# TABLE OF CONTENTS

## 1. GENERAL (GE)
- GE-001 Cover sheet
- GE-101 Sheet List
- GE-101 Sheet List
- GE-101 Sheet List
- GE-301 Urban Project Location
- GE-302 Urban Project Location
- GE-303 Urban Project Location
- GE-311 Urban Proposal Explanation
- GE-312 Urban Proposal Explanation
- GE-313 Urban Proposal Explanation
- GE-310 Urban Proposal Explanation
- GE-401 Exterior Renderings
- GE-402 Exterior Renderings

## 2. ARCHITECTURAL (AR)
- AR-001 La Cité du Soleil® Plan.
- AR-002 Site Plan
- AR-011 Solar Envelope
- AR-014 Architectural Footprint
- AR-017 Measurable Area
- AR-021 Floor Plan
- AR-031 Roof Plan
- AR-051 Measurable Area
- AR-111 Building Elevations
- AR-112 Building Elevations
- AR-113 Building Elevations
- AR-114 Building Elevations
- AR-201 Longitudinal Sections
- AR-211 Transversal Sections
- AR-301 Window Schedule and Details
- AR-311 Door Schedule and Details
- AR-321 Roof Construction Details
- AR-331 Roof Construction Details
- AR-341 Wall Sections and Construction Details
- AR-351 Partitions Details

## 3. BIOCLIMATIC ANALYSIS (BA)
- BA-001 Local Climate Analysis
- BA-002 Local Climate Analysis
- BA-003 Local Climate Analysis
- BA-011 Bioclimatic drawings
- BA-012 Bioclimatic drawings
- BA-013 Bioclimatic drawings
- BA-014 Bioclimatic drawings
- BA-015 Bioclimatic drawings
- BA-016 Bioclimatic drawings
- BA-017 Bioclimatic drawings
- BA-018 Bioclimatic drawings
- BA-019 Bioclimatic drawings
- BA-020 Bioclimatic drawings
- BA-021 Bioclimatic drawings
- BA-022 Bioclimatic drawings
- BA-015 Bioclimatic drawings
- BA-016 Bioclimatic drawings
- BA-017 Bioclimatic drawings
- BA-018 Bioclimatic drawings
- BA-019 Bioclimatic drawings
- BA-020 Bioclimatic drawings
- BA-021 Bioclimatic drawings
- BA-022 Bioclimatic drawings

## 4. INTERIORS (IN)
- IN-001 Furniture Layout
- IN-002 Flooring Layout
- IN-101 Reflected ceiling Layout
- IN-102 Reflected ceiling Layout
- IN-201 Elevations
- IN-202 Elevations
- IN-203 Elevations
- IN-204 Elevations
- IN-205 Elevations
- IN-206 Elevations
- IN-207 Elevations
- IN-208 Elevations
- IN-209 Elevations
- IN-210 Elevations
- IN-211 Elevations
- IN-212 Elevations
- IN-401 Kitchen Plan
- IN-411 Kitchen Elevations
- IN-412 Kitchen Elevations
- IN-401 Kitchen Plan
- IN-411 Kitchen Elevations
- IN-412 Kitchen Elevations
- IN-501 Bathroom plan
- IN-501 Bathroom plan
- IN-511 Bathroom Elevations
- IN-512 Bathroom Elevations
- IN-513 Bathroom Elevations
- IN-501 Bathroom plan
- IN-501 Bathroom plan
- IN-601 Interior Renderings
- IN-602 Interior Renderings
- IN-603 Interior Renderings
- IN-604 Interior Renderings
- IN-605 Interior Renderings
- IN-606 Interior Renderings
- IN-607 Interior Renderings

## 5. STRUCTURAL (ST)
- ST-001 Foundation Plan and Details
- ST-011 Structural Floor Plan(s)
- ST-021 Structural Roof Plan
- ST-022 Structural Roof Plan
- ST-101 Structural Longitudinal Sections
## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST-102</td>
<td>Structural Longitudinal Sections</td>
<td></td>
</tr>
<tr>
<td>ST-103</td>
<td>Structural Longitudinal Sections</td>
<td></td>
</tr>
<tr>
<td>ST-104</td>
<td>Structural Longitudinal Sections</td>
<td></td>
</tr>
<tr>
<td>ST-111</td>
<td>Structural Transversal Sections</td>
<td></td>
</tr>
<tr>
<td>ST-201</td>
<td>Structural Blow ups</td>
<td></td>
</tr>
<tr>
<td>ST-301</td>
<td>Structural Details</td>
<td></td>
</tr>
</tbody>
</table>

