EWA
هيئة الكهرباء والماء
Electricity & Water Authority
Kingdom of Bahrain

Electricity & Water Conservation Directorate

Guide Lines for Thermal Insulation Implementation in Buildings.

(Issued by Thermal Insulation Unit)

Thermal Insulation Implementation Forms & Templates for Buildings above 4 Floors

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APPLICATION NO.

Kingdom of Bahrain		مملكة البحرين
Electricity & Water Authority		هيئة الكهرباء والماء
Electricity & Water Conservation Directorate		إدارة ترشيد الكهرباء والماء

THERMAL INSULATION IMPLEMENTATION FORM

Client Name: **Phone No.:** **e-mail:**

Bldg. No. **Road No.** **Block No.** **Area:**

Engineering Office Name: **Phone No.:**

Building Type: **No. of floors:**

- ***Thermal Transmittance (U-Value) for Roofs***

Sr. No.	Description of materials used	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
	Total thermal resistances for materials used in Roof (R_T):					

U-Value = **$W/m.^2$ °C**

Client's Name & Signature

In-charge Engineer Name & Signature

Engineering Office Stamp & Signature

Electricity & Water Authority Approval

Date of Approval

Kingdom of Bahrain		مملكة البحرين
Electricity & Water Authority		هيئة الكهرباء والماء
Electricity & Water Conservation Directorate		إدارة ترشيد الكهرباء والماء

- ***Thermal Transmittance (U-Value) for Air-conditioned floors/ceilings exposed to non-air-conditioned spaces***

Sr. No.	Description of materials used	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature | **In charge Engineer Name & Signature** | **Engineering Office Stamp & Signature**

Electricity & Water Authority Approval | **Date of Approval**

Kingdom of Bahrain		مملكة البحرين
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Electricity & Water Conservation Directorate		إدارة ترشيد الكهرباء والماء

- ***Thermal Transmittance (U-Value) for external Walls with Blocks***

Sr. No.	Description of materials used	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature _____

In charge Engineer Name & Signature _____

Engineering Office Stamp & Signature _____

Electricity & Water Authority Approval _____

Date of Approval _____

Kingdom of Bahrain		مملكة البحرين
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- ***Thermal Transmittance (U-Value) for Concrete/ Shear Walls***

Sr. No.	Description of materials used	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature | **In charge Engineer Name & Signature** | **Engineering Office Stamp & Signature**

Electricity & Water Authority Approval | **Date of Approval**

Kingdom of Bahrain		مملكة البحرين
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Electricity & Water Conservation Directorate		إدارة ترشيد الكهرباء والماء

- ***Thermal Transmittance (U-Value) for External Columns***

Sr. No.	Description of materials used	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature | **In charge Engineer Name & Signature** | **Engineering Office Stamp & Signature**

Electricity & Water Authority Approval | **Date of Approval**

Kingdom of Bahrain		مملكة البحرين
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- ***Thermal Transmittance (U-Value) for External Beams***

Sr. No.	Description of materials used	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature | **In charge Engineer Name & Signature** | **Engineering Office Stamp & Signature**

Electricity & Water Authority Approval | **Date of Approval**

Kingdom of Bahrain		مملكة البحرين
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- ***Thermal Transmittance (U-Value) for Spandrel Area of Curtain Wall***

Sr. No.	Description of materials used	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature	In charge Engineer Name & Signature	Engineering Office Stamp & Signature

Electricity & Water Authority Approval	Date of Approval

Kingdom of Bahrain		مملكة البحرين
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- ***Thermal Transmittance (U-Value) for walls of light wells/shafts/voids***

Sr. No.	Description of materials used in Walls	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature _____

In charge Engineer Name & Signature _____

Engineering Office Stamp & Signature _____

Electricity & Water Authority Approval _____

Date of Approval _____

Kingdom of Bahrain		مملكة البحرين
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- ***Thermal Transmittance (U-Value) for*** ***(specify the type of wall)***

Sr. No.	Description of materials used in Exterior Walls	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature | **In charge Engineer Name & Signature** | **Engineering Office Stamp & Signature**

Electricity & Water Authority Approval | **Date of Approval**

Kingdom of Bahrain		مملكة البحرين
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Glass Selection Details

Location	Windows & Doors	Curtain Wall	Sky Light	Total Glass Area (M^2)	Total Surface Area (M^2)	Glass %
Glass Area (M^2)						

LOCATION	GLASS MAKE/DESCRIPTION/COATING SURFCE #		THICKNESS (mm)			SUMMER U-VALUE ($W/M^2\ ^oC$)	SHADING COEFFICIENT (SC)	LIGHT TRANSMITTANCE %
	OUTER GLASS	INNER GLASS	OUTER GLASS	AIR SPACE	INNER GLASS			
WINDOWS & DOORS								
CURTAIN WALLS								
SKY LIGHT								

I hereby state that all information in the attached tables and documents is correct and I confirm that I will comply with Thermal Insulation Order no. (8 /99) for the construction of this building.

