



هيئة الكهرباء والماء
Electricity & Water Authority

العزل الحراري
في مباني مملكة البحرين
Samples of Cross Sections for Walls
نماذج للرسومات المقطعية للجدران

Important Note: These samples are intended for demonstration purposes only. Users should practice their due diligence to ensure that their designs are complying with local regulations. Actual Thermal Transmittance & Resistance values must be obtained from EWA approved manufacturers' / suppliers' documents.

2030

Thermal Insulation Systems for Walls:

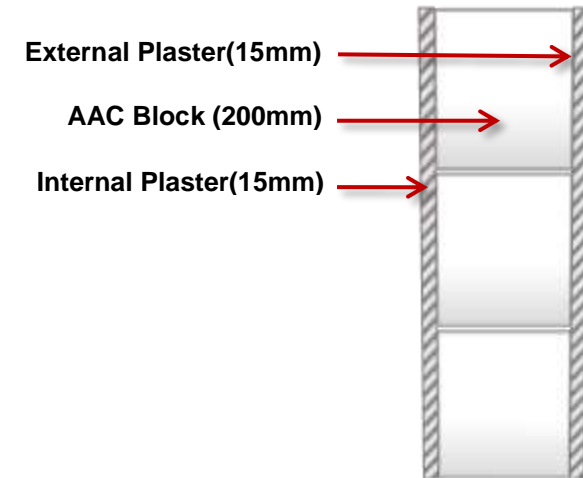
AAC Blocks:

- Mfg / Suppliers: Insulated Building Systems Factory - Kingdom of Bahrain

Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	External Plaster	1800	15	0.75	0.020
3	AAC Block	528	200	0.13	1.550
4	Internal Plaster	1800	15	0.75	0.020
5	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.770
Total Thermal Transmittance (U-value) W/m².K					0.565

- Mfg / Suppliers: Saudi Acico Co. LTD. (KSA) / Bahrain Blocks

Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	External Plaster	1800	15	0.75	0.020
3	AAC Block	465	200	0.12	1.667
4	Internal Plaster	1800	15	0.75	0.020
5	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.887
Total Thermal Transmittance (U-value) W/m².K					0.530

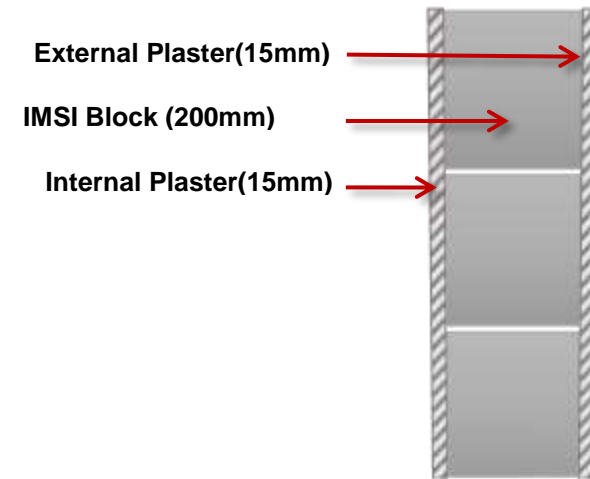


AAC Block
Autoclaved aerated concrete block

IMSI Blocks:

- Mfg / Suppliers: Redx Industries Kingdom of Bahrain

Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	External Perlite Plaster (Gulf perlite)	408	26	0.08	0.325
3	IMSI Block	2420	200	0.2024	0.988
4	Internal Perlite Plaster (Gulf perlite)	408	26	0.08	0.325
5	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.759
Total Thermal Transmittance (U-value) W/m².K					0.568



IMSI Block
Concrete blocks with expanded polystyrene

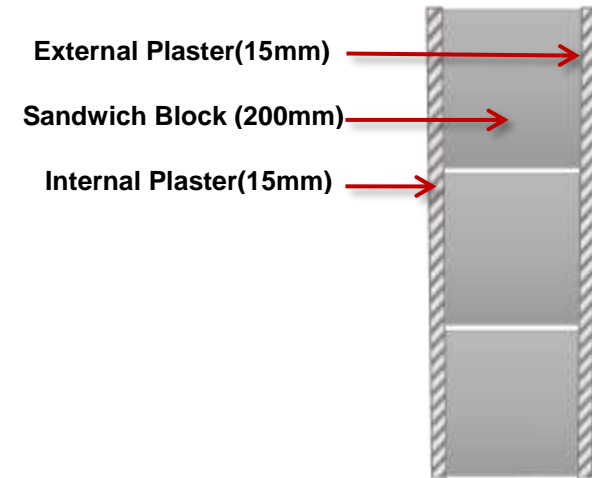
Sandwich Block:

