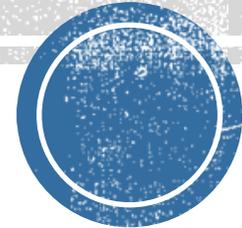




EXPANDED POLYSTYRENE SOLUTIONS



## STYRO Insulations Mat. Ind. (L.L.C)

Established in January 2000

STYRO provides complete integrated insulation and construction solutions for residential, commercial infrastructural and governmental structures. Our services cover consultation, materials and installation of various products that insure proper insulation from liquid, gases, and soundproofing; in addition to our non-dispensable elements for constructions.



# Manufacturing Process

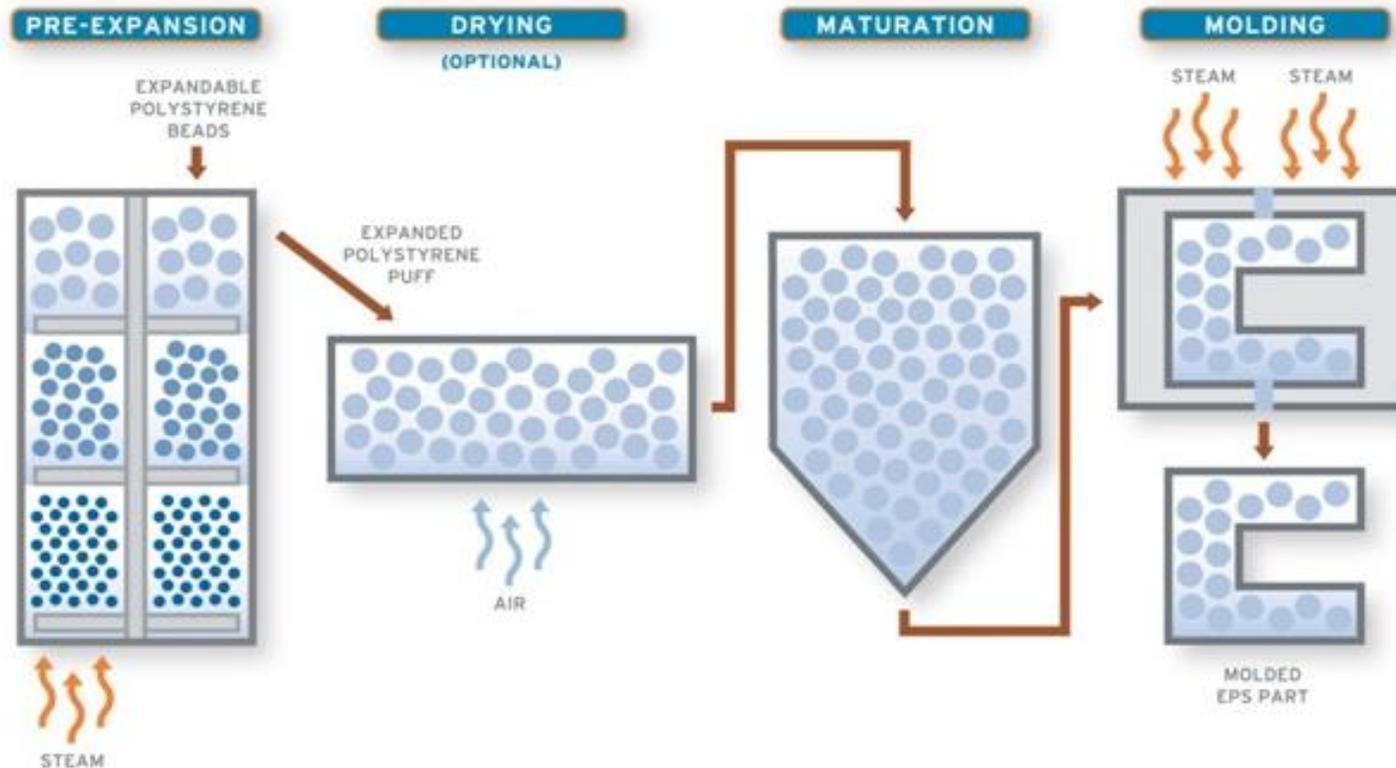
Raw material → BASF – Germany - Receiving raw material from the supplier on that time we verified the certificate of analysis for beads size, percentage of pentane,

Pre-expansion → Upon contact with steam the pre-foaming agent found within the polystyrene beads (pentane) starts to boil and the beads are expanded to between 40 to 50 times their original volume.

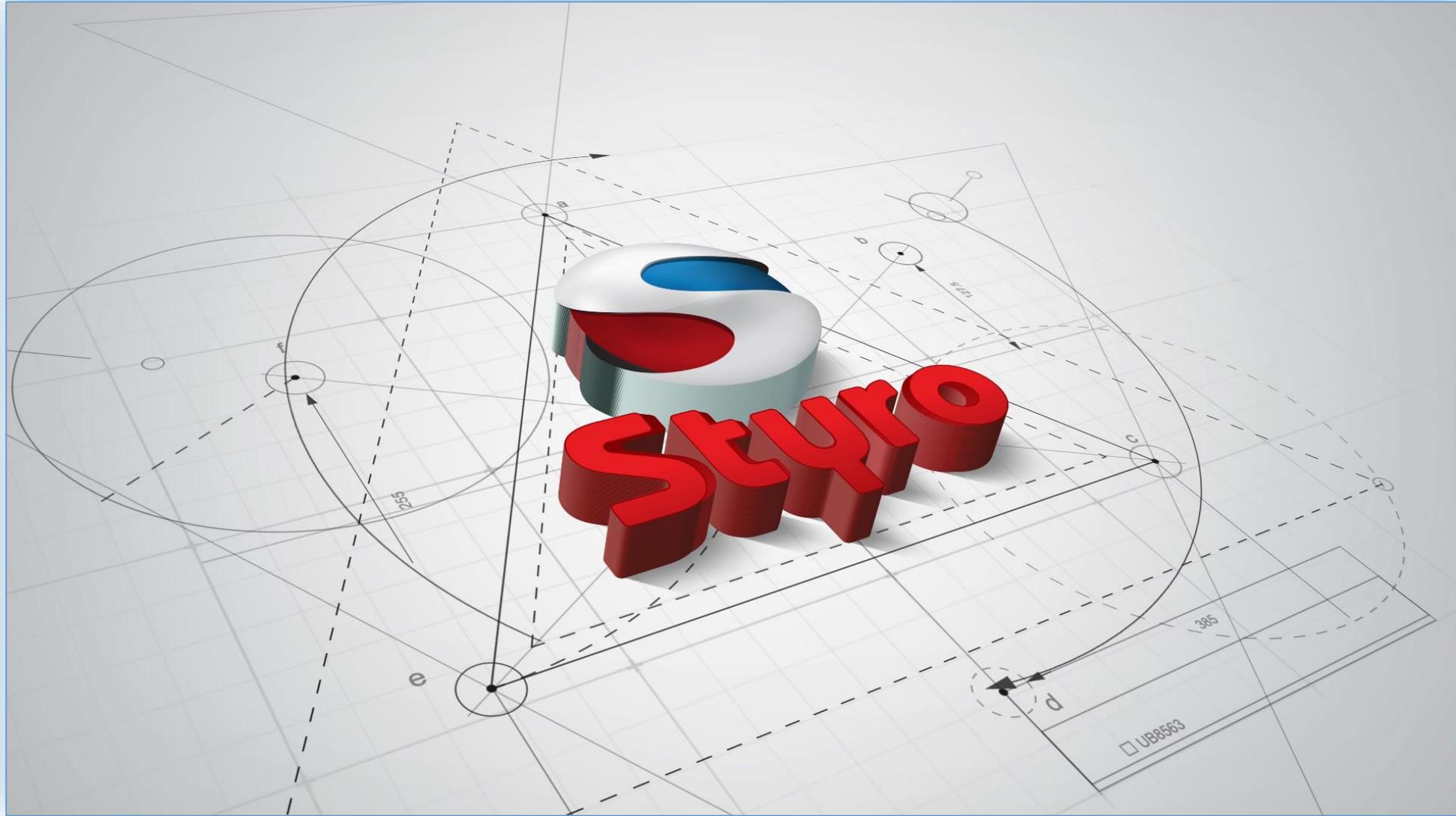
Beads curing → Normally expanded beads will be stored from 4 to 24 hrs in the aerated silo bags. In order to reach an equilibrium temperature & pressure.

