SECTION 203 – COARSE AGGREGATE

2/7/20254

**203.01 – Description**

These specifications cover material used as coarse aggregate in the production of hydraulic cement concrete, asphalt concrete, asphalt surface treatments, and in drainage. Coarse aggregate shall be from quarries on the Department’s Approved List No. 5.

**203.02 – Materials**

1. Coarse aggregate shall consist of crushed stone, crushed slag, crushed or uncrushed gravel, or lightweight aggregate. Coarse aggregate shall be clean, hard, tough, and durable pieces free from: adherent coatings and deleterious amounts of friable, thin, elongated, or laminated pieces; soluble salts; or organic materials. **Crushed hydraulic cement concrete** will be permitted for use as a coarse aggregate provided it conforms to the physical requirements specified herein and shows no adverse chemical reaction. Crushed hydraulic cement concrete will not be permitted in the following: (1) reinforced hydraulic cement concrete, (2) in combination with other materials in contact with geotextile fabric when such fabric is used as a drainage item, and (3) in backfill or bedding for perforated pipe.
2. **Crushed gravel** shall consist of particles of which at least 80% by weight shall have at least one face fractured by artificial crushing. Tests to verify conformance shall be performed in accordance with VTM-15.
3. **Blast furnace slag** shall be relatively free from foreign minerals and glassy or spongy pieces. It shall weigh at least 70 pounds per cubic foot, dry rodded, for size No. 68 and smaller and at least 65 pounds per cubic foot, dry rodded, for larger sizes. Tests to verify conformance shall be performed in accordance with AASHTO T19. When used in asphalt surface treatments, blast furnace slag shall not contain more than 10% nonporous material and shall have an absorption of at least 3%. Tests to verify conformance will be performed in accordance with AASHTO T85.
4. **Crushed glass** shall consist of particles of curbside-collected or waste glass. It shall be free from sources of glass that include automotive glass, lead crystal, TV monitors, lighting fixtures and electronics applications. Non-glassy material associated with curbside collection (paper, capping materials, etc.), excluding fragments of broken ceramics and pottery, shall be limited to 5% by weight using a gravimetric determination, and including loss on ignition performed in accordance with ASTM D2974. 100% of the crushed glass shall pass the 3/8 inch- sieve with less than 5% passing the No. 200 sieve. Crushed glass shall not be used in hydraulic cement concrete, asphalt, base or subbase, or exposed shoulder applications.
5. **Lightweight coarse aggregate** shall conform to Section 206.

**203.03 – Detail Requirements**

1. **Grading:** Open-graded coarse aggregates shall conform to the requirements of Table II-3. Tests to verify conformance shall be performed in accordance with AASHTO T27.

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| **TABLE II-3**  **Sizes of Open-Graded Coarse Aggregates** | **Amounts Finer Than Each Laboratory Sieve (% by Weight)** | **No.** **100** |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 10-30 |
| **No.** **50** |  |  |  |  |  |  |  |  |  |  |  |  |  | Max.5 |  |
| **No.16** |  |  |  |  |  |  |  |  | Max. 5 |  | Max. 5 | Max. 5 |  | Max. 10 |  |
| **No.** **8** |  |  |  |  |  |  | Max. 5 | Max. 5 | Max. 10 | Max. 5 | Max. 10 | Max. 10 | Max. 5 | Oct-40 |  |
| **No.** **4** |  |  |  | Max. 5 |  | Max. 5 | Max. 10 | Max. 10 | 25-May | Max. 15 | 25-May | 30-Oct | 30-May | 85-100 | 85-100 |
| **3/8** **in.** |  |  |  |  | Max. 5 | Max. 15 |  | 20-55 | 30-65 | 40-70 | 40-75 | 85-100 | 75-100 | Min. 100 | Min. 100 |
| **1/2** **in.** |  |  | Max. 5 | 30-Oct | Max. 10 | Oct-40 | 25-60 |  |  | 90-100 | 90-100 | Min. 100 | Min. 100 |  |  |
| **3/4 in.** | Max. 5 | Max. 5 |  |  | 20-55 | 40-85 |  | 90-100 | 90-100 | Min. 100 | Min. 100 |  |  |  |  |
| **1** **in.** |  |  | 0-15 | 35-70 | 90-100 | 90-100 | 95-100 | Min. 100 | Min. 100 |  |  |  |  |  |  |
| **1-1/2 in.** | Max. 15 | Max. 15 | 35-70 |  | Min. 100 | Min. 100 | Min. 100 |  |  |  |  |  |  |  |  |
| **2** **in.** |  | 35-70 | 90-100 | 95-100 |  |  |  |  |  |  |  |  |  |  |  |
| **2-1/2 in.** | 25-60 | 90-100 | Min. 100 | Min. 100 |  |  |  |  |  |  |  |  |  |  |  |
| **3** **in.** |  | Min. 100 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **3-1/2 in.** | 90-100 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **4** **in.** | Min. 100 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Va. Size No.** | | 1 | 2 | 3 | 357 | 5 | 56 | 57 | 67 | 68 | 7 | 78 | 8 | 8P | 9 | 10 |

1. **Soundness:** Soundness shall conform to the requirements of Table II-4. Tests to verify conformance shall be performed in accordance with AASHTO T103 or T104. The requirement for soundness test for crushed glass is waived due to its preclusion from the applications shown in Table II-4.

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| **TABLE II-4**  **Soundness** | | |
| **Use** | **Max. Soundness Loss (%)** | |
| **Magnesium Sulphate**  **(5 Cycles)** | **Freeze and Thaw**  **(100 Cycles)** |
| Hydraulic cement concrete | 12 | 5 |
| Asphalt surface courses | 15 | 6 |
| Asphalt and aggregate bases | 20 | 7 |
| Select material (Type I) and subbase | 30 | 12 |



**Abrasion Loss:** Abrasion loss shall conform to the requirements of Table II-5. Tests to verify conformance shall be performed in accordance with AASHTO T96 on aggregate with a grading the most nearly identical with the grading to be used in the work.

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| **TABLE II-5**  **Abrasion** | | |
|  | **Max. Los Angeles Abrasion Loss (%)** | |
| **Use** | **100 Rev.** | **500 Rev.** |
| Grade A stone | 9 | 40 |
| Grade B stone | 12 | 45 |
| Grade C stone | 14 | 50 |
| Slag | 12 | 45 |
| Gravel | 12 | 45 |

1. **Deleterious Material**: The amount of deleterious material shall be not more than the following:

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| **Material** | **% by Weight** | **AASHTO Test Method** |
| Coal and lignite | 0.25 | T113 |
| Clay lumps | 0.25 | T112 |
| Material passing No. 200 sieve by washing1 | 1.00 | T11 |
| 1When the material passing the No. 200 sieve by washing is dust of fracture, the percentage of deleterious material may be increased to 1.50%. | | |

1. **Flat and Elongated Particles:** Coarse aggregate to be used as a temporary riding surface during construction activities or as the final riding surface after construction shall not contain more than 30% by mass of aggregate particles retained on and above the 3/8-inch sieve having a maximum to minimum dimensional ratio greater than 5 as determined in accordance with ASTM D4791.
2. Specific Gravity: Specific gravity will be tested in accordance with AASHTO T85.