

DPWH Standard Specification on Item 1013A – Corrugated Asphalt Roofing

1013A.1 Definition

This Item shall consist of furnishing all corrugated asphalt roofing materials, tools, equipment and plant including labor required in undertaking the proper and complete installation together with related accessories as shown on the Plans and in accordance with this Specification.

Corrugated Asphalt Roofing is a lightweight material made of bitumen, protective resin, mineral additives and organic fiber to improve weather resistance. It is also durable and resistant to uplift and fire.

1013A.2 Materials Requirements

All corrugated asphalt roof materials shall be delivered at the jobsite with labels affixed indicating the quality (including cellulose fiber), make type and thickness. Each roof in position shall withstand up to 200 kph of wind pressure.

1013A.2.1 Bitumen Properties

The oxidized bitumen prepared from crude petroleum shall be homogenous and free of water in which each type shall conform to the physical properties prescribed in Table 1013A.1. This covers four types of asphalt intended for use in built-up roof construction, bituminous vapour retarder, and some modified bitumen systems and for adhering insulation boards used in various types of roof systems.

1013A.2.1.1 Sampling

It shall conform to the requirements of ASTM D 140 – Standard Practice for Sampling Bituminous Materials.

1013A.2.1.2 Test Method

Determination of material properties in this specification shall be in accordance with the ASTM Methods of Tests prescribed in Table 1013A.1

TABLE 1013A.1 Physical Requirements of Asphalt in Roofing

Property	Test Method	Type I		Type II		Type III		Type IV	
		Min	Max	Min	Max	Min	Max	Min	Max
Softening point, °C***	ASTM D36	57	66	70	80	85	96	99	107
Flash point, °C	ASTM D92	260	...	260	...	260	...	260	...
Penetration, units at 25°C	ASTM D5	18	60	18	40	15	35	12	25
Ductility at 25°C, cm	ASTM D113	10.0	...	3.0	...	2.5	...	1.5	...
Solubility in trichloroethylene, %	ASTM D2042	99	...	99	...	99	...	99	...

*** In cases where a disagreement exists between the Engineer and the Contractor, ASTM Test Method D 36 shall be used as the referee method.

1013A.2.1.3 Testing for Asphalt Roofs

Testing requirements for this Item shall be the same with the testing requirements of Item 1013 – Corrugated Metal Roofing.

1013A.2.1.4 Rejection and Resubmittal

Materials failing to meet the requirements of this Specification shall constitute grounds for rejection. The Supplier/Contractor may request for re-inspection/test of the rejected materials and resubmits the lot after removal of those packages not conforming to the requirements as approved by the Engineer.

1013A.2.1.5 Packaging and Marking

Asphalt roofing products may be shipped in container or bill of lading on bulk shipment as agreed upon by the manufacturer and the purchaser where each shall be marked with the following information:

- a) Name of manufacturer or seller
- b) ASTM designation
- c) Type of product
- d) Flash point
- e) Equiviscous temperature (EVT) for mop and for mechanical spreader application.

1013A.2.2 Dimensions

Tolerances in dimension for delivered corrugated asphalt roof shall conform to the following:

	Dimensions
Width	930 – 970 mm
Length	1990 – 2010 mm
Thickness	2.6 – 3.3 mm
Pitch	90 – 100 mm
Corrugation Height	35 – 40 mm
No. of Corrugation	9 – 11

1013A.2.3 Strap Fasteners

Same as Item 1013.2.2

1013A.2.4 Rivets and Washers

Same as Item 1013.2.3

1013A.2.5 Soldering Lead

Same as Item 1013.2.4

1013A.2.6 Accessories

Same as Item 1013.2.5

1013A.3 Construction Requirements

1013A.3.1 Preparatory Work

Preparatory to the installation of the corrugated asphalt roofing, purlins should have been placed and spaced properly to fit the length of roofing sheets to be used such that the centerline of the purlins at end laps are 150 mm from the bottom line of end laps and intermediate purlins are placed equidistantly. Top of purlins should be at the same plane.

1013A.3.2 Installation of Corrugated Asphalt Sheets

Installation of corrugated asphalt sheets with end laps shall start at the lower part of the roof and proceed towards the direction of monsoon wind with side laps of at least one (1) corrugation. End laps shall be 200 mm minimum. Each sheet shall be fastened temporarily by 1.83 mm diameter by 25 mm long galvanized flat head nails at valleys of corrugations covered by side or end laps.

Sheets at the first stage shall be hanged over at 70 mm maximum.

Succeeding upper rows of corrugated asphalt sheets shall be installed in the same manner until the entire roof area is covered.

Valleys, ridge/hip rolls and flashings, when required, shall be installed before fastening the roofing sheets with galvanized straps and rivets. One strap shall be riveted at each alternate corrugation at the gutter line, the ridge line and at end laps and the straps bent around and nailed to the purlins. Riveting at intermediate purlins between end laps shall be done at every fourth corrugation. Rivet shall be provided with a galvanized mild iron washer below and one lead and one galvanized iron washer above the sheet. Rivet shall be sufficiently long to permit forming a hemispherical head. Riveting shall be done such that the lead washer shall be compressed to provide a watertight fit around the rivet.

1013A.3.3 Installation of Roofing Accessories

Same as Item 1013.3.3

1013A.3.4 Joints of Asphalt Roofing Accessories

Same as Item 1013.3.4

1013A.3.5 Roof Installation on Metal Purlins

Same as Item 1013.3.5

1013A.3.6 Water Leak Test

Same as Item 1013.3.6. For water and weather proofing, it shall be tested in accordance with ASTM D 1499.

1013A.4 Method of Measurement

Asphalt roofing sheets shall be measured and paid for on an area basis in square meters or part thereof, such roofing sheets including all laps, fasteners and rivets as installed complete and accepted.

1013A.5 Basis of Payment

Payment for completely installed and accepted roofing sheets shall be based on actual measurement and the corresponding contract unit price thereof. Payment based on contract unit price shall constitute full compensation.

Payment shall be made under:

Pay Item No.	Description	Unit of Measurement
1013A (a)	Corrugated Asphalt Roofing	Square Meter
1013A (b)	Roofing Accessories	Linear Meter
1013A (c)	Roof Ventilation	Each

References:

1. DPWH Standard Specifications for Public Works Structures (Buildings, Ports and Harbors, Flood Control and Drainage Structures and Water Supply Systems) Volume III, 1995 Edition
 - **Item 1013** - Corrugated Metal Roofing
2. DPWH Standard Specifications for Highways, Bridges, and Airports.
 - **Item 705** – Joint Materials
3. American Society for Testing Materials (ASTM)
 - **ASTM D 312/ 312 M** - Standard Specification for Asphalt Used in Roofing
 - **ASTM D 140/ 140 M** - Standard Practice for Sampling Bituminous Materials
 - **ASTM D 36/ D 36 M** - Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)
 - **ASTM D 3461** - Standard Test Method for Softening Point of Asphalt and Pitch (Mettler Cup-and-Ball Method)
 - **ASTM D 92** - Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester
 - **ASTM D 5/ D 5M** - Standard Test Method for Penetration of Bituminous Materials
 - **ASTM D 113** - Standard Test Method for Ductility of Bituminous Materials
 - **ASTM D 2042** - Standard Test Method for Solubility of Asphalt Materials in Trichloroethylene
 - **ASTM D 1499** - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Plastics
4. <http://www1.onduline.com/ph/> (July 3, 2015)
5. Mineral Products Industry – Emission Factors
6. Preliminary Performance Criteria for Bituminous Membrane Roofing
7. Testing Application Standard No 110-2000