



Republic of the Philippines
 DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
 Manila



017-13 DPWH
 10-02-2024

SEP 26 2024

DEPARTMENT ORDER) **SUBJECT** : **Specification on the Use of**
) **Conditional Item 310 (16) -**
) **Bituminous Concrete Surface**
NO. 177) **Course with High Modulus Anti-**
) **Rutting and Cracking Modifier,**
Series of 2024) **Hot-Laid**
 or 10/2/2024

In line with the continuing efforts to upgrade the construction technology thru adoption of successful research studies, this Department Order has approved the use of **High Modulus Anti-Rutting and Cracking Modifier** as additive in **Hot Mix Asphalt (HMA)** to improve the quality of asphalt, subject to the specifications hereto attached. A Certificate of Conditional Approval (CCA) has been issued by this Department, accrediting the use of High Modulus Anti-Rutting and Cracking Modifier in DPWH Projects, from **July 29, 2024 to July 28, 2029**.

This Item will be conditionally included in the Project and Contract Management Application (PCMA) for ready use in various DPWH projects until the date of expiration of the CCA.


MANUEL M. BONOAN
 Secretary

Department of Public Works and Highways
 Office of the Secretary



WIN4U02040

- Encls.: 1. Specification on the Use of Conditional Item 310 (16) - Bituminous Concrete Surface Course with High Modulus Anti-Rutting and Cracking Modifier, Hot-Laid
 2. Certificate of Conditional Approval

14.1.2 MLL/JDV/RPF



**Specification on the Use of Conditional
Item 310 (16) - Bituminous Concrete Surface Course with
High Modulus Anti-Rutting and Cracking Modifier, Hot-Laid**

310 (16).1 Description

This Item shall consist of constructing a Bituminous Concrete Surface Course composed of aggregates, high modulus anti-rutting and cracking modifier, mineral filler and bituminous material mixed in a central plant, constructed and laid hot on the prepared base in accordance with this Specification and in conformity with lines, grades, thickness and typical cross-section shown on the Plans.

High modulus anti-rutting and cracking modifier is an additive material in asphalt mix used to improve pavement performance by increasing the high and low temperature stability, promoting resistance to water change, offering fatigue resistance, and preventing ultraviolet (UV) aging since it can easily be proportioned, mixed, manufactured, and construct for local asphalt mix.

310 (16).2 Material Requirements

310 (16).2.1 Composition and Quality of Bituminous Mixture (Job-Mix Formula)

It shall conform to the requirements of Composition and Quality of Bituminous Mixture of Item 307, Bituminous Plant-Mix Surface Course – General.

310 (16).2.2 Bituminous Material

It shall be Penetration Graded Asphalt Cement and shall conform to the requirements of Item 702, Bituminous Materials. The grade of the bituminous material shall be specified in the Plans.

310 (16).2.3 Aggregates

Aggregates shall conform to the requirements of Item 703, Aggregates.

310 (16).2.4 Mineral Filler

It shall conform to the requirements of Item 703A, Mineral Filler.

310 (16).2.5 Hydrated Lime

It shall conform to the requirements of Item 701, Construction Lime.

310 (16).2.6 High Modulus Anti-Rutting and Cracking Modifier

It shall conform to the requirements of Table 310 (16).1.

**Table 310 (16).1 Physical Specification of High Modulus
Anti-Rutting and Cracking Modifier**

Item	Technical Requirement	Test Method
Appearance	Granule of even size, no agglomeration, black in color	-
Unit Weight, g	≤ 0.03	ASTM D792
Density, g/cm ³	≤ 1.0	ASTM D792
Melt Flow Rate, g/10 minutes	≥ 1.0	ASTM D1238
Ash Content, %	≤ 5	ASTM D5630

Note: ASTM D792, Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D1238, Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
ASTM D5630, Standard Test Method for Ash Content in Plastics

310 (16).2.7 Proportioning of Mixtures

It shall conform to the requirements of Proportioning of Mixtures of Item 310, Bituminous Concrete Surface Course, Hot-Laid.

The mixture shall be in accordance with the design and physical specifications of Table 310 (16).2 and Table 310 (16).3., respectively.

Table 310 (16).2 Design Specification

Properties	Specified Criteria
Modifier dosage	0.8% by weight of mix (8 kg for every 1 M.T.)
Aggregate Temperature, °C	200 ± 5
Asphalt Binder Temperature, °C	155 ± 5
Mixing Temperature, °C	180 ± 5 (recommended) Maximum of 195
Mixing Time during Batching	50 seconds (20 seconds dry and 30 seconds wet mixing)
Laying or Placing Temperature of Asphalt Mix, °C	≥ 165
Compaction Temperature, °C	≥ 160

Table 310 (16).3 Physical Specification

Item	Standard Index	Test Method
Marshall Stability, kN	≥8	ASTM D6927
Flow Value, mm	2-4	
Residual Marshall Stability, %	≥85	
Tensile Strength Ratio, %	≥80	AASHTO T283

*Note: ASTM D6927, Standard Test Method for Marshall Stability and Flow of Asphalt Mixtures
 AASHTO T 283, Standard Method of Test for Resistance of Compacted Asphalt Mixtures to
 Moisture-Induced Damage*

310 (16).3 Construction Requirements

This shall be in accordance, whenever applicable, with the Construction Requirements of Item 307.

