Guidelines for Local Agency Use of ODOT’s New HMA Specifications

David Miller, P.E.
Office of Pavement Engineering

February 4, 2015
ODOT Asphalt Items

- 441 Asphalt Concrete Surface Course
- 441 Asphalt Concrete Intermediate Course
- 442 Asphalt Concrete Surface Course
- 442 Asphalt Concrete Intermediate Course
- 301 Asphalt Concrete Base
- 302 Asphalt Concrete Base
ODOT Asphalt Items

- 441 Asphalt Concrete Surface Course
- 441 Asphalt Concrete Intermediate Course
- 442 Asphalt Concrete Surface Course
- 442 Asphalt Concrete Intermediate Course
- 301 Asphalt Concrete Base
- 302 Asphalt Concrete Base
441 vs. 442 Mixes

441 Surface and Intermediate
- Contractor designed mix
- Marshall mix design
- 50 to 1500 trucks per day

442 Surface and Intermediate
- Contractor designed mix
- Superpave mix design
- Greater than 1500 trucks per day*

Guidelines for Local Agency Use of ODOT's New HMA Specifications
Item 441 Asphalt Concrete Surface Course

- PG64-22 binder
- PG70-22M in certain districts
- 1” to 1.5” lift thickness
- 1.25” preferred
- Type 1 mix design properties
- 446 or 448 acceptance
Item 441 Asphalt Concrete Intermediate Course

- PG64-22 binder
- Type 1 mix design properties
  - 1” to 1.5” lift thickness
- Type 2 mix design properties
  - 1.75” to 3” lift thickness
  - 1.75” preferred
- 446 or 448 acceptance
### Asphalt Mixture Composition

<table>
<thead>
<tr>
<th>Property</th>
<th>Type 1 Surface</th>
<th>Type 1 Intermediate</th>
<th>Type 2 Intermediate</th>
</tr>
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<tbody>
<tr>
<td>1 1/2 inch (37.5 mm)&lt;sup&gt;[1]&lt;/sup&gt;</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1 inch (25.0 mm)&lt;sup&gt;[1]&lt;/sup&gt;</td>
<td>90 to 100</td>
<td>90 to 100</td>
<td>95 to 100</td>
</tr>
<tr>
<td>3/4 inch (19.0 mm)&lt;sup&gt;[1]&lt;/sup&gt;</td>
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<td>100</td>
<td>85 to 100</td>
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<tr>
<td>1/2 inch (12.5 mm)&lt;sup&gt;[1]&lt;/sup&gt;</td>
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<td>65 to 85</td>
<td>65 to 85</td>
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<td>3/8 inch (9.5 mm)&lt;sup&gt;[1]&lt;/sup&gt;</td>
<td>90 to 100</td>
<td>90 to 100</td>
<td>90 to 100</td>
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<tr>
<td>No. 4 (4.75 mm)&lt;sup&gt;[1]&lt;/sup&gt;</td>
<td>45 to 57</td>
<td>50 to 72</td>
<td>35 to 60</td>
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<td>No. 8 (2.36 mm)&lt;sup&gt;[1]&lt;/sup&gt;</td>
<td>30 to 45</td>
<td>30 to 55</td>
<td>25 to 48</td>
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<td>No. 16 (1.18 mm)&lt;sup&gt;[1]&lt;/sup&gt;</td>
<td>17 to 35</td>
<td>17 to 40</td>
<td>16 to 36</td>
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<td>No. 30 (600 μm)&lt;sup&gt;[1]&lt;/sup&gt;</td>
<td>12 to 25</td>
<td>12 to 30</td>
<td>12 to 30</td>
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<td>No. 50 (300 μm)&lt;sup&gt;[1]&lt;/sup&gt;</td>
<td>5 to 18</td>
<td>5 to 20</td>
<td>5 to 18</td>
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<td>No. 100 (150 μm)&lt;sup&gt;[1]&lt;/sup&gt;</td>
<td>2 to 10</td>
<td>2 to 12</td>
<td>2 to 10</td>
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<tr>
<td>No. 200 (75 μm)&lt;sup&gt;[1]&lt;/sup&gt;</td>
<td>5.8 to 10.0</td>
<td>5.0 to 10.0</td>
<td>4.0 to 9.0</td>
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<td>Asphalt Binder&lt;sup&gt;[2]&lt;/sup&gt;</td>
<td>1.2</td>
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<td>F/A Ratio, max.&lt;sup&gt;[3]&lt;/sup&gt;</td>
<td>+2</td>
<td>+2</td>
<td>+2</td>
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<td>F-T Value&lt;sup&gt;[4]&lt;/sup&gt;</td>
<td>50</td>
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<tr>
<td>Blows&lt;sup&gt;[5]&lt;/sup&gt;</td>
<td>1200</td>
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<tr>
<td>Stability, min., pounds&lt;sup&gt;[5]&lt;/sup&gt;</td>
<td>(5338)</td>
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<tr>
<td>Blows, min.&lt;sup&gt;[7]&lt;/sup&gt;</td>
<td>8 to 16</td>
<td>8 to 16</td>
<td>8 to 16</td>
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<tr>
<td>Flow, 0.25 mm&lt;sup&gt;[5]&lt;/sup&gt;</td>
<td>3.5</td>
<td>3.5</td>
<td>4.0</td>
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<tr>
<td>Design Air Voids&lt;sup&gt;[6]&lt;/sup&gt;</td>
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<td>VMA, min.&lt;sup&gt;[7]&lt;/sup&gt;</td>
<td>16</td>
<td>16</td>
<td>13</td>
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446 vs. 448 Acceptance