Block moulding → The beads are placed within a mould and again re-heated with steam. The pre-foamed beads expand further, completely fill the mould cavity and fuse together. The beads are moulded to form block and customized products.

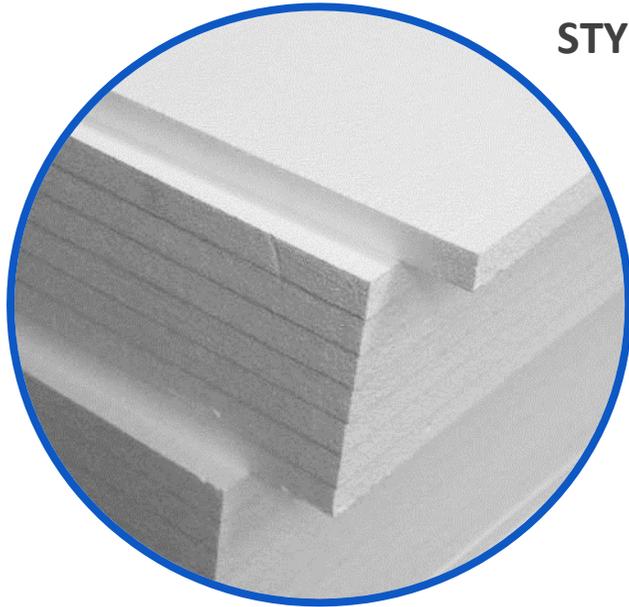
Blocks curing → Moulded EPS products are kept for drying purpose for at least 3 – 4 weeks to get good dimensional stability, compressive strength and smooth surface finish during cutting process.



# Manufacturing Process of STYRO Expanded polystyrene

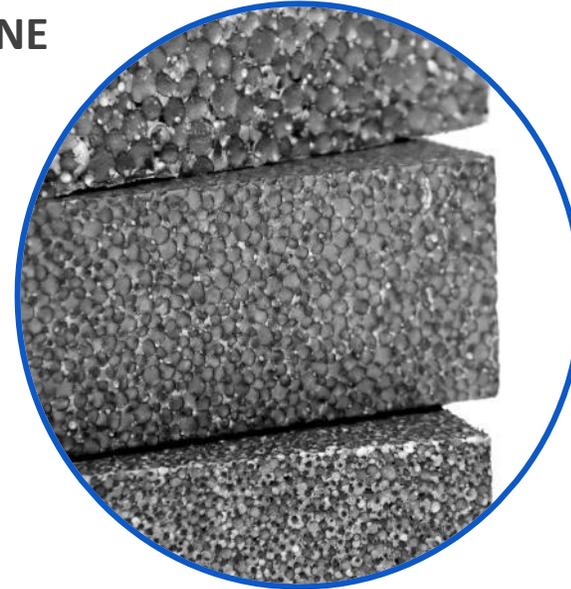


# STYRO Products



## STYRO EXPANDED POLYSTYRENE

Expanded Polystyrene (EPS) is a generic term for polystyrene and styrene copolymers. It is a rigid cellular plastic foam material derived from petroleum and natural gas by products.



## STYRO GRAYPOR

STYRO Graypor is an energy-efficient, cost-effective, innovative, grey-color EPS insulation material introduced by STYRO provided by BASF. Its Infrared absorbers and reflectors prevent the heat dissipation caused by radiation.

# Non-Polluting material

---

Our products is free from :

Free from Ozone depleting substances ( CFS ,HCFC ,Halons and Methyl bromide )

Free from Brominated compounds (PBPEs and PBBs)

Free from lead ,Iadmium ,chromium (VI) and mercury

Free from asbestos content .





## DECLARATION LETTER

To Whom it May Concern,

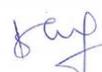
### Environment Impact Factors ODP, CFC & GWP

**ODP=0** - The ODP or (Ozone Depletion Potential) is the potential for a single molecule of the refrigerate to destroy the Ozone Layer.

**GWP<5** - Since it has no HCFC/ CFC Compound it comes under the group of GWP.

**EPS contains no CFC's, HCFC's**, it is not noxious, and it is physically and chemically inert. It contains no known biological or physiological irritant, thus it is **Environment Friendly**, since it has no Chlorine content.