Client's Name & Signature | **In-charge Engineer Name & Signature** | **Engineering Office Stamp & Signature**

Electricity & Water Authority Approval | **Date of Approval**

Where: $(U) = \frac{1}{R_T}$ $W/m.^2k$ R_T = Total thermal resistance's: $(R_T) = R_o + R_i + R_1 + R_2 + R_3 + \ldots. = (m.^2k/w)$

Thermal resistance for adjacent air layer ($m.^2k/w$)

Section	Thermal resistance for adjacent air layer	
	Interior thermal resistance (R_i)	Outside thermal resistance (R_o)
Wall	0.121	0.059
Roof	0.166	0.059

THERMAL INSULATION IMPLEMENTATION
CALCULATION SHEET FOR GLASS AREA

Job Title:_____ **Client's Name:** _____

Type of External Glazed Window/Glazed Door/Curtain wall/Sky light	Size of window/door /curtain wall/sky light (W x H)	Front Elevation		Rear Elevation		Left Elevation		Right Elevation		Total Glass Area of all Elevations (M^2)	Total Surface Area of all Elevations (M^2)
		Qty (N_f)	Total Glass Area (M^2) ($WxHxN_f$)	Qty (N_r)	Total Glass Area (M^2) (WxHxNr)	Qty (N_l)	Total Glass Area (M^2) ($WxHxN_l$)	Qty (N_{ri})	Total Glass Area (M^2) (WxHxNri)		
Total glass area in each elevation (G_a)											
Surface area of each elevation (S_a)											
Percentage of Glass (G_a/S_a)X100											

Engineering Office Name: _____

Incharge Engineer's Name: _____

Incharge Engineer's Signature:_____

Notes:

1. Indicate type of window/door/curtain wall/sky light as $W_n/D_n/CW_n/SKL_n$ respectively. $_n$ is variable as per schedule of windows, doors, curtain wall and sky light. Use additional sheets if required.

2, For windows facing light wells, submit separate calculation sheet.

CALCULATION SHEET FOR EXTERNAL SURFACE AREAS (including glass)

Floor Designation	Front		Rear		Left		Right	
	LxHxN*	Area (M^2)	LxHxN*	Area (M^2)	LxHxN*	Area (M^2)	LxHxN*	Area (M^2)
Ground Floor								
Mezanine Floor								
Typical Floors								
Roof Deck								
Pent House								
Other Floors								
Total area								

Engineering Office Name: _____

Incharge Engineer's Name: _____

Incharge Engineer's Signature:_____

Notes:

L= Length (Meters) **H= Hight (Meters)**

N* = No. of Typical Floors and is applicable for calculating total surface area of typical floors. For remaining floors N*=1

Other floors: Specify & add if any

Exclude basement, car park levels & parapet in calculation of external surface areas.

Submit separate calculation sheet for light wells.

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FOLLOW-UP NOTICE FOR

THERMAL INSULATION IMPLEMENTATION

TO:
ELECTRICITY & WATER CONSERVATION DIRECTORATE
ELECTRICITY & WATER AUTHORITY
***FAX:* 17006349**

Application No.: Building Permit No. _ _ _
Client Name: _ _ _
Building No. Road No. Block No. Area _ _

We would like to inform you that we are going to start the installation of thermal insulation for the (Roof / Wall/Glass) of floor no. ……. on ……. and that the thermal insulation will not be covered before ……

Name & Signature of supervising Engineer:
Telephone No.:
Engineering Office Name & Stamp:
Date:

Note:

This form should be sent for each floor/roof/glass when intending to start the installation of thermal insulation and at least two weeks before its completion.
Copies of building permission & address card for entrance should be sent with the first Follow up Notice.

