

SECTION 430: OPEN GRADED FRICTION COURSE (OGFC)

430.1 DESCRIPTION

This work shall consist of constructing an open-graded friction course (OGFC) on a prepared surface. OGFC shall be composed of aggregate, asphalt binder, and hydrated lime or anhydrite based material.

430.2 MATERIALS

430.2.1 Aggregate

The aggregate shall be crushed stone or crushed gravel, composed of hard durable pebbles or fragments so as to provide a material that will meet the grading requirements of Table 430.2.1:1, “OGFC Gradation Requirements,” when tested by means of AASHTO T 11 and AASHTO T 27 unless otherwise shown in the plans. Aggregate acceptance shall be based on test results of material samples taken of the combined aggregates and lime before adding asphalt Materials.

**Table 430.2.1:1
OGFC Gradation Requirements**

Sieve Size	Percent Passing
1/2 in.	100
3/8 in.	90-100
No. 4	25-55
No.10	0-12
No. 40	0-8
No. 200	0-4

At least seventy-five percent (75%) of the material retained on the No. 4 sieve shall be particles having at least two (2) fractured faces. Fractured Faces shall be determined in accordance with NMDOT Method FF-1, *Fractured Face Determination for Coarse Aggregate*.

The aggregate shall be free from vegetable matter, lumps or balls of clay, adherent films of clay, or other material that will prevent thorough coating with asphalt Material.

The aggregate shall have an Aggregate Index of 20 or less when calculated in accordance with Section 910, “Aggregate Index,” of the NMDOT Standard Specifications for Highway and Bridge Construction, current edition.

The City will allow the combination of Materials from two or more sources to produce coarse aggregate only when each source independently meets the Aggregate Index requirement as specified above.

430.2.2 Asphalt Material

The type and grade of asphalt binder Material shall be a PG64-22 performance-graded asphalt binder provided in accordance with AASHTO M 320 unless otherwise specified or determined by the City Engineer or designee. In addition, asphalt binder Material shall meet the requirements of Section 405, “Hot-Mix Asphalt (HMA) Material,” of these Standard Specifications.

The asphalt Material source to be used shall not be changed without the written approval of the City Engineer or designee.

430.2.3 Hydrated Lime or Anhydrite Based Material

Hydrated lime or anhydrite based material shall be provided in accordance with Section 405, "Hot-Mix Asphalt (HMA) Material" of these Standard Specifications.

430.2.4 Mix Design

430.2.4.1 Use of NMDOT Approved Mix Design

An Asphalt Certification Letter shall be provided by the Contractor to the City Engineer or designee at a minimum five (5) working days prior to the beginning of OGFC paving operations. The Asphalt Certification Letter must reference an NMDOT approved and current OGFC mix design. The Asphalt Certification Letter must clearly identify the NMDOT State Materials Laboratory or District Laboratory mix design number and NMDOT laboratory number. The Contractor shall provide a copy of the NMDOT approved and current OGFC mix design as an attachment to the Asphalt Certification Letter.

430.2.4.2 Mix Design General

The Job Mix Formula (JMF) gradation shall be within the master range for the specified type of OGFC. The mix design shall establish a single percentage of aggregate passing each required sieve size and a single percentage of asphalt Material to be added to the aggregate. The mix design shall specify whether to add hydrated lime or anhydrite based material and how much to use. If hydrated lime or anhydrite based material is added, it shall be included in the gradation for establishing the mix design.

430.3 CONSTRUCTION REQUIREMENTS

430.3.1 General

The percentage of asphalt Material shall be maintained within plus or minus 0.3% of the target value established in the mix design. The quantity of asphalt Material shall be determined by the "strap method" or other method approved by the City Engineer or designee.

Calibration and plant control shall be the Contractor's responsibility.

430.3.2 Preparation of Roadbed

Prior to placing OGFC, all foreign matter and Deleterious Materials shall be cleaned from the existing surface.

430.3.2.1 Tack Coat

Tack Coat shall be applied to the existing surface in accordance with Section 425, "Tack Coat" of these Standard Specifications when specified in the Contract or as determined by the City Engineer or designee.

430.3.3 Temperature and Weather Limitations

The OGFC shall not be placed on wet surfaces or when the City Engineer or designee determines that the weather conditions prevent proper handling and finishing.

OGFC shall be placed only when the Chill Factor is at least 60°F. If the air temperature is 90°F or warmer, the Chill Factor shall not be considered.

Chill Factor determination shall be in accordance with Section 435.3.5.5 of these Standard Specifications.