For **STYRO Insulations Mat. Ind. LLC**

  
Mr. Noor S.K  
Business Development Director



### **Styro Insulation Mat. Ind. (L.L.C)**

Industrial Area - 11  
P.O.Box 29272, Sharjah  
United Arab Emirates

T : 971 6 534 4504  
F : 971 6 534 4506

info@styrouae.com  
www.styrouae.com



# Environment Impact factors

- So , STYRO Products are comply with LEED and estidama requirements





UL2818  
Certification  
as per CDPH  
STANDARD  
Method V1.2

- TVOC → 0.22 mg/m<sup>3</sup>

# Technical Data Sheets



## STYRO GRAYPOR

### Technical and Physical Properties

Standards	ASTM C 578	TYPE XI	TYPE I	TYPE VIII	TYPE II	TYPE IX
	BS 3837	LD	SD	HD	EHD	UHD
Product	Graypor 150	Graypor 180	Graypor 220	Graypor 290	Graypor 380	
Density	12-15	15-18	18-22	22-29	29-38	
	( Kg / m <sup>3</sup> )					
Compressive Resistance	35	69	90	104	173	
	(@ yield or 10 % deformation, which occurs first, min kPa)					
Thermal Resistance R-Value	0.75	0.78	0.79	0.79	0.79	
	( of 25.4 mm thickness @ mean temperature of 24 ± 1 °C min,K.m <sup>2</sup> /W )					
Thermal Conductivity K-Value	0.0335	0.0322	0.0321	0.0320	0.0320	
	( max, W/m.K @ 35 °C and 60 % RH, as per independent tests )					
Flexural Strength	70	173	208	240	345	
	(min, kPa)					
Water Vapor Permeance	5	5	3.5	3.5	2.5	
	( of 25.4 mm thickness, max, perm )					
Water Absorption	4	4	3	3	2	
	( total immersion, max, volume % )					
Dimensional Stability	2.0	2.0	2.0	2.0	2.0	
	(change in dimensions, max % )					
Oxygen Index	24	24	24	24	24	
	( min, volume % )					
Flame Spread Index	5	5	5	5	5	
	( max, as per surface burning characteristics-UL 723 )					
Smoke Developed	20	20	20	20	20	
	( max, as per surface burning characteristics-UL 723 )					



## STYRO Expanded Polystyrene (EPS)

### Technical and Physical Properties

Standards	ASTM C 578	TYPE XI	TYPE I	TYPE VIII	TYPE II	TYPE IX	TYPE XIV	TYPE XV
	BS 3837	LD	SD	HD	EHD	UHD	SHD	XD
Product	STYRO 150	STYRO 180	STYRO 220	STYRO 290	STYRO 380	STYRO 460	STYRO 500	
Density	12-15	15-18	18-22	22-29	29-38	38-46	min 46	
	( Kg / m <sup>3</sup> )							
Compressive Resistance	35	80.8	120	141	205	285	422	
	(@10 % deformation, kPa)							
Thermal Resistance R-Value	0.60	0.64	0.67	0.71	0.72	0.73	0.74	
	( of 25.4 mm thickness @ mean temperature of 24 ± 1 °C min,K.m <sup>2</sup> /W )							
Thermal Conductivity K-Value	0.0422	0.0395	0.0377	0.0354	0.0353	0.0348	0.0341	
	( max, W/m.K @ 35 °C and 60 % RH )							
Flexural Strength	70	185.8	228.1	260	352.9	442.3	525.1	
	(min, kPa)							
Water Vapor Permeance	3.5	3.3	3.2	3.1	2.7	2.5	2.2	
	( of 25.4 mm thickness, max, perm )							
Water Absorption	2.0	1.8	1.6	1.3	1.1	0.9	0.7	
	( total immersion, max, volume % )							
Dimensional Stability	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
	(change in dimensions, max % )							
Oxygen Index	24	24	24	24	24	24	24	
	( min, volume % )							
Flame Spread Index	5	5	5	5	5	5	5	
	( max, as per surface burning characteristics ASTM E84-UI 723 )							
Smoke Developed	5	5	5	5	5	5	5	
	( max, as per surface burning characteristics ASTM E84-UI 723 )							



P.O.Box: 29272, Sharjah-UAE  
+971 6 534 4504

P.O.Box: 9108, Abu Dhabi-UAE  
+971 2 551 3688

info@styrouae.com  
www.styrouae.com



P.O.Box: 29272, Sharjah-UAE  
+971 6 534 4504

P.O.Box: 9108, Abu Dhabi-UAE  
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info@styrouae.com  
www.styrouae.com



# STYRO PRODUCTS ARE COMPLY WITH ASTM C578

**C578 - 19**

**TABLE 1 Physical Property Requirements of RCPS Thermal Insulation**

Note 1—It is possible that values for properties listed in this table will be affected by the presence of a surface skin which is a result of the manufacturing process. The values for Type XIII properties listed in this table must be generated on material with the surface skin removed. Where products are tested with skins-in-place, this condition shall be noted in the test report.

Note 2—Type III has been deleted because it is no longer available.

Note 3—In addition to the thermal resistance values in Table 1, values at mean temperatures of 25 ± 2°F (-4 ± 1°C), 40 ± 2°F (4 ± 1°C), and 110 ± 2°F (43 ± 1°C) are provided in XI.7 for information purposes.

Note 4—Values quoted are maximum values for 1.00 in. (25.4 mm) thick samples with natural skins intact. Lower values will result for thicker materials. Where water vapor permeance is a design issue, consult manufacturer.

Note 5—It is acceptable to determine the values for thermal resistance listed in this table on product at a thickness other than 1 in. (25.4 mm) in accordance with 7.2.2.1. When tested at a thickness other than 1 in. (25.4 mm), the thermal resistance per inch shall meet the minimum requirement.

Note 6—Types XI, I, VIII, II, IX, XIV and XV are typically EPS insulation. Types XII, X, XIII, IV, VI, VII and V are typically XPS insulation.

Classification	Type I	Type II	Type III	Type IV	Type V	Type VI	Type VII	Type VIII	Type IX	Type X	Type XI	Type XII	Type XIII	Type XIV	Type XV
Compressive resistance at yield or 10 % deformation, whichever occurs first (with skins intact), min, psi (kPa)	5.0 (35)	10.0 (69)	13.0 (90)	15.0 (104)	25.0 (173)	40.0 (276)	60.0 (414)	15.0 (104)	15.0 (104)	20.0 (138)	25.0 (173)	40.0 (276)	60.0 (414)	60.0 (414)	100.0 (690)
Thermal resistance of 1.00-in. (25.4-mm) thickness, min. F·h/Btu (K·m <sup>2</sup> /W) Mean temperature, 75 ± 2°F (24 ± 1°C)	3.1 (0.55)	3.6 (0.63)	3.8 (0.67)	4.0 (0.70)	4.2 (0.74)	4.3 (0.76)	4.6 (0.81)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)	5.0 (0.88)
Flexural strength, min, psi (kPa)	10 (70)	25 (173)	30 (208)	35 (240)	50 (345)	60 (414)	75 (517)	40 (276)	40 (276)	45 (310)	50 (345)	60 (414)	75 (517)	100 (690)	100 (690)
Water vapor permeance of 1.00-in. (25.4-mm) thickness (See Note 4), max, perms (g/24 in <sup>2</sup> /hr)	5.0 (287)	3.0 (287)	3.3 (201)	3.5 (201)	2.8 (143)	2.5 (143)	2.2 (89)	1.5 (89)	1.5 (89)	1.5 (114)	1.5 (86)	1.1 (63)	1.1 (63)	1.1 (63)	1.1 (63)
Water absorption by total immersion, max, volume %	4.0	4.0	3.0	3.0	2.0	2.0	0.3	0.3	1.0	0.3	0.3	0.3	0.3	0.3	0.3
Dimensional stability (change in dimensions), max, %	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Oxygen index, min, volume %	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Density, min, lb/ft <sup>3</sup> (kg/m <sup>3</sup> )	0.70 (112)	0.90 (143)	1.15 (182)	1.35 (209)	1.80 (279)	2.40 (368)	3.00 (458)	1.20 (182)	1.50 (226)	1.50 (226)	1.45 (219)	1.45 (219)	1.80 (279)	2.20 (332)	3.00 (448)

