

# VARIFOAM

## (Insulated Sandwich Panels)

### (CORRUGATED AND FLAT)

## GENERAL TECHNICAL DATA

<b>Types of Varifoam panels</b>	Profiles, Flat, curved Panels, Acoustical Panels and Others
<b>Panels thickness</b>	Minimum 55 mm, Max. 170 mm, Standard 55, 75, 85, 100,125 & 150 mm
<b>Panel length</b>	Any length required. Nominal transportation limit 16.0 M. longer panels available using special transportation arrangement
<b>Panel weight</b>	Shall vary depending on metal skins and panels thicknesses. Panel VF-55 mm gage 0.5/0.5 mm approx. Weight 12.0 Kg/m <sup>2</sup> . panels VF-85 mm gage 0.75/0.75 approx. Weight 18.0 Kg/m <sup>2</sup> for further information contact HESCO office.
<b>Panel skin substrate</b>	Standard is galvanized steel designation G-90, other substrates such as aluminum, Zaltite or stainless steel available on special request
<b>Metal gages</b>	Nominal from 0.5 mm up to 0.9 mm, available standards: 0.5, 0.60, 0.75 and 0.90 mm
<b>Interior paint finish</b>	HESCO standard Polyester finish having a standard Bonewhite colour
<b>Exterior paint finish</b>	KYNAR PVF-2 , Duragard PVF-2, Versacor TF, HP-200
<b>Insulation type</b>	Polisocyanurate / Polyurethane foam core having 95% closed cell structure
<b>Foam properties</b>	Density from 32 – 37 Kg/m <sup>3</sup> or more for special panel or on request Tensile Strength = 3.0 Kg/Cm <sup>2</sup> Compressive Strength = 1.62 Kg/cm <sup>2</sup> , Insulation K factor = 0.018 W/M.K.
<b>Thermal heat transmission (U-value)</b>	Depending on the panel thickness and type profiles (VF) or flat (VFF) <b>Type U-VALUE</b> For VF-55 MM 0.42 w/m <sup>2</sup> deg. C For VF-85 MM 0.25 w/m <sup>2</sup> deg. C For VFF-100 MM 0.18 w/m <sup>2</sup> deg. C For VFF-150 MM 0.12 w/m <sup>2</sup> deg. C
<b>Fire test</b>	Classified as non-flammable, self-extinguishing <b>Flame spread:</b> German DIN standard B1 classification (ASTM-E84 tunnel test equivalent (25) <b>Smoke developed:</b> German DIN standard 53436/37: light transmission (%) 60 rating (ASTM-384 tunnel test equivalent approx. 450)
<b>Load span tables</b>	Varifoam is very strong: for example, Varifoam (VF-85 mm) roof panels using galv. Steel skins 0.75 mm/0.75 mm thick design wind load of 1.0 KN, and a deflection limit of L/180. The panel can span more than 5.0 M for multiple span conditions. Comprehensive Computer Printout Analysis available on request. For more information, refer to technical brochure or call HESCO office
<b>Laboratory test</b>	Various independent laboratory tests can be provided on request with particular reference to the following important tests. 1. Fire test B1 classification according to German DIN standard 2. Thermal transmittance test according to ASTM-C-236 3. Air infiltration and water penetration test according to ASTM E-283 4. Exterior coating performance test. (See details in paint specification)
<b>Quality control</b>	Various quality control in-house testing are performed continuously at HESCO plant. In-house quality control test and procedures manual available on request
<b>Quality assurance</b>	Varifoam manufacturing process itself as well as production methods; inspection, testing, quality control and general standard of workmanship have been examined and approved by (Lloyds Register of Shipping): a worldwide organization recognized and respected throughout the industry. (Copy of the certificate available on request)
<b>Erection manual</b>	Erection manual available on request

# Architectural Specification

## A) SCOPE OF WORK:

Furnish insulated metal roof and wall panels and accessories in accordance with this specification and all applicable drawings. Products to be considered equal to those specified below must be approved in writing by the Architect.