- Mfg / Suppliers: Ahmed Rashid Al-Jalahma & Sons Co - Kingdom of Bahrain

Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	External Plaster	1800	15	0.75	0.020
3	Sandwich Block	2360	200	1.246	1.605
4	Internal Plaster	1800	15	0.75	0.020
5	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.825
Total Thermal Transmittance (U-value) W/m².K					0.548

- Mfg / Suppliers: Al-Manaratain Co. - Kingdom of Bahrain

Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	External Plaster	1800	15	0.75	0.020
3	Sandwich Block	465	200	0.1251	1.599
4	Internal Plaster	1800	15	0.75	0.020
5	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.819
Total Thermal Transmittance (U-value) W/m².K					0.550

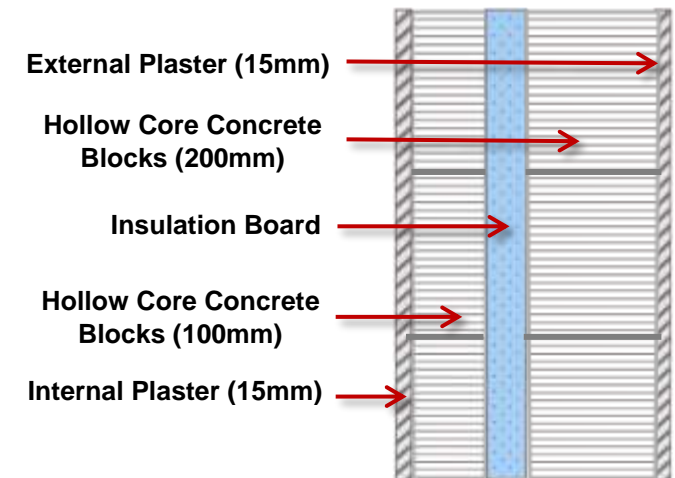


Sandwich Block
Concrete blocks with expanded polystyrene

Cavity Wall(Expanded Polystyrene):

-Mfg / Suppliers: Expanded polystyrene: Noor Factories (BH)

Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	External Plaster	1800	15	0.75	0.020
3	Concrete Block	2100	200	0.885	0.226
4	EPS	22.5	60	0.0397	1.511
5	Concrete Block	2100	100	0.602	0.166
6	Internal Plaster	1800	15	0.75	0.02
7	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					2.123
Total Thermal Transmittance (U-value) W/m².K					0.471



-Mfg / Suppliers: Extruded polystyrene: Fabco Plastic Factory(KSA)

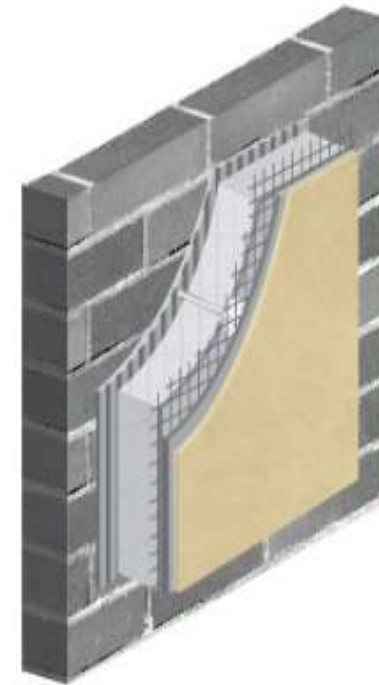
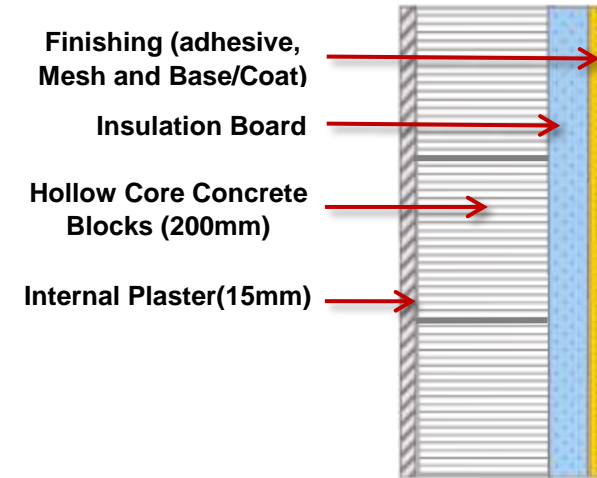
Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	External Plaster	1800	15	0.75	0.020
3	Concrete Block	2100	200	0.885	0.226
4	Insulated Board	35	60	0.0348	1.724
5	Concrete Block	2100	100	0.602	0.166
6	Internal Plaster	1800	15	0.75	0.02
7	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					2.336
Total Thermal Transmittance (U-value) W/m².K					0.428