- Both methods check binder content, air voids, gradation, and maximum specific gravity
- 446 **always** requires pavement cores tested for density
- Uniform thickness lifts always required
- 448 **may** require density with nuclear gauge
- If: 1” uniform thickness, 1 mile continuous paving (minimums)
441 Pay Item Descriptions

- AC Surface Course, Type 1, (446), PG64-22
- AC Surface Course, Type 1, (446), PG70-22M
- AC Surface Course, Type 1, (448), PG64-22
- AC Surface Course, Type 1, (448), PG70-22M

- AC Intermediate Course, Type 2, (446)
- AC Intermediate Course, Type 2, (448)

- AC Intermediate Course, Type 1, (448)
Item 442 Asphalt Concrete Surface Course

- PG70-22M binder
- 9.5mm or 12.5mm nominal maximum aggregate size
- Lift thickness
  - 1” to 1.5” (9.5mm mix)*
  - 1.5” to 2.5” (12.5mm mix), 1.5” preferred
- Type A or B mix design
- 446 or 448 acceptance
Item 442 Asphalt Concrete Intermediate Course

- PG64-28 binder
- 9.5mm or 19mm nominal maximum aggregate size
- Lift thicknesses
  - 1” to 1.5” (9.5mm mix)
  - 1.75” to 3” (19mm mix), 1.75” preferred
- Type A or B mix design
- 446 or 448 acceptance
## 442 Gradations

### TABLE 442.02-2 AGGREGATE GRADATION REQUIREMENTS

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<thead>
<tr>
<th>Sieve Size</th>
<th>9.5 mm mix</th>
<th>12.5 mm mix</th>
<th>19 mm mix</th>
<th>Total Percent Passing</th>
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<td>–</td>
<td>–</td>
<td>100</td>
</tr>
<tr>
<td>3/4 inch (19 mm)</td>
<td>–</td>
<td>100</td>
<td>85 to 100</td>
<td></td>
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<tr>
<td>1/2 inch (12.5 mm)</td>
<td>100</td>
<td>95 to 100</td>
<td>90 max</td>
<td></td>
</tr>
<tr>
<td>3/8 inch (9.5 mm)</td>
<td>90 to 100</td>
<td>96 max</td>
<td>–</td>
<td></td>
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<tr>
<td>No. 4 (4.75 mm)</td>
<td>70 max</td>
<td>52 min</td>
<td>–</td>
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<tr>
<td>No. 8 (2.36 mm)</td>
<td>34 to 52</td>
<td>34 to 45</td>
<td>28 to 45</td>
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<tr>
<td>No. 200 (75 μm)</td>
<td>2 to 8</td>
<td>2 to 8</td>
<td>2 to 6</td>
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## 442 Type A and B

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<th>Lane ADTT</th>
<th>Course Aggregate Angularity</th>
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<tr>
<td></td>
<td>Type A</td>
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[1] Percent one or more fractured faces.

