



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
MANILA

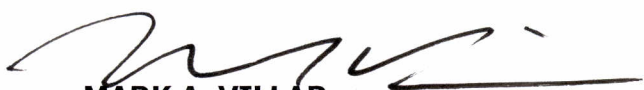
097.13 DPWH
02-12-2019

JAN 29 2019

DEPARTMENT ORDER) SUBJECT : Specification on the Use of
11) Conditional Item 310(12) -
No.) Bituminous Concrete Surface
Series of 2019) Course, Hot-Laid with
02.12.19) ANTI-RUTTING ADDITIVE (ARA)

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 **Anti-Rutting Additive (ARA)** as additive in **Hot Mix Asphalt (HMA)** to improve the quality of asphalt, subject to the specifications hereto attached. ARA in HMA is recommended to be used in asphalt overlay projects that will carry less than 2000 vehicles per day. A Certificate of Conditional Approval has been issued by this Department, accrediting the use of ARA in DPWH Projects, from December 6, 2018 to December 5, 2023.

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


MARK A. VILLAR
Secretary

- Encl.: a. Specification on the Use of Conditional Item 310(12) - Bituminous Concrete Surface Course, Hot-Laid with ANTI-RUTTING ADDITIVE (ARA)
- b. Certificate of Conditional Approval for Anti-Rutting Additive (ARA)

14.1.2 FET/RPF

Department of Public Works and Highways
Office of the Secretary



WIN9U01702

Specification on the Use of Conditional Item 310(12) - Bituminous Concrete Surface Course, Hot-Laid with ANTI-RUTTING ADDITIVE (ARA)

310(12).1 Description

This Item shall consist of constructing a Bituminous Concrete Surface Course composed of aggregates, anti-rutting additives, 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.

Anti-Rutting Additive (ARA) is an additive material in asphalt mixture used to increase the strength and durability of the adhesion between aggregates. ARA in HMA is recommended to be used in asphalt overlay projects that will carry less than 2000 vehicles per day.

310(12).2 Material Requirements

310(12).2.1 Composition and Quality of Bituminous Mixture (Job-Mix Formula)

It shall conform to the requirements of Subsection 307.2.1 of Item 307, Bituminous Plant-Mix Surface Course – General.

310(12).2.2 Bituminous Material

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

310(12).2.3 Aggregates

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

310(12).2.4 Mineral Filler

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

310(12).2.5 Hydrated Lime

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

310(12).2.6 Anti-Rutting Additive (ARA)

The proportion of ARA in HMA shall be 0.3% by weight of asphalt mix.

310(12).2.6.1 Types of Anti-Rutting Additives

The types of ARA to be used shall be high density polyethylene and several polymeric materials, and auxiliary agents which promote dissolution.

310(12).2.6.2 Physical and Chemical Requirements

ARA and the asphalt mixture with ARA shall conform to the physical requirements given in Tables 310(12).1, and 310(12).2, respectively.

Table 310(12).1- Physical Requirements of ARA

Item	Unit	Standard Index	Test Method
Diameter		< 5mm /GRANULE	ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
Specific Gravity		< 1.0	ASTM D792, Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
Melt Flow Rate	g/10min	> 1.0	ASTM D1238, Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
Moisture content	%	< 0.5	ASTM D6869, Standard Test Method for Coulometric and Volumetric Determination of Moisture in Plastics Using the Karl Fischer Reaction (the Reaction of Iodine with Water)

Table 310(12).2- Physical Requirements of Asphalt Mixture with ARA

Item	Unit	Standard Index	Test Method
Marshall Stability	kN	7.5 Min.	ASTM D6927, Standard Test Method for Marshall Stability and Flow of Asphalt Mixtures
Flow value	1/10mm	20-40	
Residual Marshall stability	%	75 Min.	

310(12).2.7 Proportioning of Mixtures

It shall conform to the requirements of Subsection 310.2.6, Proportioning of Mixtures of Item 310.

