



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

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DEPARTMENT ORDER)
NO. 44)
Series of 2015)

SUBJECT: DPWH Standard Specification for
Item 1039 - Aluminum Cladding

In line with the continuing efforts to upgrade the construction technology thru the adoption of successful research studies, this Department has approved the DPWH Standard Specification for **Item 1039 - Aluminum Cladding** subject to its specifications hereto attached.

This specification shall form part of the on-going revision of the DPWH Standard Specifications for Buildings, Ports and Harbors, Flood Control and Drainage Structures and Water Supply Systems (Volume III).

This Order shall take effect immediately.

ROGELIO L. SINGSON
Secretary

Department of Public Works and Highways
Office of the Secretary



WIN5U01055

5.5.2 FET/JFS

DPWH Standard Specification for Item 1039 - Aluminum Cladding

1039.1 Description

This Item covers aluminum cladding sheet as exterior and interior materials applied to the walls, columns and ceiling of a structure to protect from the effects of weather and for aesthetic purposes.

1039.2 Material Requirements

1039.2.1 Aluminum and Aluminum Alloy

Aluminum and aluminum alloy shall be flat sheet, coiled sheet, and plate, in the alloys and tempers shown in Tables 2 and 3 of ASTM B 209M, and in the following finishes:

- a) Plate in all alloys and sheet in heat-treatable alloys: mill finish.
- b) Sheet in non-heat-treatable alloys: mill finish, one-side bright mill finish, standard one-side bright finish, and standard two-sides bright finish.

Aluminum sheets shall be supplied without nail holes, and are normally applied horizontally (ceilings) and vertically (walls) in accordance with accepted practices.

1039.2.2 Rivet

The rivet shall conform to the following requirements or as specified in the plans:

Length	:	18.0 mm
Shaft Diameter	:	5.0 mm
Head Diameter	:	14.0 mm
Holes for Fixed Points	:	5.2 mm
Holes for Sliding Points	:	8.5 mm

1039.2.3 General Quality

Unless otherwise specified, the material shall be supplied in the mill finish and shall be uniform as defined by the requirements of this Item and shall be commercially sound. Any requirement not so covered shall be subjected to evaluation and approval of the Engineer. Framing system shall be made of aluminum to prevent corrosion of the panels.

Each sheet and plate shall be examined to determine conformance to this Specification with respect to general quality and identification marking.

1039.2.4 Tensile Properties of Material

Limits - The sheet and plate shall conform to the requirements for tensile properties as specified in Tables 2 and 3 of ASTM B 209 for non-heat-treatable and heat-treatable alloys, respectively.

Number of Samples - One (1) sample shall be taken from each end of each parent coil, or parent plate, but no more than one sample per 1000 kg of sheet or 2000 kg of plate, or part thereof, in a lot shall be required.

Test Specimens - Geometry of test specimens and the location in the product from which they are taken shall be as specified in ASTM Test Methods B 557M.

Test Methods - The tension test shall be made in accordance with ASTM Test Methods B 557M.

1039.2.5 Bend Properties

Limits - Sheet and plate shall be capable of being bent cold through an angle of 180 degrees around a pin having a diameter equal to *N* times the thickness of the sheet or plate without cracking, the value of *N* being as prescribed in Table 2 of ASTM B 209 for the different alloys, tempers, and thicknesses. The test need not be conducted unless specified on the purchase order.

Test Specimens - When bend tests are made, the specimens for sheet shall be the full thickness of the material, approximately 20 mm in width, and when practical, at least 150 mm in length. Such specimens may be taken in any direction and their edges may be rounded to a radius of approximately 2 mm. For sheet less than 20 mm in width, the specimens should be the full width of the material.

Test Methods - The bend tests shall be made in accordance with ASTM Test Method E 290 except as stated otherwise in 2.5 Test Specimens.

1039.3 Installation Requirements

Installation requirements shall be prepared by the Contractor and shall be approved by the Engineer.

1039.3.1 General

The Contractor/fabricator/installer is responsible for the designing, supplying and erecting the complete aluminum cladding system, coordinating and maintaining tolerances between the structures and cladding system.

When using aluminum cladding panels for cladding, a back-ventilated curtain façade shall be constructed. A ventilation space shall be left between the outer wall/insulation and the aluminum cladding panels through which moisture arising during construction or occupancy can escape. The ventilation space shall be sufficiently dimensioned in accordance with the pertinent regulations.

Ventilation gap shall be greater than or equal to twenty millimeter (≥ 20 mm). Condensation shall be removed via the ventilation.

Sufficient ventilation openings shall be ensured on the top and bottom edges of the exterior cladding as well as in the area of window and door openings. Planning details shall be coordinated between the Engineer and the Contractor.

The load-bearing exterior wall generally requires no special preparation. The exterior wall need not be plastered.

Every weather shell reacts to changing weather conditions and moisture with changes in dimension. If the structure is designed properly, these changes are captured in the weather shell and are not transferred to the exterior wall.