## B) PRODUCT DESCRIPTION:

- B1. **General:** Varifoam a factory made insulated metal roof and wall cladding panels, shall be a nominal 1.0 M wide and having a thickness of (55, 75, 85, 100 or 150 mm). The panel length shall be maximum possible, with length as shown on the drawings. The panels shall present a fluted surface externally and flat surface internally and could be flat externally & internally. The panels shall be as manufactured by HESCO, Al-Howaish Industrial Co., Ltd. in Jeddah, Saudi Arabia HESCO Tel. 637 8000 / Fax 636 4566.
- B2. **Physical Properties:**
- B2-1 **Steel Skins:** The interior and exterior face skins shall be formed of 0.50, 0.60, 0.75 or 0.90 mm) gage galvanized steel conforming to ASTM –A446-71 grade A structural quality with hot-dipped commercial quality galvanized coating, designation G-90 (275 gm/m<sup>2</sup>).
- B2-2 **Insulation:** Continuously poured in place rigid expanded Polysocyanurate / Polyurethane foam with a minimum 95% closed cell structure.  
**Density:** 37 kg/m<sup>3</sup> (minimum) determined in accordance with the procedures specified in ASTM D 1622-63 (re-approved 1975)  
**Tensile Strength:** 3.0 Kg/cm<sup>2</sup> (minimum) determined in accordance with the procedures specified in ASTM C 297-76  
**Compressive Strength:** 1.62 kg/m<sup>2</sup> (minimum) determined in accordance with the procedures specified in ASTM C-365-57 (re-approved 1976)
- B2-3 **Colour Coating:** The exterior face of panels and exterior flashing shall receive a factory applied (KYNAR PVF-2, HP 200 pr VERSACOR TF) paint finish having a colour to be selected from HESCO standard colour range. The interior face of panels and interior flashings shall receive a factory applied decorative HESCO standard Polyester paint finish having a Bonewhite colour. (KYNAR PVF-2, HP 200 or VERSACOR TF) coating specifications shall be as detailed in a separate section of these specification.
- B2-4 **Side Joints:** The side joints shall be of the male-female interlocking type. All side joints shall have one line of factory applied caulking at lower leg of the female side and additional two lines of field applied sealant below the batten cover in the case of roof panels. All side joints of roof and wall panels shall be covered with a roll-formed batten strip. This batten strip is fastened on both sides with stainless steel pop rivets staggered at 400 mm center.
- B2-5 **End Lap Joints:** If multiple courses are required, the joints shall be accomplished by the erector cutting back the interior liner and removing the foam as per details and recommendation from the manufacturer. Two line of sealant must be used at all lap joints and extra stainless steel fasteners to insure good lasting performance as per manufacturer's recommendation.
- B2-6 **Fastening:** The Varifoam shall be secured to the structural frame with stainless steel self-tapping screws with combination washers. Stainless steel screws are to have colored plastic caps to match colour of Varifoam. Flashing and accessories shall be installed with stainless steel sheet metal screws and or stainless steel pop rivets as per manufacturer's standard practice.
- B2-7 **Metal Flashing and Trim:** shall be factory formed from the same material and finish as the face skins of panel.

C) **PRODUCT PERFORMANCE:**

- C1 **Structural Tests:** Structural design shall have been verified by witnessed structural tests for wind loads by the “Chamber Method” as outlined in ASTM specification E72. Standard test design loading shall be 1,000 n/m<sup>2</sup> positive to negative simulated wind load and a deflection limit if L/180 under positive loading.
- C2 **Fire Performance Testing:** Panels shall be rated and carry the following listings:  
C2-1 **Flame Spread:** German DIN standard B1 classification (ASTM E84 Tunnel Test Equivalent 25)  
C2-2 **Smoke Developed:** German DIN standard 53436/37 Light Transmission (%) 60 rating (ASTM E84 Tunnel Test Equivalent approximate 450).
- C3 **Thermal Value:** The panels when tested by recognized independent laboratories should achieve a U-Value of 0.42 w/m<sup>2</sup> deg. C at 55 mm thick in accordance with ASTM C-236 (ASHRAE Winter Design) with 15 MPH wind outside, still air inside.
- C4 **Weather Tightness:** Panels shall meet the air infiltration test when tested by recognized independent laboratories in accordance with ASTM E-283 (Test of rate of air leakage), with a static pressure difference of 5.0 PSF to 20 PSF. Panels should also meet the water penetration test as conducted in accordance with ASTM E-331 “Test of Water Penetration” with a static pressure difference of 5.0 PSF to 20.0 PSF.
- C5 **Colour Coating Testing:** Panel coating shall meet all performance criteria as listed in the appropriate paint specification depending on the selected coating system as specified above (either KYNAR-PVF2, HP-200 or VERSACOR TF finish.)