China Proposal for Micro-Van and Micro-Truck

Micro-van and Micro-truck:
- GVM ≤ 2.5 ton
- R-point height ≥ 800mm from the ground
- Mid-engine and with Rear axle drive

Limit value
74dB(A)

China’s proposal is already included in the document “GRB-59-04” Paragraph 6.2.2.1.6. highlighted in red.
Contents

• Introduction of Micro-Van and Micro-Truck (Page 3)
• Definition of Micro-Van and Micro-Truck (Page 4)
• Market share of Micro-Van and Micro-Truck (Page 5-6)
• Limitation of Micro-Van and Micro-Truck (Page 7-9)
• Micro-Van and Micro-Truck have louder noise (Page 10)
• Exposed noise sources lead to louder noise (Page 11-12)
• Difficulty of adding noise shield for Micro-Van and Micro-Truck (Page 13-14)
• Sound limit value problems of Micro-Van and Micro-Truck (Page 15)
• Conclusion (Page 16)
• Reference (Page 17)
• Sidelights (Page 18)
What are Micro-Van and Micro-Truck?

- **GVM ≤ 2.5 ton**
- R-point height ≥800mm from the ground
- Mid-engine and with Rear axle drive

**M1 vehicle**
- SEDAN (front engine)
- SUV (front engine)
- MPV (front engine)
- Heavy M1 (GVM > 2.5t)

**N1 vehicle**
- Van (FF)
- Pick up (FR)
- Light truck (GVM > 2.5t)

**Micro-Van (MR)**
- GVM ≤ 2.5 ton
- R-point height ≥800mm
- Mid-engine and with Rear axle drive

**Micro-Truck (MR)**
- GVM ≤ 2.5 ton
- R-point height ≥800mm
- Mid-engine and with Rear axle drive
How to define Micro-Van and Micro-Truck?

Mid-engine: Center of gravity of engine is between the front and rear axles, and the longitudinal distance from center of front axle to center of gravity of engine $\geq 300\text{mm}$.

- Height of R-point $\geq 800\text{mm}$
- GVM $\leq 2.5\text{ ton}$
- Rear axle drive
Market share of Micro-Van and Mirco-Truck in China (2013)

Total sales of vehicles: 22 million, M1 and N1: 20 million, Micro-Van and Mirco-Truck: 2.2 million
Micro-Van and Micro-Truck usage in China

**By locations (%)**

- **Mirco-Van**
  - countryside and farms: 52%
  - between villages: 40%
  - village to town: 8%
  - Percentage (Total: 100%)

- **Mirco-Truck**
  - countryside and farms: 66%
  - between villages: 32%
  - village to town: 2%
  - Percentage (Total: 100%)

**By usage (%)**

- **Mirco-Van**
  - delivery: 44%
  - farms: 30%
  - little trade: 26%
  - Percentage (Total: 100%)

- **Mirco-Truck**
  - delivery: 54%
  - farms: 28%
  - little trade: 18%
  - Percentage (Total: 100%)
## Micro-Van Micro-Truck and other vehicles Parameters Comparison

<table>
<thead>
<tr>
<th>Model</th>
<th>SGMW Micro-Van</th>
<th>SGMW Micro-Truck</th>
<th>Renault Kangoo</th>
<th>PSA Partner</th>
<th>Japan Kei-truck</th>
<th>Piaggio Porter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picture</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
<td><img src="image5.png" alt="Image" /></td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
</tbody>
</table>

### Dimension and Weight

<table>
<thead>
<tr>
<th>Dimension and Weight</th>
<th>SGMW Micro-Van</th>
<th>SGMW Micro-Truck</th>
<th>Renault Kangoo</th>
<th>PSA Partner</th>
<th>Japan Kei-truck</th>
<th>Piaggio Porter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exterior dimension OL/OW/OH(mm)</td>
<td>3810/1510/1820</td>
<td>4250/1510/1760</td>
<td>4010/1672/1860</td>
<td>4137/1960/1800</td>
<td>3395/1475/1735</td>
<td>3390/1395/1730</td>
</tr>
<tr>
<td>Cabin dimension OL/OW/OH(mm)</td>
<td>N/A</td>
<td>2500/1430/340</td>
<td>N/A</td>
<td>N/A</td>
<td>1700/1240/235</td>
<td>1760/1270/235</td>
</tr>
<tr>
<td>Wheelbase(mm)</td>
<td>2500</td>
<td>3050</td>
<td>2600</td>
<td>2693</td>
<td>1900</td>
<td>1810</td>
</tr>
<tr>
<td>Treads(F/R)(mm)</td>
<td>1290/1290</td>
<td>1280/1290</td>
<td>1400/1415</td>
<td>1420/1440</td>
<td>N/A</td>
<td>1205/1220</td>
</tr>
<tr>
<td>Kerb mass(kg)</td>
<td>955</td>
<td>920</td>
<td>1230</td>
<td>----</td>
<td>790</td>
<td>850-1100</td>
</tr>
<tr>
<td>Gross vehicle mass (kg)</td>
<td>1575</td>
<td>1720</td>
<td>1875</td>
<td>2054</td>
<td>1140</td>
<td>1500-2200</td>
</tr>
<tr>
<td>R Point(mm)</td>
<td>895</td>
<td>845</td>
<td>691</td>
<td>711-724</td>
<td>----</td>
<td>780-800</td>
</tr>
</tbody>
</table>