**TABLE 2 Common Dimensions of RCPS Thermal Insulation**

Type	XI, I, VIII, II, IX, XIV, XV	X, IV, XII	V, VII	V	XIII
Width, in. (mm)	12 to 48 (305 to 1219)	16, 24, 48 (406, 610, 1219)	24 (610)	16 (406)	14 to 20 (356 to 508)
Length, in. (mm)	48 to 192 (1219 to 4877)	48, 96, 108 (1219, 2438, 2743)	48, 96 (1219, 2438)	96 (2438)	36 to 112 (914 to 2846)
Thickness, in. (mm)	¼ to 24 (9.5 to 610)	½ to 4 (13 to 102)	1 to 4 (25 to 102)	1 to 4 (25 to 102)	7 to 10 (178 to 254)

7.1.2 All dimensional requirements are described in Section 8.

7.1.3 All workmanship, finish, and appearance requirements are described in Section 9.

7.1.4 Density shall be in accordance with Table 1.

Note 2—For lots of 150 units or less, the tightened inspection sampling plan in Practice C390 will be followed.

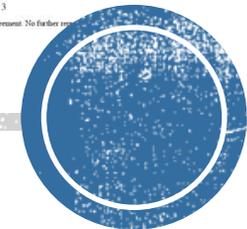
7.2 **Qualification Requirements:**

7.2.1 The physical properties listed in this section of the specification are defined as qualification requirements (refer to Practice C390). Thermal resistance, compressive resistance, flexural strength, water vapor permeance, water absorption, dimensional stability, and oxygen index shall be in accordance

with Table 1. The average test value based upon testing the number of test specimens required by the specified test method for each physical property or Section 11 of this specification shall be used to determine compliance.

7.2.2 The mean thermal resistance of the material tested shall not be less than the minimum value identified in Table 1. The thermal resistances of individual specimens tested shall not be less than 90 % of the minimum value identified in Table 1.

7.2.2.1 Test 1 in. (25.4 mm) thick specimens for determination of compliance with thermal resistance, compressive resistance, water vapor permeance, water absorption, dimensional stability and density property requirements in Table 1. If



# STYRO Certification:

**AD** **مجلس أبوظبي للجودة والمطابقة**  
**ABU DHABI QUALITY AND CONFORMITY COUNCIL**

**وثيقة المطابقة**  
**Conformity Document**

Certificate No:	<b>QAD-2022.0313.01-IP</b>	رقم الشهادة:
Expiry Date:	<b>13 March 2023</b>	تاريخ الانتهاء:

Issuing Date: **14 March 2022** تاريخ الاصدار:

Conformity Scheme: **Insulation Products Certification Scheme** برنامج المطابقة:

Product: **EXPANDED POLYSTYRENE** المنتج:

Name and Address of the Licensee: **STYRO INSULATION MATERIAL INDUSTRIES LLC**  
**Icad III (57SR40), Postal code 9108 Abu Dhabi, UAE** اسم وعنوان صاحب الحق باستخدام العلامة:

Name and Address of the Manufacturer and the Factory: **STYRO INSULATION MATERIAL INDUSTRIES LLC**  
**Icad III (57SR40), Postal code 9108 Abu Dhabi, UAE** اسم وعنوان المصنع ومكان التصنع:

Trademark / Brand Name: **STYRO** العلامة التجارية / الاسم التجاري:

QAD-2022.0313.01-IP

This is an electronic certificate and does not require stamp  
 Visit our website to verify this certificate:  
<https://qadab.qcc.abudhabi.ae/en/pages/homepage.aspx>  
 Any changes or modification on this certificate will affect its validity

من الوثيقة الإلكترونية لا يحتاج إلى ختم  
 زيارتنا موقعنا للتحقق من هذه الشهادة:  
<https://qadab.qcc.abudhabi.ae/en/pages/homepage.aspx>  
 أي تغييرات أو تعديل على هذه الشهادة سيؤثر على صحتها



**حكومة دبي** **بلدية دبي**  
**GOVERNMENT OF DUBAI** **DUBAI MUNICIPALITY**

**CERTIFICATE OF PRODUCT CONFORMITY**  
 Dubai Central Laboratory Department (DCLD) of Dubai Municipality hereby attests that the product(s)

**Rigid Cellular Polystyrene Thermal Insulation**  
 (Details as per the attached Scope of Certification)  
 manufactured by:  
**STYRO INSULATIONS MAT . IND . LLC**  
**Industrial Area No. 11, Sharjah, U.A.E.**

have been assessed in accordance with DCLD Document Ref. No. DM-DCLD-RD-DP21-2001 (IC) "General Rules for DM third party product certification system through factory assessment" and the relevant Specific Rules, and were found in conformity with the standard specification:

**ASTM C 578:18**  
 Accordingly, DCLD hereby authorizes the above manufacturer to affix the DCL Product Conformity Mark on the above-mentioned product(s).

for / **ENGR. AMIN AHMED AMIN**  
 Director, Dubai Central Laboratory Department  
 Dubai Municipality

**IAF** **Elc2C** **CB-PRD-001** Certificate No: **CL00020005** Rev 1 Valid Until: **30/09/2023** **DCLD** **PRODUCT CONFORMITY** Current Issue Date: **06/07/2022** Original Issue Date: **11/12/2009**

The attached Scope of Certification bearing the same Certificate Number forms an integral part of this Certificate.  
 This Certificate is an electronic document subject to the Terms and Conditions of the Product Certification System and shall not be reproduced except in full.

تتمثل الوثيقة المرفقة بـ نطاق الشهادة التي تحمل نفس رقم الشهادة كجزء لا يتجزأ من هذه الشهادة.  
 هذه الشهادة هي وثيقة إلكترونية تخضع لشروط وأحكام نظام شهادة المنتج، ولن يتم إعادة إنتاجها إلا بأكملها.