External Thermal Insulation System with Expanded Polystyrene:

- Mfg / Suppliers: Henkel Industries (UAE) / Bader Trading & Contracting

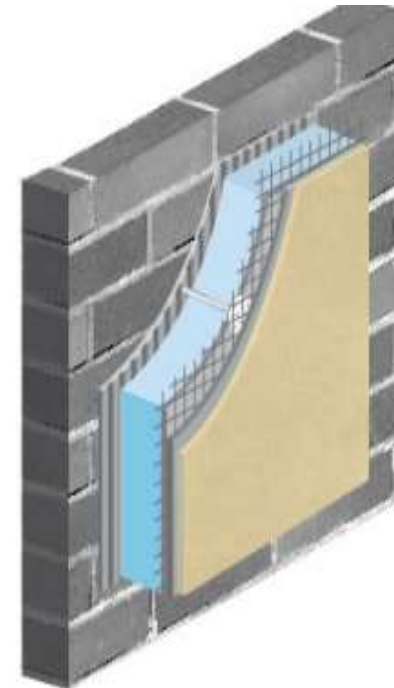
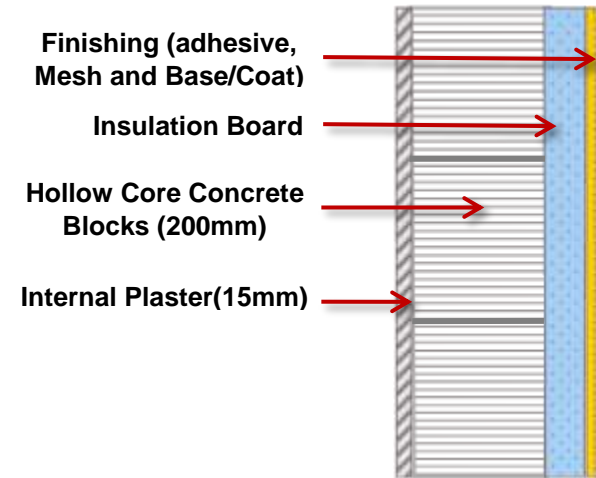
Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	Internal Plaster	1800	15	0.75	0.020
3	Concrete Block	2100	200	0.885	0.226
4	EPS	20	50	0.0363	1.377
5	Finishing	-	-	-	-
6	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.803
Total Thermal Transmittance (U-value) W/m².K					0.555



External Thermal Insulation System with Extruded Polystyrene:

- Mfg / Suppliers: Marmax (Egypt)/ Al Mezal general Trading

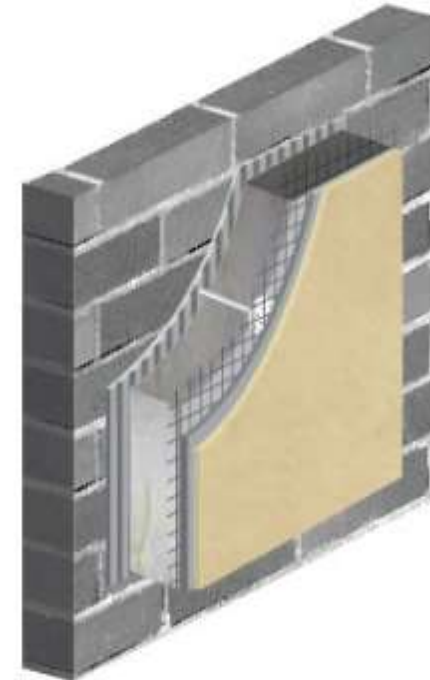
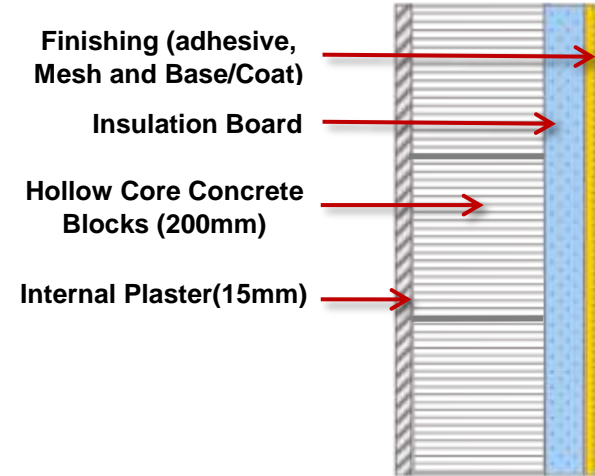
Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	Internal Plaster	1800	15	0.75	0.020
3	Concrete Block	2100	200	0.885	0.226
4	XPS	35	50	0.037	1.351
5	Finishing	-	-	-	-
6	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.777
Total Thermal Transmittance (U-value) W/m².K					0.563



External Thermal Insulation System with Rockwool:

- Mfg / Suppliers: Terraco (UAE)/ Green Innova trading

Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	Internal Plaster	1800	15	0.75	0.020
3	Concrete Block	2100	200	0.885	0.226
4	Rockwool	148	50	0.0376	1.330
5	Finishing	-	-	-	-
6	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.936
Total Thermal Transmittance (U-value) W/m².K					0.517



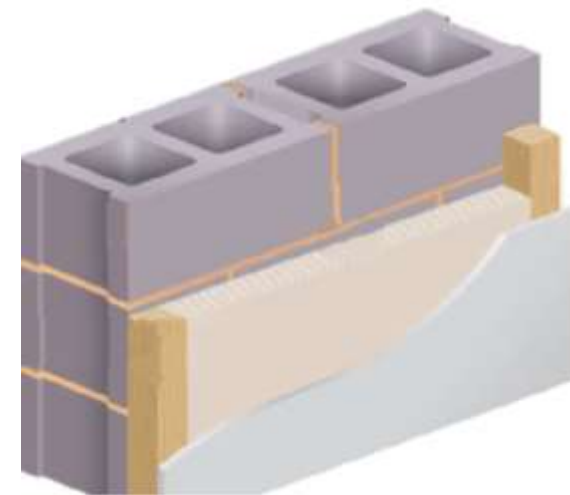
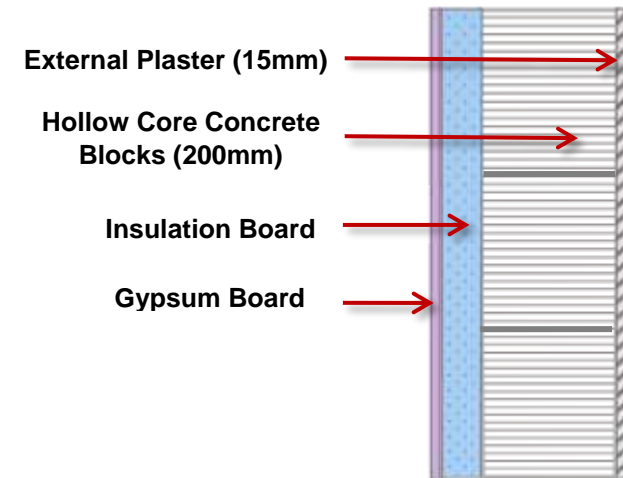
Internal Thermal Insulation System with Expanded Polystyrene

- Mfg / Suppliers: Green Products Industries(BH)/Bader Trading & Contr.

Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	External Plaster	1800	15	0.75	0.020
3	Concrete Block	2100	200	0.885	0.226
4	EPS	20	60	0.0388	1.546
5	Gypsum Board	950	15	0.16	0.094
6	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					2.066
Total Thermal Transmittance (U-value) W/m².K					0.484

- Mfg / Suppliers: Iznik Trading, (BH)

Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	External Plaster	1800	15	0.75	0.020
3	Concrete Block	2100	200	0.885	0.226
4	EPS	1300	60	0.0397	1.511
5	Gypsum Board	950	15	0.16	0.094
5	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					2.031
Total Thermal Transmittance (U-value) W/m².K					0.492

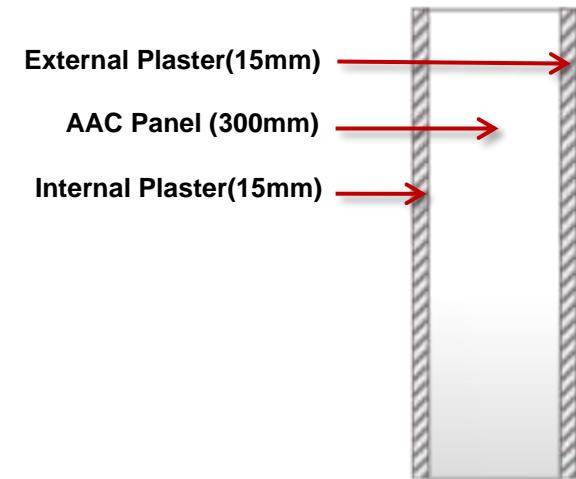


AAC Panels:

Autoclaved Aerated Concrete Panels

- Mfg / Suppliers: ESPAC Precast Aerated Company (KSA)/Dilla Decor

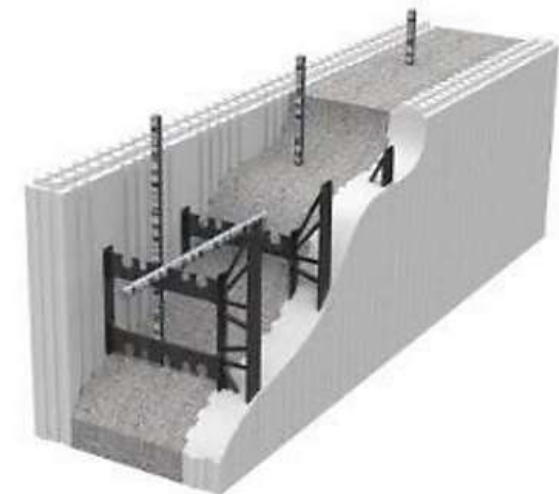
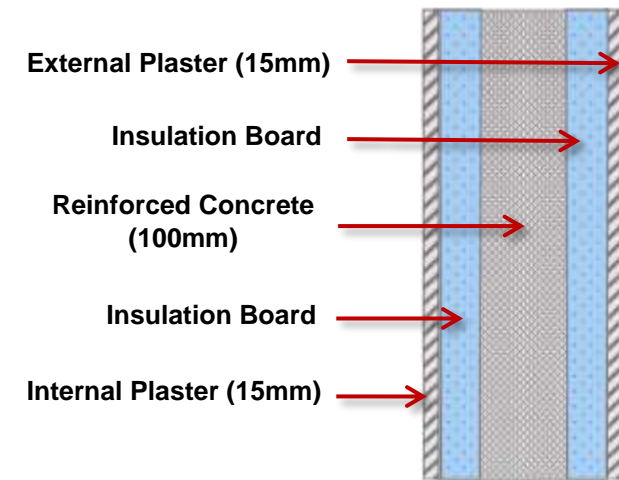
Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	External Plaster	1800	15	0.75	0.020
3	AAC Panels	598	300	0.172	1.744
4	Internal Plaster	1800	15	0.75	0.020
5	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.964
Total Thermal Transmittance (U-value) W/m².K					0.509