Thermal Insulation Implementation Program
Material Approval Form for Glass

Application # _____ Owner's Name_____

Engineering Office Name: _____

Date of Submission: _____

We submit following details for the Glass to be used in the above project for approval:

Manufacturer & Brand		
Local Agent of Manufacturer/Supplier & their Tel No.		
Aluminum Fabricator & Tel No.		
Product Description of glass for windows/doors .		
Product Description of glass for curtain wall..		
Product Description of glass for skylight..		
Expected start date of fabrication:*		
Documents/Samples to be submitted with this Form:	• Performance Data from Manufacturer for each type of glass. • Certificate from the local supplier & Fabricator as per the format enclosed. • One Sample for each type duly labeled with following details: - Engineering Office: - TII Application No.: - Project Name: - Client Name: - Glass Make & Product description: - Supplier/ Aluminum Fabricator details:	
Client's Name & Signature	Engineer in Charge Name & Signature	Engineering Office Stamp & Signature
MEW Approval::		
Approved/Rejected	Remarks:	
Signature: **Date:**	**Stamp**	

- Engineering Office to send Follow Up Notices for inspection of glass at the factory of the Fabricator and at the building site at least one week before the start of Fabrication/installation of the glass.. Approved glass sample(s) should be available at building site till the final inspection of glass.
- Copies of delivery notes from the glass manufacturer to local supplier and from the local supplier to Aluminum Fabricator should be submitted to EWA at the time of inspection of glass.

Certificate to be given by the Glass Supplier & Aluminium Fabricator

Project Name: _____ Thermal Insulation Application No.:_____
Client : _____
Engineering Office: _____

We hereby confirm that the glasses supplied/used for windows/curtain walls/skylight for the above project are as given below:

Location	Make/Brand	Glass description & coating surface #		Thickness (mm)		
		Outer glass	Inner glass	Outer glass	Air Space	Inner glass
Windows						
Curtain walls.						
Skylight.						
Glass received from: Delivery Note No(s)& Date(s)*:						
Date the glass would be ready for inspection by E.O & MEW*:						

Signature: _____

Name: _____

Designation: _____

Company Stamp

Glass supplier should refer the thermal insulation application No. in their delivery notes to the aluminium fabricator.

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THERMAL INSULATION IMPLEMENTATION MODIFICATION FORM

To : Electricity & Water Conservation Directorate

We would like to inform you about the following changes in our Application No. _____

Date Approved _____

☐ **Owner** ☐ **Engineering Office**

☐ **Insulation Materials in Roof** ☐ **Insulation Materials in walls**

☐ **Glass Type** ☐ **Glass Area**

- ***Thermal Transmittance(U-value) for Roof***

Sr. No.	Description of materials used in Roof	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
	Total thermal resistances for materials used in Roof (R_T):					

U-Value = W/m.^{2} °C

_____ _____ _____

Client's Name & Signature **In charge Engineer Name & Signature** **Engineering Office Stamp & Signature**

_____ _____

Electricity & Water Authority Approval **Date of Approval**

Kingdom of Bahrain		مملكة البحرين
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Electricity & Water Conservation Directorate		إدارة ترشيد الكهرباء والماء

- ***Thermal Transmittance (U-Value) for Air-conditioned floors/ceilings exposed to non-air-conditioned spaces***

Sr. No.	Description of materials used	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature | **In charge Engineer Name & Signature** | **Engineering Office Stamp & Signature**

Electricity & Water Authority Approval | **Date of Approval**

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- ***Thermal Transmittance (U-Value) for external Walls with Blocks***

Sr. No.	Description of materials used	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature _____

In charge Engineer Name & Signature _____

Engineering Office Stamp & Signature _____

Electricity & Water Authority Approval _____

Date of Approval _____

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- ***Thermal Transmittance (U-Value) for Concrete/ Shear Walls***

Sr. No.	Description of materials used	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature | **In charge Engineer Name & Signature** | **Engineering Office Stamp & Signature**

Electricity & Water Authority Approval | **Date of Approval**

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- ***Thermal Transmittance (U-Value) for External Columns***

Sr. No.	Description of materials used	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature _____

In charge Engineer Name & Signature _____

Engineering Office Stamp & Signature _____

Electricity & Water Authority Approval _____

Date of Approval _____

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- ***Thermal Transmittance (U-Value) for External Beams***

Sr. No.	Description of materials used	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature

In charge Engineer Name & Signature

Engineering Office Stamp & Signature

Electricity & Water Authority Approval

Date of Approval

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- ***Thermal Transmittance (U-Value) for Spandrel Area of Curtain Wall***

Sr. No.	Description of materials used	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature	In charge Engineer Name & Signature	Engineering Office Stamp & Signature

Electricity & Water Authority Approval **Date of Approval**

Kingdom of Bahrain		مملكة البحرين
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Thermal Transmittance (U-Value) for walls of light wells/shafts/voids

Sr. No.	Description of materials used in Walls	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/$m.^2$ °C

Client's Name & Signature	**In charge Engineer Name & Signature**	**Engineering Office Stamp & Signature**

Electricity & Water Authority Approval | **Date of Approval**

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- ***Thermal Transmittance (U-Value) for*** ***(specify the type of wall)***