## Certificate of Compliance



You have been awarded:  
**Intertek ETL US Mark for Thermal Insulation Boards**

Standards: UL 723 (2010)

Certificate number: WH116-28153601

**Organization:** Styro Insulations Mat . Ind . LLC  
**P.O. Box 29272**  
**Industrial Area – 11**  
**Sharjah**  
**United Arab Emirates**

**Product:** STYRO Expanded Polystyrene G (EPS)  
**Spec ID:** 37391  
**Listing Information:** See following page(s)

**Certification body:** Intertek Testing Services NA, Inc.  
**Initial registration:** May 12, 2016  
**Date of expiry:** December 31, 2023  
**Issue status:** 9

  
**Authorized By:**  
**Jean-Philippe Kayl, Director of Certification**  
Intertek Testing Services NA, Inc.  
545 E. Algonquin Road, Ste H, Arlington Heights, IL 60005 USA  
Phone: 847-439-5667 Fax: 847-439-7320

[www.intertek.com](http://www.intertek.com)

The certificate and schedule are held in force by regular annual surveillance visits by Intertek Testing Services NA, Inc. and the reader or user should contact Intertek to validate its status. This certificate remains the property of Intertek Testing Services NA, Inc. and must be returned to them on demand. This Certificate is for the exclusive use of Intertek's Client and is provided pursuant to the Certification agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this certificate. Only the Client is authorized to permit copying or distribution of this certificate and then only in its entirety. Use of Intertek's Certification mark is restricted to the conditions laid out in the agreement. Any further use of the Intertek name for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. Initial Factory Assessments and Follow-up Services are for the purpose of assuring appropriate usage of the Certification mark in accordance with the agreement, they are not for the purposes of production quality control and do not relieve the Client of their obligations in this respect.

## Certificate of Compliance



You have been awarded:  
**Intertek ETL US Mark for Thermal Insulation Boards**

Standards: UL 723 (2010)

Certificate number: WH116-28153602

**Organization:** Styro Insulations Mat . Ind . LLC  
**P.O. Box 29272**  
**Industrial Area – 11**  
**Sharjah**  
**United Arab Emirates**

**Product:** STYRO Expanded Polystyrene W (EPS)  
**Spec ID:** 37392  
**Listing Information:** See following page(s)

**Certification body:** Intertek Testing Services NA, Inc.  
**Initial registration:** May 12, 2016  
**Date of expiry:** December 31, 2023  
**Issue status:** 9

  
**Authorized By:**  
**Jean-Philippe Kayl, Director of Certification**  
Intertek Testing Services NA, Inc.  
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## Certificate of Compliance



You have been awarded:  
**Intertek ETL US Mark for Exterior Cladding Systems & Components**

Standards: NFPA 285 (2012), NFPA 288 (2016) Ed. 2017, NFPA 285 (2019)

Certificate number: WH120-28153606

**Organization:** Styro Insulations Mat . Ind . LLC  
**P.O. Box 29272**  
**Industrial Area – 11**  
**Sharjah**  
**United Arab Emirates**

**Product:** STYRO Exterior Insulation and Finish System  
**Spec ID:** 56914  
**Listing Information:** See following page(s)

**Certification body:** Intertek Testing Services NA, Inc.  
**Initial registration:** June 09, 2020  
**Date of expiry:** December 31, 2023  
**Issue status:** 3

  
**Authorized By:**  
**Jean-Philippe Kayl, Director of Certification**  
Intertek Testing Services NA, Inc.  
545 E. Algonquin Road, Ste H, Arlington Heights, IL 60005 USA  
Phone: 847-439-5667 Fax: 847-439-7320

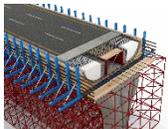
[www.intertek.com](http://www.intertek.com)

The certificate and schedule are held in force by regular annual surveillance visits by Intertek Testing Services NA, Inc. and the reader or user should contact Intertek to validate its status. This certificate remains the property of Intertek Testing Services NA, Inc. and must be returned to them on demand. This Certificate is for the exclusive use of Intertek's Client and is provided pursuant to the Certification agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this certificate. Only the Client is authorized to permit copying or distribution of this certificate and then only in its entirety. Use of Intertek's Certification mark is restricted to the conditions laid out in the agreement. Any further use of the Intertek name for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. Initial Factory Assessments and Follow-up Services are for the purpose of assuring appropriate usage of the Certification mark in accordance with the agreement, they are not for the purposes of production quality control and do not relieve the Client of their obligations in this respect.





# STYRO Solutions



**STYRO** Void Fill



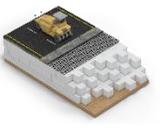
**STYRO** Void Formers



**STYRO** Piling



**STYRO** Floor Raising



**STYRO** Geofoam



**STYRO** Landscaping



**STYRO** EIFS

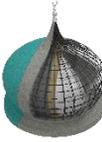
**STYRO** Roof Insulation



**STYRO** Domes with EIFS



**STYRO** Domes for Concrete Casting



**STYRO** Interior Decoration



**STYRO** Buoys



**STYRO** Pontoons



**STYRO** EDPS



**STYRO EIFS**

# Types of EIFS Systems

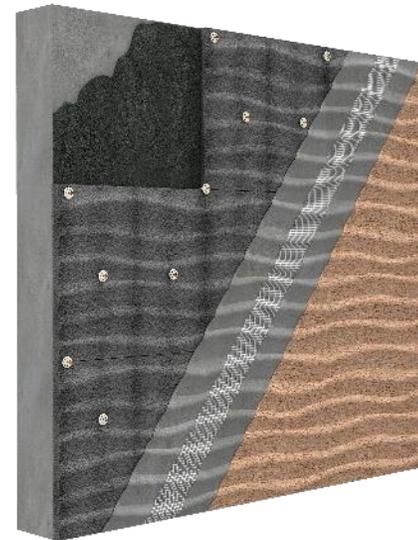
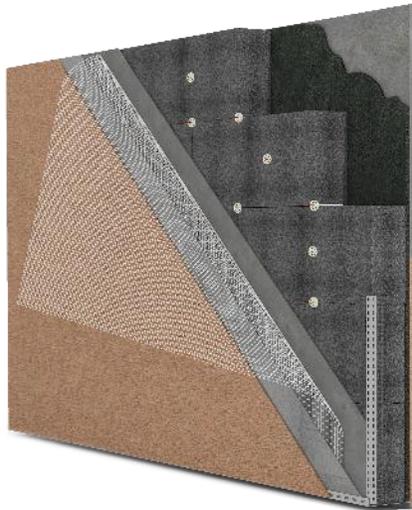
## STYRO EIFS Systems