Polystyrene/ Concrete Sandwich Panel

- Mfg / Suppliers: Jehan Green Walls (UAE) / Crans Contracting

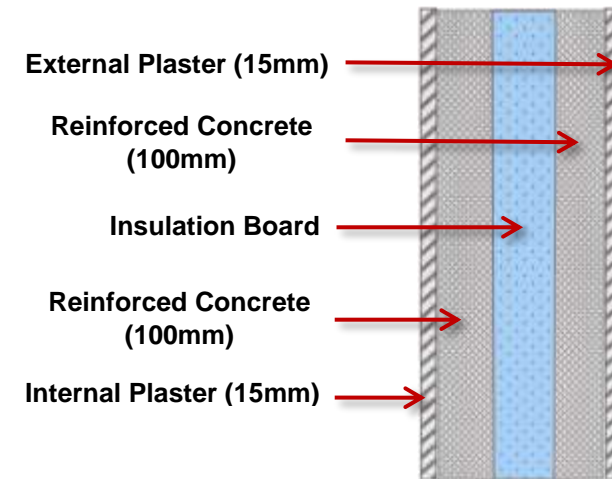
Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	External Plaster	1800	15	0.75	0.020
3	Insulated Board	18	60	.033	1.818
4	Reinforced Concrete	2500	100	2.5	0.04
5	Insulated Board	18	60	.033	1.818
6	Internal Plaster	1800	15	0.75	0.020
7	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					3.896
Total Thermal Transmittance (U-value) W/m².K					0.257



Concrete/Polystyrene Sandwich Panel

- Mfg / Suppliers: Al-Khajah Factories W.L.L..(BH) :
- JMS Eco Insulated Smart & Green Building System

Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	External Plaster	1800	15	0.75	0.020
3	Reinforced Concrete	2500	100	2.5	0.040
4	EPS	18	70	0.041	1.707
5	Reinforced Concrete	2500	100	2.5	0.040
6	Internal Plaster	1800	15	0.75	0.020
7	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.928
Total Thermal Transmittance (U-value) W/m².K					0.519



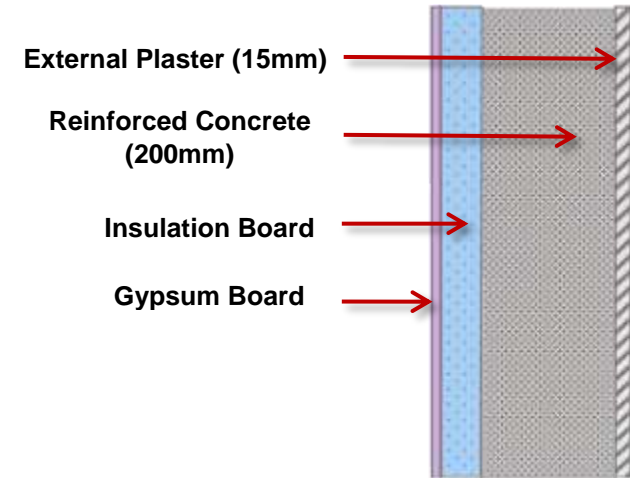
Thermal Insulation Systems for Columns & Beams/ Shear Walls

SYSTEM NAME / DESCRIPTION						CROSS SECTION / IMAGE
Internal Thermal Insulation:						
Type (1): Expanded Polystyrene:						
- Mfg / Suppliers: Noor Factory (BH)						
Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W	
1	Ext. Surface Resistance				0.059	
2	External Plaster	1800	15	0.75	0.020	
3	Reinforced Concrete	2500	200	2.5	0.08	
4	EPS	20	60	0.0397	1.511	
5	Gypsum Board	950	15	0.16	0.094	
6	Int. Surface Resistance				0.121	
Total Thermal Resistance (R) m ² .K/W					1.885	
Total Thermal Transmittance (U-value) W/m².K					0.530	

Type (2): Extruded Polystyrene:

- Mfg / Suppliers: Marmax (Egypt)/ Al Mezal general Trading

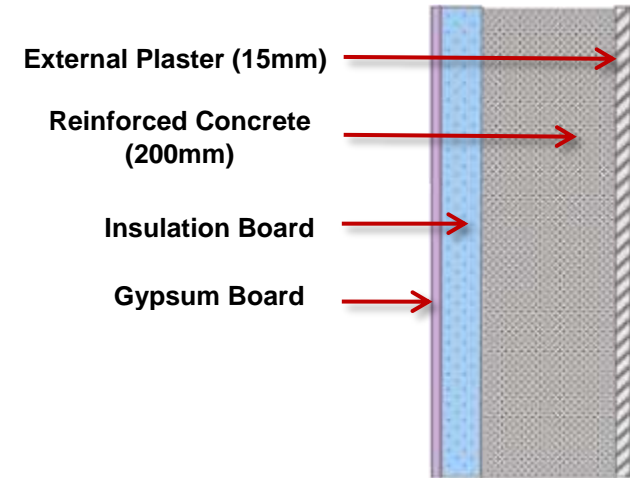
Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	External Plaster	1800	15	0.75	0.020
3	Reinforced Concrete	2500	200	2.5	0.08
4	XPS	20	60	0.037	1.622
5	Finishing	-	-	-	-
6	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.902
Total Thermal Transmittance (U-value) W/m².K					0.526



