target} , of the vehicle shall be placed above the rear axle(s). The sum of the extra loading and the rear axle load in an unladen condition, $m_{ra \text{ load unladen}}$, is limited to 75% of the technically permissible maximum laden mass allowed for the rear axle, $m_{ac \text{ ra max}}$. The target mass shall be achieved with a tolerance of $\pm 5\%$. If the centre of gravity of the extra loading cannot be aligned with the centre of the rear axle, the test mass, m_t , of the vehicle shall not exceed the sum of the front axle in an unladen condition, $m_{fa \text{ load unladen}}$, and the rear axle load in an unladen condition, $m_{ra \text{ load unladen}}$ plus the extra loading, m_{load} , and the mass of the driver m_d . The test mass for vehicles with more than two axles shall be the same as for a two-axle vehicle. If the vehicle mass of a vehicle with more than two axles in an unladen condition, $m_{unladen}$, is greater than the test mass for the two-axle vehicle, then this vehicle shall be tested without extra loading. If the vehicle mass of a vehicle with two axles, $m_{unladen}$, is greater than the target mass, then this vehicle shall be tested without extra loading.	M ₂ , M ₃	$m_t = m_{t0}$ The mass in running order shall be achieved with a tolerance of $\pm 10\%$.	Incomplete M ₂ , M ₃	If the tests are carried with an incomplete vehicle not having a bodywork, $m_{target} = 50 \text{ [kg/kW]} \times P_n \text{ [kW]}$ is calculated in compliance with conditions above (see N ₂ , N ₃ category), or $m_t = m_{chassisM2M3} + m_{loadM2M3} = m_{t0}$ The mass in running order shall be achieved with a tolerance of $\pm 10\%$.	
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2.2.3.	Before the measurements are started, the engine shall be brought to its normal operating conditions.	Fulfilled												
2.2.4.	If the vehicle is fitted with more than two-wheel drive, it shall be tested in the drive which is intended for normal road use.	Fulfilled												
2.2.5.	If the vehicle is fitted with fan(s) having an automatic actuating mechanism, this system shall not be interfered with during the measurements.	Fulfilled												
2.2.6.	If the vehicle is equipped with an exhaust system containing fibrous materials, the exhaust system is to be conditioned before the test according to Annex 4.	Fulfilled												
3.	METHODS OF TESTING													
3.1.	Measurement of Sound of Vehicles in Motion													
3.1.1.	General conditions of test	Fulfilled												
	Two lines, AA' and BB', parallel to line PP' and situated respectively 10m \pm 0.05m forward and 10 m \pm 0.05 m rearward of line PP' shall be marked out on the test runway	Fulfilled												

		
	<p>The microphone shall be located at a distance of 7.5m \pm 0.05m from the reference line CC' of the track and 1.2m \pm 0.02m above the ground.</p>	<p>Fulfilled</p>
<p>3.2.</p>	<p>Measurement of Sound Emitted by Stationary Vehicles</p>	
	<p>The microphone shall be located at a distance of 0.5m \pm 0.01m from the reference point of the exhaust pipe defined in Figure 2 and at an angle of 45° (\pm5°) to the vertical plane containing the flow axis of the pipe termination. The microphone shall be at the height of the reference point, but not less than 0.2m from the ground surface.</p>	<p>Fulfilled</p>
<p>3.2.5.3.2.1.</p>	<p>Target engine speed</p> <p>The target engine speed is defined as:</p> <p>(a) 75% of the rated engine speed S for vehicles with a rated engine speed \leq5,000min⁻¹;</p> <p>(b) 3,750min⁻¹ for vehicles with a rated engine speed above 5,000min⁻¹ and below 7,500min⁻¹;</p> <p>(c) 50% of the rated engine speed S for vehicles with a rated engine speed \geq7,500min⁻¹.</p> <p>If the vehicle cannot reach the engine speed as stated above, the target engine speed shall be 5% below the maximum possible engine speed for that stationary test.</p>	<p>Fulfilled</p>

		
Annex 5 Item 1	METHOD OF MEASUREMENT	
	The measurement is performed at microphone positions 2 and 6 according to Figure 1, with the vehicle stationary. The highest A-weighted sound level is registered during venting the pressure regulator and during ventilating after the use of both the service and parking brakes.	Fulfilled
2.	EVALUATION OF THE RESULTS	
	For all microphone positions two measurements are taken. In order to compensate for inaccuracies of the measuring equipment, the meter reading is reduced by 1dB(A), and the reduced value is taken as the result of measurement.	Fulfilled
	The noise during venting the pressure regulator is measured with the engine at idling speed.	Fulfilled
		
3.	LIMITING VALUE	
	The sound level shall not exceed the limit of 72dB(A).	Fulfilled

2. Test Results

Test Vehicle

Vehicle Category	N1
Technically Permissible Unladen Mass	2033 kg
Test Speed (km/h)	50 km/h
Gearbox type and gear choice	Automatic / D3
Engine Speed (rpm)	3000 rpm
Test result by motion vehicle	76 dB
Test result by stationary vehicle	81 dB
Compressed air noise	66 dB

***According to base vehicle manufacturer values, test results had been decreased 3 dB(A) with VGT system.**

3. Test place and date

TR-Istanbul 11/08/2020

4. Final Confirmation

As the result of inspections of DELTA Plastik Makine San. Ve Tic. Ltd. Şti. sample product, it has been confirmed that the sample vehicle fulfilled the requirements related to the ECE R-51.03 as given.

This report can not be multiplied without written approval of Dekra A.Ş.
That report can not be used as a homologation projects.

This technical report consists of 9 pages.

TR-Istanbul

21.08.2020



Recognized Expert
Eren AKDAĞ