1. EI (External Insulation)

2. ED (External Decoration)

3. ID (Insulation & Decoration)

4. MM (Mix Media)



## Why STYRO EIFS?

Many superior features which make STYRO EIFS the product of choice for decorative and insulation include:

- Thermal Performance
- Relatively Low Cost
- Moisture Protection
- Lightness
- Fire Safety
- Flexibility
- Finish Durability
- Ease of transportation and installation
- High compressive strength
- Easy Maintenance
- Design versatility
- Weather Resistance
- Colour Fastness
- Impact Resistance
- Adaptability to long spans and curvatures
- Suitability For Recladding Particularly Over Uninsulated Concrete And Masonry
- Energy Savings



# Thermal Conductivity of STYRO Graypor:

- STYRO Graypor is recommended material to be used as thermal insulation as it has low thermal conductivity and superior thermal resistance, in this case study we GRAYPOR 180 will be used.
- It has thermal conductivity of **0.0322 W/mk.**

 GOVERNMENT OF DUBAI	<b>Organization/Unit:</b> إدارة مختبر دبي المركزي Dubai Central Laboratory Department	الوحدة التنظيمية:	 بلدية دبي DUBAI MUNICIPALITY
	<b>Document Title:</b> THERMAL TRANSMISSION PROPERTIES BY HEAT FLOW METER (THERMAL COND)	عنوان الوثيقة:	
	<b>Doc Ref.:</b> DM-DCLD-F-CM-0100	رقم الوثيقة :	

**CONSTRUCTION MATERIAL LABORATORY SECTION  
GREEN BUILDING PRODUCT UNIT**

<b>Report No:</b>	409154	<b>Request No:</b>	EMTX-2022-1006570
TEST NO / SPECIMEN NO.	1	2	3
MEASURED THICKNESS (L) (mm)	49.86	49.83	51.14
MEASURED DENSITY (kg/m <sup>3</sup> )	16.15	16.20	16.26
MEAN TEMPERATURE ACHIEVED (deg C)	34.96	35	34.93
AVERAGE HEAT TRANSFER (q) μV	1905	1911	1859
THERMAL CONDUCTIVITY, W/(m K)	0.0322	0.0323	0.0322
THERMAL CONDUCTIVITY, Btu-in /h.square ft.degF	0.2233	0.2240	0.2233
AVERAGE THERMAL CONDUCTIVITY, W/(m K)			0.0322
THERMAL RESISTANCE, (Square m K) / W	1.5484	1.5427	1.5882
THERMAL RESISTANCE, ft square / Btu	8.7938	8.7614	9.0198
AVERAGE THERMAL RESISTANCE, (Square m K) / W			1.5598
AVERAGE TEMPERATURE GRADIENT (K/m)	399.77	400.04	389.40
WEIGHT DIFFERENCE (%)	-0.027	-0.041	-0.040
TEST DURATION (h:mm:ss)	02:36:02	03:16:27	02:37:09
<b>Sampled By:</b>	Mr. Lino /DM	<b>Tested By:</b>	NIMIAH
<b>Sampled Brought By:</b>	Raman / Client Representative	<b>Testing Date:</b>	14/02/2022 09:26AM
<b>Sampling Method:</b>	DCL-IC-99	<b>Sampling Report No:</b>	NA
<b>Test Method:</b>	ASTM C518-17	<b>Test Method Variation:</b>	NIL
<b>Remarks:</b>	CUSTOMER PERFORMED SAMPLING AND PROVIDED THE SAMPLE; THE RESULTS APPLY ONLY TO THE SAMPLE AS RECEIVED AND TESTED.		

**Disclaimer :** \* Information is supplied by the customer and Laboratory is not responsible for this data.

\*\*\* END OF REPORT \*\*\*

*This report is computer approved and authorized by Head of Unit and does not require any signature.*



PO Box 67, Dubai, UAE - Tel: (+971 4) 3027216 - Email: labs@dm.gov.ae - Website: http://www.dm.gov.ae

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## U-Value Comparison between EIFS Building & Non-EIFS Building:

### Case study:

- U-value calculation for a building using EIFS system/for façade.
- Assuming that:
  - The insulation thickness is **50 mm** and hollow blocks are existing as a substrate.
  - The Maximum U-value for external wall is **0.57 W/m<sup>2</sup>k**

U value Calculation for External Wall with (EIFS)			
S.no	Thickness (mm)	Layers	Resistance (W/m <sup>2</sup> .k)
1	200	Hollow blocks	0.171
2	20	Plastering	0.028
3	5	Adhesive (cement)	0.007
4	50	Thermal insulation board Graypor 180 (k = 0.0322 W/mk)	1.55
5	2	Base coat (cement)	0.006
6	2	Second coat (cement)	
7	1.5	Finishing	0.010
Total R value (W/m <sup>2</sup> .k)			<b>1.772</b>
U Value (W/m <sup>2</sup> . K)			<b>0.56</b>

U value Calculation for External Wall without (EIFS)			
S.no	Thickness (mm)	Layers	Resistance (W/m <sup>2</sup> .k)
1	200	Hollow blocks	0.171
2	20	Plastering	0.028
7	1.5	Finishing	0.010
Total R value (W/m <sup>2</sup> .k)			<b>0.209</b>
U Value (W/m <sup>2</sup> . K)			<b>4.78</b>

- These two U-Values of Facade calculated above will be used to determine the heat gain in summer and heat loss in winter.





# Heat Transfer Comparison between EIFS Building & Non-EIFS Building

## Assumption:

### Summer cooling load for the wall:

Outside temperature ( $T_o$ ) = 50° C  
 Inside temperature ( $T_i$ ) = 20° C  
 Change in temperature ( $\Delta T$ ) = 30° C

### Winter heating load for the wall:

Outside temperature ( $T_o$ ) = 10° C  
 Inside temperature ( $T_i$ ) = 25° C  
 Change in temperature ( $\Delta T$ ) = 15° C

Using the heat transfer equation, the total heat gain /loss from façade systems for external wall can be determined.