The moisture balancing and insulation during the summer and rainy season shall be guaranteed even under unfavorable construction conditions.

The façade surfaces, corners and edges of aluminum cladding panels shall be optimally protected against high impacts and jolts.

Dry construction materials in the case of back-ventilated cladding ensure reliable values for dew point calculation and determination of the insulation thicknesses.

Coats of paint for the purposes of renovation are not required in the case of back-ventilated cladding with permanently treated weather shells, eliminating the problem of moisture migration from inside to outside that is associated with such painting measures.

In contrast to plastered surfaces, graffiti can be removed from aluminum cladding panels.

Back-ventilated façades can be replaced at any location with panels of identical color.

1039.3.2 Manufacturing Tolerances

Preparatory to rolling aluminum cladding sheet and plate to the specified thickness, the aluminum or aluminum-alloy plates which are bonded to the alloy ingot or slab shall be of the composition shown in Table 1 of ASTM B 209 and shall each have a thickness not less than that shown in Table 5 of ASTM B 209 for the alloy specified.

When the thickness of the cladding is to be determined on finished material, not less than one transverse sample approximately 20 mm in length shall be taken from each edge and from the center width of the material. Samples shall be mounted to expose a transverse cross section and shall be polished for examination with a metallurgical microscope. Using 1003 magnification, the maximum and minimum cladding thickness on each surface shall be measured in each of five fields approximately 2.5 mm apart for each sample. The average of the ten values (five minima plus five maxima) on each sample surface is the average cladding thickness and shall meet the minimum average and, when applicable, the maximum average specified in Table 5 of ASTM B 209.

1039.3.3 Erection Tolerances

Limit variations from plumb, level, or dimensional angle to the following:

- a. Not more than 3 mm deviation in one (1) storey height, in 3m vertical, angular run, or in 6m horizontal run.
- b. Not more than 6mm deviation in 12m run, in any direction.
- c. At battered wall areas, plumb is defined to match indicated slope.

Limit variations from location (theoretical calculated position in plan or elevated based on established floor lines and column lines), including variations from plumb and level, to the following:

- a. Not more than 9.5 mm total deviation for member for 3 m run.
- b. Not more than 3 mm change in deviation for member for 3 m run.

1039.3.4 Weathering Sealants

Sealants shall be installed as indicated and required to achieve water and airtight assembly.

- a. Clean and prime joints with sealant. Install sealant and related backing material around the perimeter of frames.
- b. Apply sealant filling joint and tool smooth to insure full contact with adjacent surfaces. Strike off excess material.

1039.3.5 Workmanship, Finish, and Appearance

Workmanship - The product shall be free of defects that will impair appearance, erection, or serviceability.

Finish - The exposed surface of the cladding shall be smooth or otherwise textured as specified in the Plans.

1039.4 Cleaning, Protection, Test and Rejection

Clean surfaces complying with the manufacturer's recommendations prior to substantial completion, exercising care to avoid damage to protective coatings and finishes.

Initiate and maintain protection and other precautions required to ensure that system will be without damage or deterioration at the time of acceptance.

If any material fails to conform to all of the applicable requirements of this Item, it shall be cause for rejection of the inspection lot.

When there is evidence that a failed specimen was not representative of the inspection lot and when no other sampling plan is provided or approved by the Engineer through the contract or purchase order, at least two additional specimens shall be selected to replace each test specimen that failed. All specimens so selected for retest shall meet the requirements of the specification or the lot shall be subject to rejection.

Material in which defects are discovered subsequent to inspection may be rejected.

If material is rejected by the Engineer, the Contractor or Supplier shall be responsible only for replacement of the material to the Engineer. As much as possible, the rejected material shall be returned to the Contractor or Supplier by the Engineer.

1039.5 Method of Measurements

The area to be paid for shall be the number of square meter of the façade and/or ceiling to be covered with aluminum cladding, placed and accepted as the completed work, measured from edge to edge.

1039.6 Basis of Payment

The accepted number of square meter prescribed in Section 1039.5, Method of Measurement, shall be paid for at the contract unit price for aluminum cladding which payment shall be the full compensation for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work item.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
1039	Aluminum Cladding	Square Meters (m ²)

5.5.2 JVSA/AGD

References:

1. DPWH Standard Specifications for Public Works Structures, Volume III, 1995 Edition
2. American Society for Testing and Materials (ASTM)
3. American Concrete Institute (ACI)
4. Internet
 - a. <http://www.vivalda.co.uk/decorative-cladding/aluminium-cladding.html> (Nov. 19, 2014)
 - b. http://www.armetco.com/aluminum_panel.htm (Nov. 19, 2014)
 - c. http://webcache.googleusercontent.com/search?q=cache:http://www.bhel.com/dynamic_files/tender_files/pdf/Technical%2520specification%2520for%2520Aluminum%2520cladding%2520sheet.pdf (Nov. 19, 2014)