



Department of Transportation

ENGINEERING
INSTRUCTION

EI
15-010

Title: **REVISED FRICTION AGGREGATE REQUIREMENTS FOR DOWNSTATE HIGH TRAFFIC VOLUME CONDITIONS**

Superseded By
EB 15-031
Effective 9/28/15

Approved:

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6/5/15
Date

ADMINISTRATIVE INFORMATION:

- This Engineering Instruction (EI) is effective beginning with projects submitted for the lettings on or after September 1, 2015.
- This EI supersedes EI 96-023 *Changes to the Coarse Aggregate Requirements for Hot Mix Asphalt Top Course Mixes*.
- The revisions will be incorporated into the next update of the Standard Specifications.
- This EI is being issued concurrently with EI 15-011 *Revised Special Specifications for 6.3 Polymer Modified HMA, Micro-Surfacing, Paver Placed Surface Treatment and Quick-Set Slurry*.

PURPOSE: This EI issues revisions to the friction aggregate requirements in §401-2.02 A. *Coarse Aggregate Type F1 Conditions* and §501-2.02 B. 2. b. *Type 1 Coarse Aggregate*.

TECHNICAL INFORMATION:

- The revised coarse aggregate requirements no longer allow the use of limestone and/or dolomite as the primary coarse friction aggregate for downstate high traffic volume locations. Limestone and dolomite may still be used in limited quantities at these locations, as long as the final aggregate blend meets the requirements.
- The minimum 95.0% noncarbonate particles requirement for aggregate blends used in downstate high traffic volume locations has been changed to 90.0% minimum.
- There is no change to the design guidance regarding where to apply F1/Type 1 friction aggregate. In general:
 - Downstate is defined as the City of New York and the surrounding counties of Dutchess, Nassau, Orange, Putnam, Rockland, Suffolk, and Westchester.
 - High traffic volume refers to 2 or 3 lane highways with design year two-way AADT over 8000, or for more than three lanes with two-way AADT over 13,000.
- These changes have no impact to upstate high traffic volume requirements (F2/Type 2), statewide low traffic volume requirements (F3/Type 3), or "no-traffic" requirements (F9/Type 9)

IMPLEMENTATION: For projects scheduled for letting:

- Before September 1, 2015 – Designers of pavement or bridge projects requiring F1 or Type 1 friction aggregate in Regions 8, 10 and 11 will include the appropriate Standard Specification revision with the PS&E submission or issue an Amendment to include it if the Amendment deadline has not passed.
- On or After September 1, 2015 – The revisions to the Standard Specifications will be included in the contract documents beginning with projects submitted for the lettings on or after September 1, 2015.
- Any special specification that includes F1 or Type 1 friction aggregate requirements must be reviewed and updated or deleted, if needed, by the Region or Program Area that issued it. Special specifications for pavement, bridge approach, and bridge deck surfaces that reference

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the friction aggregate requirements in Section 401 or Section 501 should not need to be updated; however, those that do not must be updated or deleted by the Regions and Program Areas that issued them. EI 15-011 *Revised Special Specifications for 6.3 Polymer Modified HMA, Micro-Surfacing, Paver Placed Surface Treatment and Quick-Set Slurry* is being issued concurrently to update the F1 friction aggregate requirements and reissue those statewide special specifications.

TRANSMITTED MATERIALS: The following Standard Specification revisions are transmitted by this EI:

- Section 401– Plant Production, §401-2.02 A. *Coarse Aggregate Type F1 Conditions*
- Section 501– Portland Cement Concrete – General, §501-2.02 B. 2. b. *Type 1 Coarse Aggregate*

BACKGROUND: Current design standards for downstate high traffic riding surface applications (pavement and bridge decks) require the use of F1 (in HMA) or Type 1 (in PCC) aggregates. The related materials specifications allowed the use of high acid insoluble residue (AIR) carbonates (limestone and dolomite with at least 20.0% AIR) in these applications as the primary coarse friction aggregate.

In 2010, a section of pavement with high AIR limestone was constructed in a downstate high traffic volume location. These types of aggregates are typically not locally available downstate, so the Department had limited experience with them in downstate high traffic volume applications. Because of the limited experience, an annual friction testing and monitoring program was initiated for this pavement. The results of this monitoring program do not provide confidence that high AIR carbonate aggregates will consistently provide the expected long-term pavement friction in downstate high traffic volume conditions. Therefore, the material related aggregate specifications for F1/Type 1 conditions are being revised to no longer allow these aggregates as the primary coarse friction aggregate.

During this same time, a different pavement section was constructed in a downstate high traffic volume location with an aggregate blend resulting in 90.0-95.0% noncarbonate particles where 95.0% noncarbonate particles are required. This pavement was also friction tested and monitored for several years. The results of this pavement monitoring indicate that the 95.0% noncarbonate particles requirement can be lowered to 90.0% while still consistently providing the expected long-term pavement friction in downstate high traffic volume conditions. Therefore, the material related aggregate specifications for F1/Type 1 conditions are being modified to allow aggregate blends with 90.0% noncarbonate particles where 95.0% was previously required.