430.3.4 Mixing Requirements

Hot mix plant shall conform to the requirements of Section 423.3.4.1, "Mixing Plants," and all Subsections thereof of the NMDOT Standard Specifications for Highway and Bridge Construction, current edition. Any reference to "Project Manager" shall be substituted with the words, "City Engineer or designee." Hot mix plants shall be of a size that is proportional to the scale of the Work.

The mineral aggregate shall be free of oily or carbonaceous coatings. The moisture content of the mixed Material shall not exceed 1% (by weight) of the dry aggregate.

The aggregate shall be mixed with asphalt Material until the aggregate particles are thoroughly and uniformly coated.

The temperature of the mixture for placement shall not exceed 260°F, or be less than 180°F unless otherwise specified by the asphalt binder Supplier's recommendations. The placement temperature for the mixture shall be approved by the City Engineer or designee and may be modified by the City Engineer or designee should changes in placement or mix production operations occur. The actual placement temperature shall not vary by more than plus or minus 20°F from the established placement temperature. The actual placement temperature shall be measured in the truck prior to dumping. If the actual placement temperature does not meet the required placement temperature specification, the material shall be rejected at no cost to the City and shall not be incorporated into the Work.

If the Contract requires hydrated lime or anhydrite based material, it shall be added to the aggregate in accordance with Section 423.3.3, "Addition of Hydrated Lime or Anhydrite Based Material," of the NMDOT Standard Specifications for Highway and Bridge Construction, current edition within the production tolerances specified. Any reference to "Project Manager" shall be substituted with the words, "City Engineer or designee."

430.3.5 Placement and Finishing

OGFC shall be placed at a thickness after compaction of five-eighths ($\frac{5}{8}$) inch or seventy-five (75) pounds per square yard unless otherwise shown on the Plans or directed by the City Engineer or designee.

The OGFC shall be placed by means of a paving machine meeting the requirements of subsection 435.3.4.3, "Pavers" of these Standard Specifications except that the City Engineer or designee may require use of an external reference of a suitable length to improve the rideability in any case deemed necessary. The control system on the paving machine shall be used to control the elevation of the screed at each end including any screed attachments used for widening. Failure of the control system to achieve the typical section in accordance with the Plans or City Standard Details shall be cause for suspension of the paving operations and removal and replacement of non-conforming material at the Contractor's expense.

Immediately following the OGFC placement, the surface shall be rolled with a steel-wheeled, self-propelled roller of such weight to achieve adequate consolidation of the aggregate without excessive breakage.

The finished surface shall be smooth and true to the dimensions shown on the Plans or City Standard Details. The finished surface shall be free of all irregularities in excess of (1/8 in) when tested by means of a (10 ft) straightedge furnished by the Contractor. All low and defective areas shall be immediately removed and replaced with new, hot OGFC, and compacted to conform to the surrounding area at the Contractor's expense.

430.3.5.1 Plan Surfacing Depths

The Contractor shall monitor and record plan depths throughout the surfacing operations at intervals specified by the City Engineer or designee. OGFC shall be rejected if the surfacing depth is not at least five-eighths (5/8) in. The City will not pay for any excess course depth.

430.3.6 Sampling and Testing

430.3.6.1 Contractor Quality Control

The Contractor shall sample the stockpiled aggregate at a point agreed to by the City Engineer or designee and shall conduct testing on those samples in accordance with applicable test procedures. This sampling and testing shall be accomplished by qualified testing personnel using equipment furnished by the Contractor that meets all applicable ASTM and AASHTO requirements. The applicable test procedures shall be performed as described in the NMDOT Technician Training and Certification Manual and are as follows for stockpiled aggregate sampling and testing:

AASHTO T 2	Sampling Aggregates
AASHTO T 11	Materials Finer than No. 200 Sieve in Mineral Aggregates by Washing
AASHTO T 27	Sieve Analysis of Fine and Coarse Aggregates
AASHTO T 248	Reducing Field Samples of Aggregate to Testing Size
NMDOT FF-1	Fractured Face Determination for Coarse Aggregate

The Contractor shall sample and test aggregate production at a rate of at least one battery of tests per day or one battery of tests per 250 tons of material produced for the first 2000 tons of production, and test at least 500 tons of material produced thereafter. The Contractor shall furnish test results to the City Engineer or designee upon request.

After the mix design has been issued and approved, the Contractor shall control the mixture production on the project such that the tolerances of Table 430.3.6.2.1:1, "Acceptance Testing Tolerances" are met. The Contractor shall perform Quality Control sampling and testing in accordance with Table 430.3.6.1:1, "Minimum Contractor QC Testing for OFGC."

