Comparative Measurements of Tire/Pavement Noise in Europe and the United States – NITE I

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OBSI Workshop
TRB 89th Annual Meeting
Caltrans Data Base - California & Arizona

- Sound Intensity Level, dBA
- OG/RAC Pavements
- PCC Pavements
- DGA Pavements
NITE Project - Measurements

- Germany, France, Belgium & the Netherlands
- Test speeds
  - 97 km/h (60 mph) primary speed - 62 pavements
  - 56 km/h (35 mph) secondary speed - 33 pavements
- Test tires
  - Caltrans standard tire – Goodyear Aquatred 3
  - Alternate tire – Uniroyal Tiger Paw AWP
European Pavements at 97 km/h

Sound Intensity Level, dBA

- PA
- PCC
- DGA
- DLPA
- SMA
Caltrans Data Base - California & Arizona

- Sound Intensity Level, dBA
- OG/RAC Pavements
- PCC Pavements
- DGA Pavements
NITE Data Base at 60 mph

Sound Intensity Level, dBA

ISO 10844
NITE & CA/AZ Data Base at 35 mph

Sound Intensity Level, dBA

- All Other Roadway Pavements
- ISO 10844 Test Tracks
Coarse & Fine SMA Surfaces

8/10mm – 105.7 dBA

0.8/1.5mm – 99.7 dBA
Stone Mastic Asphalt Surfaces of Varying Aggregate Size

Sound Intensity Level, dBA

0/5mm 0/3mm 0/8mm 0/8mm 0/11mm 0/8mm 0/14mm
Coarse & Fine DGA Surfaces

0/10mm – 101.3 dBA

“Fine” – 98.4 dBA
Single Porous Layer Asphalt Surfaces of Varying Aggregate Size

Sound Intensity Level, dBA

PA 4/8mm | ISO 10844 | PA 0/10mm | PA 0/6mm | PA | PA 0/14mm
Coarse & Fine Porous AC Surfaces

“Coarse” – 103.4 dBA

0/10mm – 98.5 dBA
Examples of “Porous” AC Surfaces

4/8mm – 95.1 dBA

ISO – 98.0 dBA
Typical 2-Layer Porous Asphalt
the Netherlands

Small Aggregate Size
Coarse Aggregate Size
Double Porous Layer Asphalt Surfaces of Varying Aggregate Size

![Bar Chart](chart.png)

- **Sound Intensity Level, dBA**

<table>
<thead>
<tr>
<th>Type</th>
<th>Sound Intensity Level, dBA</th>
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<tbody>
<tr>
<td>DLPA 2/6</td>
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<td>98</td>
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<tr>
<td>DLPA 4/8</td>
<td>99</td>
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</tbody>
</table>
Coarse & Fine Top Surfaces for Double Layer Porous AC

- 4/8mm – 96.6 dBA
- 2/6mm – 94.5 dBA
Quiet Porous PCC Surfaces
Comparison of Highly Porous and Rubber Content Pavements

European Porous Pavements

CA & AZ Rubber Pavements

Sound Intensity Level, dBA

DLPA 2/6
PA 4/8
DLPA 4/8
AZ ARFC
LA 138 RAC
I-5 Crumb Rubber
NITE I Findings

- Pavements in Europe & US generally similar
- SMA surfaces similar to DGA with noise determined largely by aggregate size
- Exposed aggregate PCC's not found to be “quiet”
- More novel quieter pavements
  - Highly porous, 2-layer AC constructions
  - Ground porous PCC
- ISO 10844 test surface is on the quieter side of in use pavements