Specifying Asphalt Pavement the ODOT Way

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Office of Pavement Engineering

Workshop on Design and Rehabilitation of Local Roadways for Ohio’s Counties

April 28, 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*
ODOT Asphalt Items

- 441 Asphalt Concrete Surface Course
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- 442 Asphalt Concrete Surface Course
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- 301 Asphalt Concrete Base
- 302 Asphalt Concrete Base
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
<table>
<thead>
<tr>
<th>Property</th>
<th>Type 1 Surface</th>
<th>Type 1 Intermediate</th>
<th>Type 2 Intermediate</th>
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<td>1 1/2 inch (37.5 mm)[1]</td>
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<tr>
<td>1 inch (25.0 mm)[1]</td>
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<tr>
<td>3/4 inch (19.0 mm)[1]</td>
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<tr>
<td>1/2 inch (12.5 mm)[1]</td>
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<td>100</td>
<td>65 to 85</td>
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<td>3/8 inch (9.5 mm)[1]</td>
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<td>90 to 100</td>
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<td>No. 4 (4.75 mm)[1]</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)[1]</td>
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<td>30 to 55</td>
<td>25 to 48</td>
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<td>17 to 40</td>
<td>16 to 36</td>
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<td>No. 30 (600 μm)[1]</td>
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<td>12 to 30</td>
<td>12 to 30</td>
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<td>5 to 20</td>
<td>5 to 18</td>
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<tr>
<td>No. 100 (150 μm)[1]</td>
<td>2 to 10</td>
<td>2 to 12</td>
<td>2 to 10</td>
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<td>No. 200 (75 μm)[1]</td>
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</tr>
<tr>
<td>Asphalt Binder[2]</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>F/A Ratio, max.[3]</td>
<td>1.2</td>
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<td>F-T Value[4]</td>
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<td>+2</td>
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<tr>
<td>Blows[5]</td>
<td>50</td>
<td>50</td>
<td>50</td>
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<tr>
<td>(N)</td>
<td>(5338)</td>
<td>(5338)</td>
<td>(5338)</td>
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<tr>
<td>Flow, 0.25 mm[5]</td>
<td>8 to 16</td>
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<td>Design Air Voids[6]</td>
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<td>3.5</td>
<td>4.0</td>
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<td>VMA, min.[7]</td>
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<td>13</td>
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446 vs. 448 Acceptance

- Both methods check binder content, air voids, gradation, and maximum specific gravity (403 acceptance)
- **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)
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<tr>
<th>Item</th>
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<tr>
<td>441</td>
<td>Asphalt Concrete Surface Course</td>
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<tr>
<td>441</td>
<td>Asphalt Concrete Intermediate Course</td>
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<td>442</td>
<td>Asphalt Concrete Surface Course</td>
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<tr>
<td>442</td>
<td>Asphalt Concrete Intermediate Course</td>
</tr>
<tr>
<td>301</td>
<td>Asphalt Concrete Base</td>
</tr>
<tr>
<td>302</td>
<td>Asphalt Concrete Base</td>
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</tbody>
</table>
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

Specifying Asphalt Pavement the ODOT Way
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

Specifying Asphalt Pavement the ODOT Way
### 442 Gradations

#### TABLE 442.02-2 AGGREGATE GRADATION REQUIREMENTS

<table>
<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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<tr>
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<td></td>
<td>100</td>
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<tr>
<td>3/4 inch</td>
<td></td>
<td>100</td>
<td>85 to 100</td>
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<tr>
<td>1/2 inch</td>
<td>100</td>
<td>95 to 100</td>
<td>90 max</td>
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<tr>
<td>3/8 inch</td>
<td>90 to 100</td>
<td>96 max</td>
<td></td>
<td></td>
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<tr>
<td>No. 4</td>
<td>70 max</td>
<td>52 min</td>
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<tr>
<td>No. 8</td>
<td>34 to 52</td>
<td>34 to 45</td>
<td>28 to 45</td>
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<td>No. 200</td>
<td>2 to 8</td>
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### 442 Type A and B

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<th>Course Aggregate Angularity</th>
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</tr>
<tr>
<td>&gt; 4000</td>
<td>100&lt;sup&gt;[1]&lt;/sup&gt; / 100&lt;sup&gt;[2]&lt;/sup&gt;</td>
<td>75&lt;sup&gt;[1]&lt;/sup&gt; / 70&lt;sup&gt;[2]&lt;/sup&gt;</td>
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</table>

<sup>[1]</sup> Percent one or more fractured faces.

<sup>[2]</sup> 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

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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
- Not recommended for MOT
301/302 Pay Item Descriptions

- 301 Asphalt Concrete Base, PG64-22
- 302 Asphalt Concrete Base, PG64-22

- Both use 403 acceptance only so no number in parentheses
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
- PG64-22 binder only
- 448 acceptance only
SS 823 Light Traffic Asphalt

- Asphalt Concrete Surface Course, Type 1 (448)
- Asphalt Concrete Intermediate Course, Type 1 (448)
- Asphalt Concrete Intermediate Course, Type 2 (448)
404LVT

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

- Contact Flexible Pavements of Ohio for questions and latest specification
Other Asphalt Items

- 424 Fine Graded Polymer Asphalt Concrete
- 443 Stone Matrix Asphalt Concrete
- 826 Asphalt Concrete with Fibers
- 857 Asphalt Concrete with Gilsonite
Pavement Planing (Milling)

- **254 Pavement Planing**
  - “Standard” planing

- **SS 897 Fine Planing**
  - Used prior to thin overlays
  - Requires sand patch test for texture

- **SS 897 Micro Planing**
  - Used for short term friction improvement
  - Requires sand patch test for texture
ODOT Resources

Pavement Design Manual

Design Reference Resource Center (DRRC)
Centralized source of electronically distributed Design reference materials, including Design Manuals, Specifications, Standard Drawings and more.

Construction Reference Resource Center (CRRC)
Access to online Construction references, including Construction Letting and Award Information, Specifications, Proposal Notes, Materials Information and more.

Specifying Asphalt Pavement the ODOT Way
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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
1980 West Broad Street
Columbus, Ohio 43223
Telephone (614) 466-3770 Ext. 466-3200

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

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Complete e-book of entire 2013 Specification (including SS 800, dated 7/19/2013):  Click here
Complete e-book of entire 2013 Specification (including SS 800, dated 10/18/2013):  Click here
Complete e-book of entire 2013 Specification (including SS 800, dated 1/17/2014):  Click here
Complete e-book of entire 2013 Specification (including SS 800, dated 4/18/2014):  Click here
### 2013 Active Proposal Notes, Spec Book, Supplemental Specifications and Supplements

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Specifying Asphalt Pavement the ODOT Way
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?