310 (16).3.1 Mixing

The proportion of high modulus anti-rutting and cracking modifier shall be at least 0.8% by weight of asphalt mix (i.e. 8 kgs of modifier in every 1 M.T. of asphalt mix). If higher strength is required, the percentage to be used shall depend on the job-mix formula and the other quality control requirements established in the laboratory.

Asphalt mix shall be produced in a batch-type batching plant composed of aggregates (Grading D), mineral filler, and penetration grade 60/70 binder (asphalt cement). The asphalt cement shall be heated at 150~160°C to comply with the required asphalt mix production temperatures. A 4.80% optimum asphalt content, by weight of mix and mineral filler (including 1% of hydrated lime) shall be added after dry mixing the heated aggregates at 200~205°C with 0.8% modifier by weight of mix, at specified mixing temperature of 185~190°C and 50-seconds mixing time (20 seconds dry mixing and 30 seconds wet mixing). Generally, the temperature during mixing production should not exceed 195°C. The final mixes shall be mixed evenly with the additive easily dispersed during mixing and all the aggregates were entirely coated with asphalt binder, having no agglomerates of severe separation of coarse and fine aggregates. The modified asphalt mix should be used within six (6) hours after production.

310 (16).3.2 Sampling of High Modulus Anti-Rutting and Cracking Modifier

Samples of high modulus anti-rutting and cracking modifier shall be taken at the place of manufacture or at the destination.

310 (16).3.3 Rejection of High Modulus Anti-Rutting and Cracking Modifier

Materials failing to meet this Specification requirements shall be the cause for rejection and shall be corrected by the Contractor at his own expense.

310 (16).3.4 Packing and Marking of High Modulus Anti-Rutting and Cracking Modifier

It shall be shipped in containers agreed upon by the manufacturer and the Contractor. It shall be packed in plastic or other suitable packing materials and shall be properly sealed. Each container shall be marked with the following information:

- a. Name of the product
- b. Lot number of manufacture
- c. Net weight
- d. Name of manufacturer

310 (16).3.5 Storage and Handling of High Modulus Anti-Rutting and Cracking Modifier

It shall be kept dry, and away from fire and explosion. Extreme crashing when transporting shall also be avoided.

It shall be stored in original container and only in cool, dry, well-ventilated, secured area.

310 (16).4 Method of Measurement

The area to be paid for under this Item shall be the number of square meters (m²) of asphalt pavement placed (with high modulus anti-rutting and cracking modifier at least 8% by weight of asphalt mix), compacted and accepted based on the thickness and density of the cores taken in accordance with the Acceptance, Sampling and Testing requirements of Item 307.

310 (16).5 Basis of Payment

The accepted quantity, measured as prescribed in Section 310 (16).4, Method of Measurement, shall be paid for at the Contract Unit Price for Bituminous Concrete Wearing Course with High Modulus Anti-Rutting and Cracking Modifier which price and payment shall be full compensation for furnishing all materials, handling, mixing, hauling, placing, rolling, compacting, labor, equipment, tools and incidentals necessary to complete this Item.

Payment shall be made under:

Pay Item (Number)	Description	Unit of Measure
310 (16)a	Bituminous Concrete Surface with High Modulus Anti-Rutting and Cracking Modifier, Hot-Laid, 30 mm	Square Meter
310 (16)b	Bituminous Concrete Surface with High Modulus anti-Rutting And Cracking Modifier, Hot-Laid, 40 mm	Square Meter

Pay Item (Number)	Description	Unit of Measure
310 (16)c	Bituminous Concrete Surface with High Modulus Anti-Rutting and Cracking Modifier, Hot-Laid, 50 mm	Square Meter

References:

1. *Final Evaluation of the Study on the Use of Anti-Rutting and Cracking Modifier (NA® Modifier) in Hot Mix Asphalt (HMA)*
2. *DPWH Standard Specification for Highways, Bridges, and Airports, Volume II*
 - a. *Item 307, Bituminous Plant-Mix Surface Course – General.*
 - b. *Item 310, Bituminous Concrete Surface Course, Hot Laid*
 - c. *701, Construction Lime.*
 - d. *Item 702, Bituminous Materials*
 - e. *Item 703, Aggregates*
 - f. *Item 703A, Mineral Filler*
3. *American Society for Testing Materials (ASTM)*
 - a. *ASTM D792, Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement*
 - b. *ASTM D1238, Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer*
 - c. *ASTM D5630, Standard Test Method for Ash Content in Plastics*
 - d. *ASTM D6927, Standard Test Method for Marshall Stability and Flow of Asphalt Mixtures*
4. *American Association of State Highway and Transportation Officials (AASHTO)*
 - a. *AASHTO T 283, Standard Method of Test for Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage*



CERTIFICATE OF CONDITIONAL APPROVAL

This is to certify that

NA Modifier

Supplied by

FMC Research Solution Inc.

#2 Ideal St., Brgy. Addition Hills,
Mandaluyong City

is duly accredited for use in DPWH infrastructure projects as an anti-rutting and cracking modifier in Hot Mix Asphalt (HMA) subject to its specifications (hereto attached) pursuant to the provisions of Department Order No. 189, Series of 2002.

This accreditation shall remain in force until expiry date printed below or until such time that the Certificate of Product Accreditation is issued, subject to its compliance with the requirements of the aforementioned Department Order.

Conditional Approval Number : **0032**
Date Issued : **July 29, 2024**
Valid Until : **July 28, 2029**

ADOR G. CANLAS, CESO IV

Undersecretary for Technical Services and
Information Management Service