### Powertrain

<table>
<thead>
<tr>
<th>Powertrain</th>
<th>SGMW Micro-Van</th>
<th>SGMW Micro-Truck</th>
<th>Renault Kangoo</th>
<th>PSA Partner</th>
<th>Japan Kei-truck</th>
<th>Piaggio Porter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displacement(ml)</td>
<td>995</td>
<td>1051</td>
<td>1598</td>
<td>1560</td>
<td>658</td>
<td>1300, 1202</td>
</tr>
<tr>
<td>Max Power(kw/rpm)</td>
<td>47.5/5600</td>
<td>38.5/5200</td>
<td>70/5000</td>
<td>66/4000</td>
<td>37</td>
<td>52/5300, 47/3500</td>
</tr>
<tr>
<td>Max Torque(N.m/rpm)</td>
<td>90/4000</td>
<td>83/3000/3500</td>
<td>130/3750</td>
<td>225/1750</td>
<td>63</td>
<td>105/4300, 140/1800</td>
</tr>
<tr>
<td>Transmission</td>
<td>5MT</td>
<td>5MT</td>
<td>5MT</td>
<td>5MT</td>
<td>5MT</td>
<td>5MT</td>
</tr>
<tr>
<td>Engine position</td>
<td>Middle</td>
<td>Middle</td>
<td>Front</td>
<td>Front</td>
<td>Front / Middle</td>
<td>Front</td>
</tr>
<tr>
<td>Drive axle</td>
<td>Rear</td>
<td>Rear</td>
<td>Front</td>
<td>Front</td>
<td>Rear</td>
<td>Rear</td>
</tr>
<tr>
<td>Tyre size</td>
<td>165 / 70 R13</td>
<td>165 / 70 R13</td>
<td>175 / 65 R14</td>
<td>185 / 65 R15</td>
<td>----</td>
<td>155/80 R13, 165/65 R 14</td>
</tr>
</tbody>
</table>

### Performance

<table>
<thead>
<tr>
<th>Performance</th>
<th>SGMW Micro-Van</th>
<th>SGMW Micro-Truck</th>
<th>Renault Kangoo</th>
<th>PSA Partner</th>
<th>Japan Kei-truck</th>
<th>Piaggio Porter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Speed(km/h)</td>
<td>120</td>
<td>105</td>
<td>164</td>
<td>154</td>
<td>104</td>
<td>130</td>
</tr>
<tr>
<td>Payload(kg)</td>
<td>----</td>
<td>800</td>
<td>----</td>
<td>----</td>
<td>350</td>
<td>550-700</td>
</tr>
</tbody>
</table>
Chinese micro-vehicles are not designed or planned for sales in Europe, Japan or US.

- The requirements of ECE, FMVSS and EPA regulations (R13H, R127, R94, FMVSS 208, EPA Tier II, etc.) are too difficult for Micro-Van and Micro-Truck.
Over 2,180,000 Micro-Vans and Micro-Trucks were sold in 2013 globally, within this nearly 95% were sold in China, and others were sold into other Third World in Africa, South America and South East Asia. Europe, Japan and US are not our target markets.

Although Micro-vehicles are very inexpensive and with poor performance, also will not be accepted by the customers in Europe, Japan, or US, it’s really an important type of vehicle for developing areas and developing countries.
Micro-Van and Micro-Truck are typically 2 to 3 dB(A) higher than front engine type.

- Micro-Van & Micro-Truck need the 74 dB(A) limit value for phase 1 like heavy M1.