The heat transfer equation is:

$$Q^* = \Delta T \cdot A \cdot U$$

- $Q^* \rightarrow$  Heat Transfer (W)
- $\Delta T \rightarrow$  Temperature difference
- $A \rightarrow$  Area (Assumption)
- $U \rightarrow$  Thermal transmittance

Summer Heat Gain				
Façade system	Area (m2)	U Value (W/m2. K)	$\Delta T$ (°K)	Heat transfer (W)
Without EIFS	2000	4.78	30	<b>286,800</b>
With STYRO EIFS	2000	0.52	30	<b>31,200</b>
Difference				<b>255,600</b>

Winter Heat Loss				
Façade system	Area (m2)	U Value (W/m2. K)	$\Delta T$ (°K)	Heat transfer (W)
Without EIFS	2000	4.78	15	<b>143,400</b>
With STYRO EIFS	2000	0.52	15	<b>15,600</b>
Difference				<b>127,800</b>



## Operation Cost in Summer:



	Heat Transfer				Cost /month (AED)
	W/first hr.	W/first hr.	KW/12 hr.	KW / month	
<b>Without EIFS</b>	286,800	286.8	812.6	48,756	<b>19,500</b>
<b>With EIFS</b>	31,200	31.2	57.2	3,432	<b>1,372</b>
				Difference	<b>18,128</b>

$$Q^* \text{ (after one hour of activating the AC)} = U \cdot A \cdot 5^{\circ}k$$

- Without EIFS →

$$Q/12 \text{ hr} = 286.8 \text{ KW} + 4.78 \text{ W/m}^2\text{k} \cdot 2000 \text{ m}^2 \cdot 5^{\circ} \text{ k} / 1000 \cdot 11 \text{ hr} = \mathbf{812.6 \text{ KW/12 hr}}$$

- With EIFS →

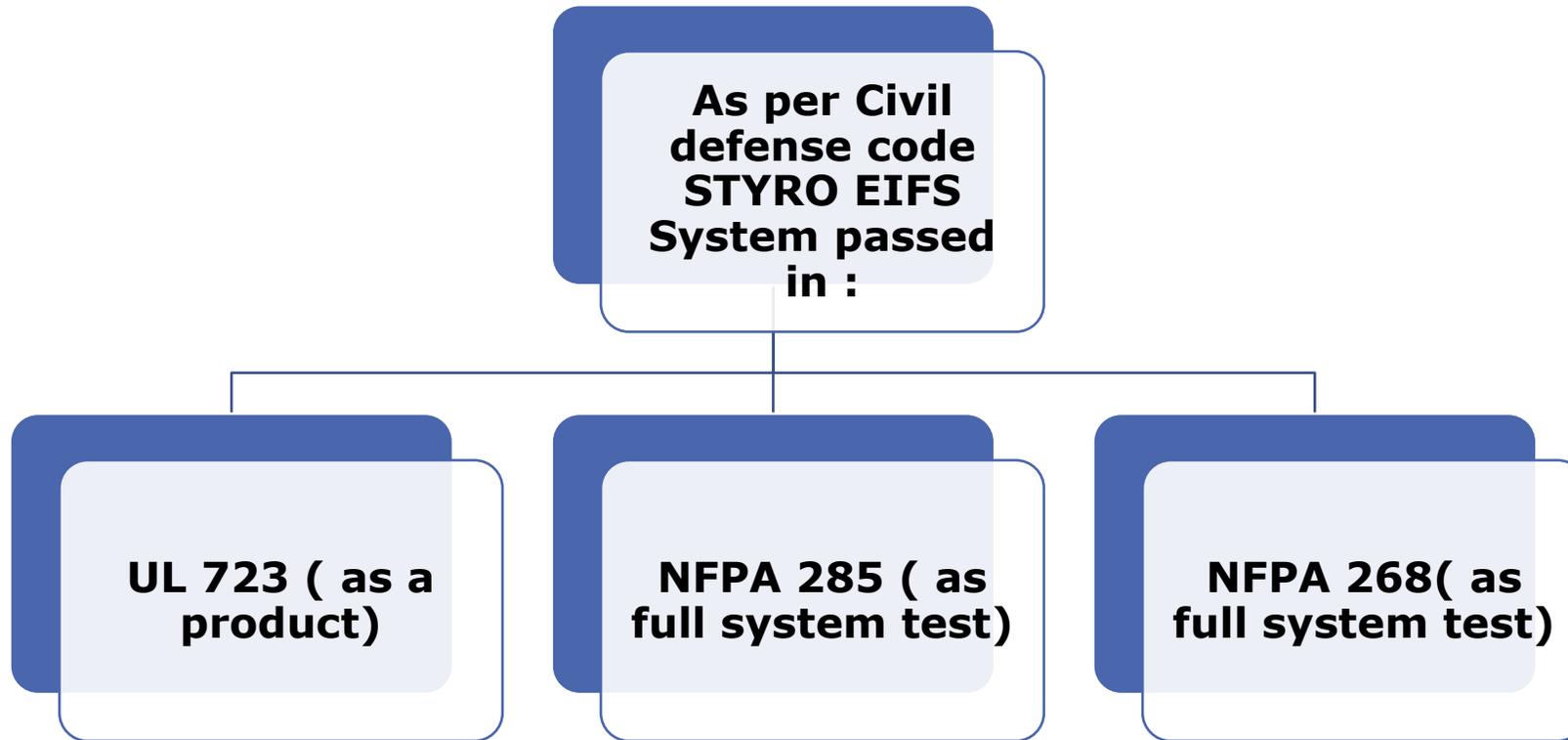
$$Q/12 \text{ hr} = 32.2 \text{ KW} + 0.52 \text{ W/m}^2\text{k} \cdot 2000 \text{ m}^2 \cdot 5^{\circ} \text{ k} / 1000 \cdot 11 \text{ hr} = \mathbf{57.2 \text{ KW/12 hr}}$$