Sr. No.	Description of materials used in Exterior Walls	Density kg/m^3	Thickness (I) m	r $\frac{m.k}{w}$	R $\frac{m^2.k}{w}$	Notes
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-						
9-						
10-						
11-						
12-						
13-						
	Total thermal resistance for materials used in Wall (R_T):					

U-Value = W/m.^{2} °C

Client's Name & Signature _____

In charge Engineer Name & Signature _____

Engineering Office Stamp & Signature _____

Electricity & Water Authority Approval _____

Date of Approval _____

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Glass Selection Details

Location	Windows & Doors	Curtain Wall	Sky Light	Total Glass Area (M^2)	Total Surface Area (M^2)	Glass %
Glass Area (M^2)						

LOCATION	GLASS MAKE/DESCRIPTION/COATING SURFCE #		THICKNESS (mm)			SUMMER U-VALUE ($W/M^2\ ^oC$)	SHADING COEFFICIENT (SC)	LIGHT TRANSMITTANCE %
	OUTER GLASS	INNER GLASS	OUTER GLASS	AIR SPACE	INNER GLASS			
WINDOWS & DOORS								
CURTAIN WALLS								
SKY LIGHT								

I hereby state that all information in the attached tables and documents is correct and I confirm that I will comply with Thermal Insulation Order no. (8 /99) for the construction of this building.

Client's Name & Signature _____

In charge Engineer Name & Signature _____

Engineering Office Stamp & Signature _____

Electricity & Water Authority Approval _____

Date of Approval _____

CHECK LIST FOR THERMAL INSULATION IMPLEMENTATION (TII)-MODIFICATION FORM

Engineering Office shall ensure that the modification form is complete with all details given below and attach supporting documents and drawings as required. Two sets are to be submitted.

	Application No. as given in the approved TII Form	
	Tick the appropriate box for the type of changes proposed	
	For change of owner, attach supporting document for transfer of ownership, copy of CPR/CR, Tel No.& e-mail for the new owner	
	For change of Engineering Office, submit "Form to be submitted with TII Modification for change of Engineering Office".	
	For change of insulation materials in roof, attach drawing for roof cross section and supporting documents for resistivity values of new materials proposed in the roof.	
	For change of insulation materials in walls, attach drawing for wall cross section and supporting documents for resistivity values of new materials proposed in the walls.	
	For change of glass type, attach drawing for glass cross section, copy of performance data sheet from the manufacturer's catalogue for the new type of glass. High light, in the performance data sheet, the glass proposed to be used. Glass selection should be in accordance with Table (5.2) in the Code of Practice for thermal insulation in buildings.	
	For change of glass area, attach revised floor plans, elevations, schedule of doors & windows and calculation sheets for glass/external surface areas, details for glass selected. Attach copy of performance data sheet from the manufacturer.	

Notes:

All the pages of the modification form duly filled with relevant information and with names and signatures of client, in-charge engineer, stamp & signature of engineering office should be submitted. If there is no change in any of the pages of the previously approved TII Form, information given in the approved TII Form shall be repeated in these pages and signed afresh by all concerned.

If wall/roof construction is different at different locations, then additional sheets for roof/wall with relevant data for each such construction/location should be included.

Kingdom of Bahrain

Electricity & Water Authority

Electricity & Water Conservation Directorate

مملكة البحرين

وزارة الكهرباء والماء

إدارة ترشيد الكهرباء والماء

FORM TO BE SUBMITTED WITH THERMAL INSULATION IMPLEMENTATION MODIFICATION FOR CHANGE OF ENGINEERING OFFICE

TII Application #._____ Building Permit # _____
1st Engineering Office Name: _____

Supervision start date: _____ Supervision end date: _____

We confirm that thermal insulation requirements as per the approved TII Form have been implemented & inspected by EWA at the following locations in the building as on the end date of our supervision:.

Walls: (Floor Nos.):. Roof: Yes/No Glass: Yes/No
Others:

Thermal insulation is yet to be implemented at the following locations of the building as on the end date of our supervision:

Walls: (Floor Nos.):. Roof Glass
Others:

Pending violations*:

:

Owner's Name & Signature	In-charge Engineer Name & Signature	Engineering Office Stamp & Signature

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2nd Engineering Office Name: _____Supervision start date: _____

We confirm that we inspected the building and will take full responsibility for the implementation of thermal insulation in the building as per attached TII Modification Form submitted for approval. We undertake to rectify pending violations.

Owner's Name & Signature	In-charge Engineer Name & Signature	Engineering Office Stamp & Signature

* Give details of pending violations notified by EWA.
Engineering Office should notify EWA by fax (Fax No. 17006349) immediately when their supervision contract is terminated.