CONTACT: Questions or comments regarding this EI should be directed to Randy Wells of the Materials Bureau Geology Section at 518-457-2109 or Randall.Wells@dot.ny.gov.

Section 401 – Plant Production
§401-2.02 A. Coarse Aggregate Type F1 Conditions

Make the following changes to the Standard Specifications dated May 1, 2008:

Delete §401-2.02 A. *Coarse Aggregate Type F1 Conditions* in its entirety and **replace** it with the following:

A. Coarse Aggregate Type F1 Conditions. Use one of the following types of coarse aggregate.

1. Sandstone, granite, chert, traprock, ore tailings, slag or other similar noncarbonated materials.
2. Gravel, or a natural or manufactured blend of the following types of materials: limestone, dolomite, gravel, sandstone, granite, chert, traprock, ore tailings, slag or other similar materials, meeting the following requirements:
 - a. 12.5 Nominal Maximum Size Aggregate Mixes. Noncarbonate plus 1/8 inch particles must comprise a minimum of 30.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). A minimum of 90.0% of plus 3/8 inch particles must be non-carbonate.
 - b. 9.5 Nominal Maximum Size Aggregate Mixes. Noncarbonate plus 1/8 inch particles must comprise a minimum of 30.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). A minimum of 90.0% of plus No. 4 particles must be non-carbonate.

Section 501 – Portland Cement Concrete – General
§501-2.02 B. 2. b. Type 1 Coarse Aggregate

Make the following changes to the Standard Specifications dated May 1, 2008:

Delete §501-2.02 B. 2. b. *Type 1 Coarse Aggregate* in its entirety and **replace** it with the following:

b. Type 1 Coarse Aggregate. Use coarse aggregate meeting one of the of the following requirements:

- Sandstone, granite, chert, traprock, ore tailings, slag, or other similar noncarbonated materials.
- For concrete mixtures containing CA1 coarse aggregate: gravel or a blend of rock types containing no less than 90.0% noncarbonate particles (by weight with adjustments to equivalent volumes for materials of different specific gravities) in the minus 1 inch, plus 1/4 inch primary size fraction.
- For concrete mixtures containing CA2 coarse aggregate: gravel or a blend of rock types containing no less than 90.0% noncarbonate particles (by weight with adjustments to equivalent volumes for materials of different specific gravities) in the minus 1 1/2 inch, plus 1/2 inch and the minus 1/2 inch, plus 1/4 inch primary size fractions.

Section 401 – Plant Production
§401-2.02 A. Coarse Aggregate Type F1 Conditions

Make the following changes to the Standard Specifications dated May 4, 2006:

Delete §401-2.02 A. *Coarse Aggregate Type F1 Conditions* in its entirety and **replace** it with the following:

A. Coarse Aggregate Type F1 Conditions. Use one of the following types of coarse aggregate.

1. Sandstone, granite, chert, traprock, ore tailings, slag or other similar noncarbonate materials.
2. Gravel, or a natural or manufactured blend of the following types of materials: limestone, dolomite, gravel, sandstone, granite, chert, traprock, ore tailings, slag or other similar materials, meeting the following requirements:
 - a. 12.5 mm Nominal Maximum Size Aggregate Mixes. Noncarbonate plus 3.2 mm particles must comprise a minimum of 30.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). A minimum of 90.0% of plus 9.5 mm particles must be non-carbonate.
 - b. 9.5 mm Nominal Maximum Size Aggregate Mixes. Noncarbonate plus 3.2 mm particles must comprise a minimum of 30.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). A minimum of 90.0% of plus 4.75 mm particles must be non-carbonate.

Section 501 – Portland Cement Concrete – General
§501-2.02 B. 2. b. Type 1 Coarse Aggregate

Make the following changes to the Standard Specifications dated May 4, 2006:

Delete §501-2.02 B. 2. b. *Type 1 Coarse Aggregate* in its entirety and **replace** it with the following:

b. Type 1 Coarse Aggregate. Use coarse aggregate meeting one of the of the following requirements:

- Sandstone, granite, chert, traprock, ore tailings, slag, or other similar noncarbonate materials.
- For concrete mixtures containing CA1 coarse aggregate: gravel or a blend of rock types containing no less than 90.0% noncarbonate particles (by weight with adjustments to equivalent volumes for materials of different specific gravities) in the minus 25.0 mm, plus 6.3 mm primary size fraction.
- For concrete mixtures containing CA2 coarse aggregate: gravel or a blend of rock types containing no less than 90.0% noncarbonate particles (by weight with adjustments to equivalent volumes for materials of different specific gravities) in the minus 37.5 mm, plus 12.5 mm and the minus 12.5, plus 6.3 mm primary size fractions.