310(12).2.7.1 Additive Amount

The proportion of (ARA) on the basis of weight of Asphalt mixtures shall be at least 0.30 weight percent. For more strength required, the percentage to be used shall depend on the job-mix formula and the other quality control requirements established in the laboratory.

310(12).2.7.2 Mixing Method:

The ARA shall be directly added into the mixer at the time of mixing of hot asphalt mixture. The injection of material into the mixer shall be supplied in a mixer in the following order:

- a. Heated Aggregates
- b. Filler
- c. Anti-Rutting Additives
- d. Asphalt

The mixing temperature shall be 175°C ±5°C, dry mixing for 15 seconds, and wet mixing for 60 seconds after Anti-Rutting Additives and asphalt injection.

310(12).3 Construction Requirements

This shall be in accordance whenever applicable, with Section 307.3, Construction Requirements of Item 307.

310(12).3.1 Sampling of ARA

Samples of ARA shall be taken at the place of manufacture or at the destination.

310(12).3.2 Testing of ARA

ARA shall be tested in accordance with the following:

- a. ASTM D792, Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
- b. ASTM D5630, Standard Test Method for Ash Content in Plastics
- c. ASTM D1238, Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
- d. ASTM D6869, Standard Test Method for Coulometric and Volumetric Determination of Moisture in Plastics Using the Karl Fischer Reaction (the Reaction of Iodine with Water)
- e. ASTM D5581, Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus (150 mm-Diameter Specimen).

310(12).3.3 Rejection of ARA

Materials failing to meet this Specification requirements shall be reported to the manufacturer within one (1) week after tests have been completed and the cause for rejection shall be stated.

310(12).3.4 Packing and Marking of ARA

ARA may be shipped in containers agreed upon by the manufacturer and the Contractor. It shall be packed in plastic or other suitable packing materials. These containers 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(12).3.5 Storage and Handling of ARA

ARA shall be kept dry, extreme crashing when transporting shall be avoided, and shall be kept away from fire and explosion.

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

310(12).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, compacted and accepted based on the thickness and density of the cores taken in accordance with Subsection 307.3.10, Acceptance, Sampling and Testing.

310(12).5 Basis of Payment

The accepted quantity, measured as prescribed in Section 310(12).4, shall be paid for at the contract unit price for Bituminous Concrete Wearing Course, Hot-Laid (with ARA), 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 (12) a	Bituminous Concrete Surface, (With Anti-Rutting Additive) Hot-Laid, 30 mm	Square Meter
310 (12) b	Bituminous Concrete Surface, (With Anti-Rutting Additive) Hot-Laid, 40 mm	Square Meter
310 (12) c	Bituminous Concrete Surface, (With Anti-Rutting Additive) Hot-Laid, 50 mm	Square Meter

References:

1. Final Report on the Construction of Two (2) Small-Scale Pilot Projects. August, 2018
2. DPWH Standard Specification for Item 310, Bituminous Concrete Surface Course, Hot-Laid
3. <http://www.taccorp.jp/ara-e>
4. <http://diamondcmx.com>



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

Certificate of Conditional Approval

Product Accreditation

This is to certify that

Anti-Rutting Additive **(ARA)**

Supplied by:

Diamond CMX Trading Corporation

*Unit 2807 Cityland Pasing Tamo Tower
2210 Don Chino Roces Avenue, Makati City*

is duly accredited for use in DPWH projects as an additive to Hot Mix Asphalt (HMA) subject to its specifications (hereto attached) pursuant to the provisions of DPWH **Department Order No. 189, series of 2002.**

This accreditation shall remain in force until expiry date printed below, subject to its compliance with the requirements of the aforementioned Department Order.

Conditional Approval Number	:	0029
Date Issued	:	December 6, 2018
Expiry Date	:	December 5, 2023


EMIL K. SADAIN, CESO I
Undersecretary for UPMO Operations and
Technical Services