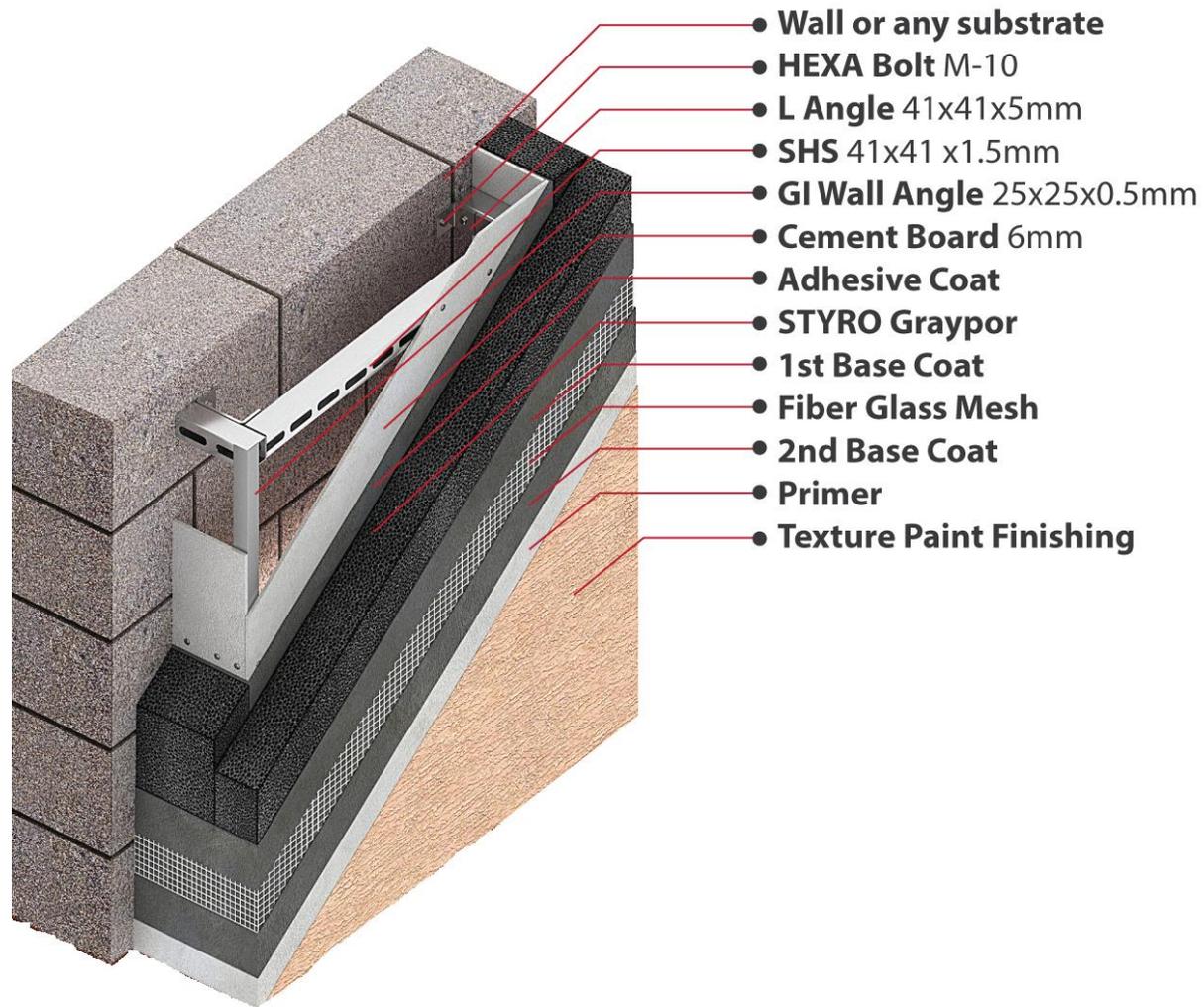
- This cost is per sq. meter.
- The highest energy consumed will be in the first hour, after that the temperature difference will be 5°k for each hour after the first hour.
- 1 KW = 0.4 AED



# SYSTEM AND COMPONENT TESTING :

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# Replacement of Heavy cladding

- **STYRO EIFS SYSTEM** can be as a replacement of heavy cladding :

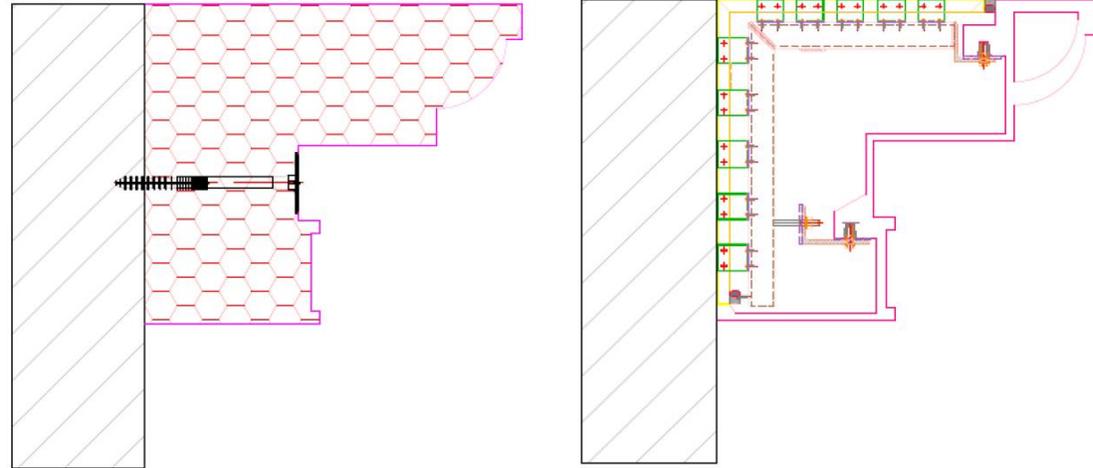


Property	Heavy cladding	STYRO EIFS
<b>Weight</b>	Heavy weight	Lightweight
<b>Safety</b>	Not safe due to its heavy weight	Safe
<b>Thermal Performance</b>	It won't show any thermal performance	The EPS is an insulation material has a low thermal conductivity
<b>Construction time</b>	The construction time of it is longer since its heavy	The ease and speed with which EIFS can be constructed results in shorter construction time due to several points; faster placement rates, reduced utility relocation and less disruption of traffic in urban areas
<b>Ease of handling</b>	It's heavier than normal concrete as it contains some fibres. So, it requires special equipment and skilled laborers	No special equipment and skilled labours are needed
<b>flexibility</b>	The boards should be prepared outside in the factory; if there is any mistake in manufacturing of the board it should be remanufactured inside the factory as it cannot be trimmed easily in site. Its not flexible at all due its strength and bonding	STYRO Graypor is a highly fixable material and can be trimmed on site to accommodate the shapes of existing utilities and services, also it can be easily shaped in site or supplied prefabricated
<b>Durability</b>	Proportioning the exact amount of fibres in the batch of concrete. a slight variation in fibres creates tremendous changes in concrete strength	STYRO Graypor is considered a permanent material when correctly specified and installed, Graypor keeps its initial properties at long term
<b>Cost</b>	> 400 AED/m2	<= 30% of heavy cladding cost
<b>Maintenance</b>	It's hard to get the item maintained at site, you need to take the item off and refabricate it inside the factory.	Repairable on site using hot wire machine
<b>Lifespan of the building's façade</b>	The heavy weight will affect the façade lifespan in longterm due to the structural weight	Lightweight system will not affect the lifespan

# Comparison between Heavy cladding & STYRO EIFS



# Structural Impact



System	STYRO EIFS	Heavy cladding
Size	1*1*1 m	1*1*1 m -
Volume	1 m <sup>3</sup>	1 m <sup>3</sup>
Density	22 kg/m <sup>3</sup> of EPS	2300 kg/m <sup>3</sup>
Weight force of the full panel	0.22 KN/m <sup>3</sup>	22.6 KN/m <sup>3</sup>





# Power of STYRO







***Thank  
You!***