### Test Result According to R51 / 03 in China

<table>
<thead>
<tr>
<th>Vehicle Test Mass at R51 / 03 (kg)</th>
<th>R51 / 03 dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>1400</td>
<td></td>
</tr>
<tr>
<td>1600</td>
<td></td>
</tr>
<tr>
<td>1800</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>2200</td>
<td></td>
</tr>
<tr>
<td>2400</td>
<td></td>
</tr>
<tr>
<td>2600</td>
<td></td>
</tr>
</tbody>
</table>

### 2 - 3 dB Separation

- The separation between Micro-Van & Micro-Truck and heavy M1 is 2 - 3 dB.
Micro-Van and Micro-Truck noise sources are much more exposed than front engine type.

Front Engine type
GVM ≤ 2.5t

Different type

Same type
GVM ≤ 2.5 ton
R-point ≥ 800mm from the ground
Mid-engine and with rear axle drive

R ≥ 800mm
Micro-Van and Micro-Truck noise sources are much more exposed than front engine type

The majority of noise sources in Micro-Van and Micro-Truck are directly exposed, resulting in inherently louder noise.
Difficulty of adding noise shield for Micro-Van and Micro-Truck

* There is no engine-compartment for Micro-Van and Micro-Truck, and it’s impossible to cover the whole powertrain system for the purpose of reducing noise, as what front engine type does.

* Adding Noise shield will greatly reduce ground clearance, key characteristic for Micro-Van and Micro-Truck used in mountain, farm, and rural areas.

The ground clearance is about 140-155mm, adding noise shield will reduce ground clearance by 10mm, resulting in poor passing capacity.

The ground clearance and passing capacity are very important for Micro-vehicles used in mountain, farm, and rural areas.
The thermal performance of Micro-Van and Micro-Truck is not as good as front type for the reason of structure and powertrain differences, and adding noise shield will greatly reduce thermal performance.
Limit value table for special M1 / N1 category

<table>
<thead>
<tr>
<th>Sub-category</th>
<th>Figure</th>
<th>Country of Origin</th>
<th>China suggestion (GRB-55-05, GRB-56-07, GRB 57-05, GRB-58-09, GRB-59-04)</th>
<th>Limit value now (GRB/2014/5)</th>
<th>Ok?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy M1</td>
<td></td>
<td>Global</td>
<td>Support GRB</td>
<td>74</td>
<td>Ok</td>
</tr>
<tr>
<td>Micro-Van Micro-truck</td>
<td></td>
<td>China</td>
<td>74</td>
<td>72</td>
<td>NG</td>
</tr>
<tr>
<td>Kei-truck</td>
<td></td>
<td>Japan</td>
<td>Support GRB</td>
<td>74</td>
<td>Ok</td>
</tr>
</tbody>
</table>

“GRB-59-04”

6.2.2.1.6. For vehicle types of category M1 and N1 having a maximum technically permissible laden mass of less than or equal to 2.5 tons, a R-point height greater than 800mm from the ground and a mid engine with the longitudinal distance from center of front axle to center of gravity of engine≥300mm and with rear axle drive, the limits of the vehicle types of category N1 having a maximum technically permissible laden mass above 2.5 tons apply.
Conclusion

- The structure and powertrain system of Micro-Vans and Micro-Trucks are quite different from the front-engine type vehicles, which will lead to a 2-3dB(A) higher test results according to ECE R51 / 03.
- The Micro-Van and Micro-Truck need a 74dB(A) limit values for phase 1st with a cut-off nearly 15-20%.
- China suggests modify “GRB 59-04 6.2.2.1.6. For vehicle types of category M1 and N1 having a maximum technically permissible laden mass of less than or equal to 2.5 tons, a R-point height greater than 800mm from the ground and a mid engine with the longitudinal distance from center of front axle to center of gravity of engine≥300mm and with rear axle drive, the limits of the vehicle types of category N1 having a maximum technically permissible laden mass above 2.5 tons apply.”
Reference

- **GRB-55-05** - (China) Discussion for limit values to Regulation No. 51
- **GRB-56-07** - (China) Proposal of new sound limit values to the draft 03 series of amendments to UN Regulation No. 51
- **GRB-56-22** - (China) Summary of the opinions of the expert from China for the noise test method of UN Regulation No. 51
- **GRB-57-05** - (China) Common solutions for Sub-categories of M1 and N1 Categories
- **GRB-57-07** - (China) Sub-categories suggestion from China
- **GRB-58-08** - (China) Comments on Japanese limit value suggestion of commercial vehicles
- **GRB-58-10** - (China) Set of sub-categories of M1 \ N1
- **GRB-59-04-Rev.1** - (GRB Expert Group on Regulation No. 51) Proposal for the 03 series of amendments to Regulation No. 51 (Noise of M and N categories of vehicles)
Experience of driving this new vehicle type

* Experience of driving Micro-Van and Micro-Truck.

* Check the mid-engine under driver seat and the different chassis.
Thank you for your attention