Table 430.3.6.1:1

Minimum Contractor QC Testing for OGFC			
Property	Acceptance Sampling/Testing Location	Minimum Testing Frequency	Lot Size (smallest of the following)
Asphalt Content	ASSHTO T 308 Binder Ignition Method	1/250 Tons, 1 / 2500 SY, 1 / Street or Site 2/Days Run	A Days Work
Lime Content	Strap Method		
Gradation	Cold Feed		

Contractor quality control sampling and testing shall be considered incidental to the OGFC item and no separate measurement or payment shall be made unless otherwise specified in the Contract.

430.3.6.2 City Quality Assurance

430.3.6.2.1 Acceptance

The City will evaluate Materials for acceptance in accordance with Table 430.3.6.2.1:1, "Acceptance Testing Tolerances." Material shall be sampled and tested for acceptance by a Certified Private Testing Laboratory appearing on the NMDOT's most current listing of Approved Private Testing Laboratories. Unless otherwise specified in the Contract, the Contractor shall obtain a certified Private Testing Laboratory independent of its quality control sampling and testing process to perform acceptance testing on behalf of the City. Acceptance test results shall be submitted to the City Engineer or designee for review, approval, and determination of acceptance by the City Engineer or designee.

Table 430.3.6.2.1:1

Acceptance Testing Tolerances	
Characteristic	Specification Limits
Asphalt Content	± 0.3% (Percent difference from Target Value of approved JMF)
Hydrated Lime or Anhydrite based Material Content (If Required by the Mix Design)	± 0.2% (Percent difference from Target Value of approved JMF)
1/2 in	Gradation Band
3/8 in	Gradation Band
No. 4	Gradation Band
No. 10	Gradation Band
No. 40	Gradation Band
No. 200	Gradation Band

Acceptance for gradation will be based on testing of samples obtained from combined aggregates and lime, if used, before addition of asphaltic materials. Acceptance for asphalt content will be based on samples obtained from the windrow or paver hopper prior to laydown and tested with the Binder Ignition method, AASHTO T 308. Acceptance for lime content will be based on daily strap totals.

Acceptance sampling and testing of the OGFC mixture shall be performed in accordance with Table 430.3.6.2.1:2, "Minimum Acceptance Guidelines for OGFC." If Material appears defective, or if the City Engineer or designee determines that a change in the process or product has occurred, additional testing may be performed at the Contractor's expense.

Table 430.3.6.2.1:2			
Minimum Acceptance Guidelines for OGFC			
Property	Acceptance Sampling/Testing Location	Minimum Testing Frequency	Lot Size (smallest of the following)
Asphalt Content	ASSHTO T 308 Binder Ignition Method	1/250 Tons, 1 / 2500 SY, 1 / Street or Site 2/Days Run	A Day's Work
Lime Content	Strap Method		
Gradation	Cold Feed		

If the mean of the test results for each material property per lot is within the Acceptance Tolerances as listed in Table 430.3.6.2.1:1, "Acceptance Testing Tolerances," the Material will be accepted. If the mean of the test results for any of the listed properties per lot is outside of the tolerances listed in Table 430.3.6.2.1:1, "Acceptance Testing Tolerances," the entire lot shall be rejected and shall be removed and replaced by the Contractor at the Contractor's expense. Material removed shall be disposed of in a suitable manner and in compliance with all environmental requirements.

The City Engineer may determine an alternate disposition of the Material not meeting acceptance criteria based on site specific circumstances, extent of failure to meet specifications, and best interest of the public.

430.4 METHOD OF MEASUREMENT

OGFC will be measured by the square yard or ton. If measured by the square yard, the average width of the OGFC placed and length along the centerline of the roadway or lane will be used in computing the quantities. All dimensions shall be shown on the typical section of the plans.

Asphalt Material, hydrated lime, and anhydrite based material will be measured and paid for in accordance with Section 405, "Hot-Mix Asphalt (HMA) Material" of these Standard Specifications.

When *OGFC Complete-In-Place* is specified in the Contract, Asphalt Material, Hydrated Lime or Anhydrite Based Material shall be considered incidental to the *OGFC Complete-In-Place* item and no direct measurement or payment will be made thereof.

430.5 BASIS OF PAYMENT

Pay Item

Pay Unit

OGFC Complete-In-Place
OGFC

Ton or Square Yard
Ton or Square Yard