[2] Percent two or more fractured faces.
442 Pay Item Descriptions

- AC Surface Course, 9.5mm, Type A or B (446 or 448)*
- AC Surface Course, 12.5mm, Type A or B (446 or 448)
- AC Intermediate Course, 19mm, Type A or B (446 or 448)
- AC Intermediate Course, 9.5mm, Type A or B (448)
ODOT Asphalt Items

- 441 Asphalt Concrete Surface Course
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Asphalt Concrete Bases

**Item 301 Asphalt Concrete Base**
- ODOT mix design
- 3” to 6” lifts

**Item 302 Asphalt Concrete Base**
- Contractor mix design
- 4” to 7.75” lifts
Low Traffic Mixes

- ODOT SS 823 Light Traffic Asphalt Mixture Composition Requirements
  - Less than 50 trucks per day
  - State park roads, driveways, bike paths

- FPO 404LVT (Low Volume Traffic) Asphalt Concrete
  - Less than 2500 ADT
SS 823 Light Traffic Asphalt

- Type 1 surface course mix
- Type 1 and 2 intermediate course mixes
- Follow 441 lift thickness guidelines
- 448 acceptance only
404LVT

- Not an ODOT specification
- Cookbook recipe design
- 1” lift thickness for surface course
- Variable depth intermediate course if needed for leveling
Other Asphalt Items

- 424 Fine Graded Polymer Asphalt Concrete
- 443 Stone Matrix Asphalt Concrete
- 826 Asphalt Concrete with Fibers
- 857 Asphalt Concrete with Gilsonite
Guidelines for Local Agency Use of ODOT's New HMA Specifications
What General Category of References Are You Interested In?

The Reference Resource Center has these specialized views to help you find the documents you need based on your area of interest:

- Construction
- Engineering
- Planning

or feel free to browse through all the available files

Alphabetical Access

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DRRC List

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Guidelines for Local Agency Use of ODOT's New HMA Specifications
ODOT 2013 CONSTRUCTION & MATERIAL SPECIFICATIONS

Copies of the 2013 Construction and Material Specifications may be purchased by contacting:

Ohio Department of Transportation
Office of Contracts
1960 West Broad Street
Columbus, Ohio 43223
Telephone (614) 466-3770 or (614) 466-3200

Price: $4.50 + Shipping + tax
Make checks payable to:
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c/o Department of Transportation

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for use on mobile devices:

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## ODOT Proposal Notes, Supplemental Specifications, and Supplements

### 2013 Active Proposal Notes, Spec Book, Supplemental Specifications and Supplements

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**Guidelines for Local Agency Use of ODOT's New HMA Specifications**
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FLEXIBLE PAVEMENTS OF OHIO
An Association for the development, improvement and advancement of quality Asphalt Pavement Construction.
6205 Emerald Parkway, Suite B, Dublin, Ohio 43016
888-4HOTMIX (In Ohio), 614-791-3600, 614-791-4800 (Fax)
info@flexiblepavements.org
www.flexiblepavements.org


General
High quality pavements are the result of well engineered pavement designs, high quality input materials, proper placement procedures, accurate and complete contract specifications, and an adequate quality assurance program. The purpose of this Technical Bulletin is to introduce the various asphalt materials available for use in Ohio, to raise awareness of the information necessary to draft complete contract specifications, and to assist agencies in adopting specifications utilizing quality control and acceptance. It is not the intention of this document to supplant proven successful means of specifying asphalt pavements. However, for those agencies who desire to remain

The asphalt binder grade adopted by ODOT for medium (normal) traffic is PG 64-22. PG stands for performance grade. The numbers represent the temperatures (in degrees Celsius) for which the binder was graded to perform. The 64 stands for the average seven day maximum pavement temperature and the minus 22 stands for the minimum pavement temperature at which the pavement will perform satisfactorily.

See the “Grade of Binder” section below for additional discussion of binder grade options. A complete discussion of PG binders can be found in Asphalt Institute publication SP-1, Performance Graded Asphalt Binder Specification and Testing.
Questions?