Type (3):Rockwool:

- Mfg / Suppliers: Terraco (UAE)/ Green Innova trading

Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	External Plaster	1800	15	0.75	0.020
3	Reinforced Concrete	2500	200	2.5	0.08
4	Rockwool	20	60	0.0376	1.596
5	Finishing	-	-	-	-
6	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.876
Total Thermal Transmittance (U-value) W/m².K					0.533

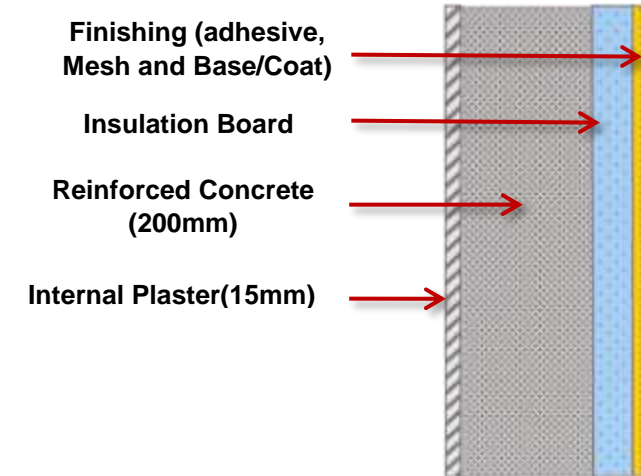


External Thermal Insulation:

Type (1): Expanded Polystyrene:

- Mfg / Suppliers: : Noor Factory (BH)

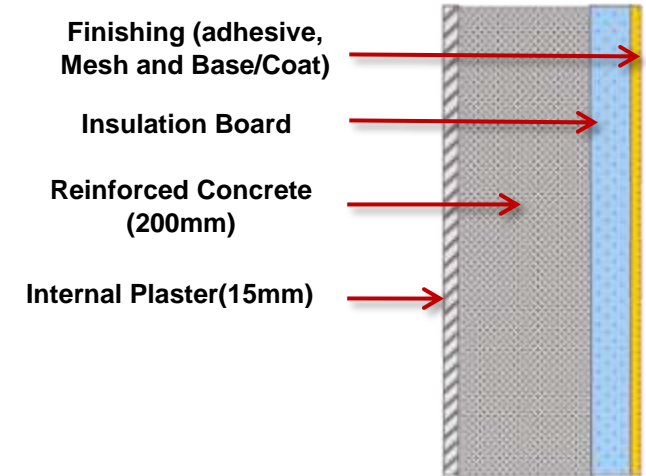
Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	Finishing	-	-	-	-
3	EPS	20	60	0.0397	1.511
4	Reinforced Concrete Block	2100	200	0.885	0.226
5	Internal Plaster	1800	15	0.75	0.020
6	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.937
Total Thermal Transmittance (U-value) W/m².K					0.516



Type (2): Extruded Polystyrene:

- Mfg / Suppliers: Marmax (Egypt)/ Al Mezal general Trading

Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	Finishing	-	-	-	-
3	XPS	35	50	0.037	1.351
4	Reinforced Concrete	2100	200	0.885	0.226
5	Internal Plaster	1800	15	0.75	0.020
6	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.777
Total Thermal Transmittance (U-value) W/m².K					0.563



Type (3):Rockwool:

- Mfg / Suppliers: Terraco (UAE)/ Green Innova trading

Sr. No.	Element	Density Kg/m ³	Thickness (mm)	Thermal Conductivity W/m.K	Thermal Resistance m ² .K/W
1	Ext. Surface Resistance				0.059
2	Finishing	-	-	-	-
3	Rockwool	148	50	0.037	1.330
4	Reinforced Concrete	2100	200	0.885	0.226
5	Internal Plaster	1800	15	0.75	0.020
6	Int. Surface Resistance				0.121
Total Thermal Resistance (R) m ² .K/W					1.936
Total Thermal Transmittance (U-value) W/m².K					0.517