### 6. FIRE PROTECTION (FP)
- FP-001 Fire Protection

### 7. PLUMBING (PL)
- PL-001 Plumbing Plan. Supply and removal
- PL-011 Greywater
- PL-021 Drain / Waste / Vent
- PL-101 Schematic diagram
- PL-201 Supply and removal Isometric
- PL-211 Greywater Isometric
- PL-221 Drain/Waste/Vent Isometric

### 8. SOLAR WATER HEATING (SW)
- SW-001 Plan
- SW-101 Isometric

### 9. MECHANICAL (ME)
- ME-001 HVAC distribution Plan
- ME-002 HVAC distribution Plan
- ME-003 HVAC distribution Plan
- ME-011HVAC equipment
- ME-021 Heating
- ME-031 Cooling
- ME-041 Ventilation
- ME-042 Ventilation
- ME-101 Mechanical room elevations
- ME-201 HVAC System Schematic drawings
- ME-221 Cooling mode Schematic drawings
- ME-222 AC System Schematic drawings
- ME-223 AC System Schematic drawings
- ME-231 Controls
- ME-301 Isometric Distribution
- ME-302 Isometric view of Clothes Dryer

### 10. ELECTRICAL (EL)
- EL-001 Grid interconnection
- EL-201 DC wiring diagram
- EL-301 Power plan
- EL-401 Lighting plan
- EL-501 One-line Diagram
- EL-601 AC Circuit layout
- EL-701 Earthing Layout

### 11. PHOTOVOLTAIC SYSTEM (PV)
- PV-001 Photovoltaic system: General
- PV-011 Photovoltaic system: Module connection
- PV-012 Photovoltaic system: DC circuits
- PV-013 Photovoltaic system: Layout
- PV-014 Photovoltaic system: Layout
- PV-021 Photovoltaic system: AC circuits
- PV-022 Photovoltaic system: Grid Interconnection
- PV-031 Photovoltaic system: Grounding system

### 12. TELECOMMUNICATIONS AND BUILDING AUTOMATIZATION SYSTEM (BAS)
- BAS-001 Wiring plan
- BAS-101 Schematic diagram
- BAS-201 Equipment

### 13. SDE INSTRUMENTATION DRAWINGS (ID)
- ID-001 General Monitoring
- ID-002 Monitoring panel room
- ID-003 Electricity meters topology
- ID-004 Electricity meters connection
- ID-005 House appliances

### 14. SITE OPERATIONS (SO)
- SO-001 Trucks shipment route
- SO-101 La Cité du Soleil®
- SO-102 Lot plan
- SO-201 Phases
### TABLE OF CONTENTS

| SO-102 Lot plan | HS-219 Health and Safety during assembly |
| SO-201 Phases | HS-220 Health and Safety during assembly |
| SO-202 Phases | HS-221 Health and Safety during assembly |
| SO-203 Phases | HS-222 Health and Safety during assembly |
| SO-204 Phases | HS-223 Health and Safety during assembly |
| SO-205 Phases | HS-224 Health and Safety during assembly |
| SO-206 Phases | HS-225 Health and Safety during assembly |
| SO-207 Phases | HS-226 Health and Safety during assembly |
| SO-208 Phases | HS-227 Health and Safety during assembly |
| SO-209 Phases | HS-228 Health and Safety during assembly |
| SO-210 Phases | HS-229 Health and Safety during assembly |
| SO-211 Phases | HS-230 Health and Safety during assembly |
| SO-212 Phases | HS-231 Health and Safety during assembly |
| SO-213 Phases | HS-232 Health and Safety during assembly |
| SO-214 Phases | HS-233 Health and Safety during assembly |
| SO-215 Phases | HS-234 Health and Safety during assembly |
| SO-216 Phases | HS-235 Health and Safety during assembly |
| SO-217 Phases | |
| SO-218 Phases | |
| SO-219 Phases | |
| SO-220 Phases | |
| SO-221 Phases | |
| SO-222 Phases | |
| SO-223 Phases | |
| SO-224 Phases | |
| SO-225 Phases | |

### 15. HEALTH AND SAFETY (HS)

| HS-001 Health and Safety in the lot and surroundings |
| HS-101 Health and Safety during the Outside Logistic |
| HS-201 Health and Safety during assembly |
| HS-202 Health and Safety during assembly |
| HS-203 Health and Safety during assembly |
| HS-204 Health and Safety during assembly |
| HS-205 Health and Safety during assembly |
| HS-206 Health and Safety during assembly |
| HS-207 Health and Safety during assembly |
| HS-208 Health and Safety during assembly |
| HS-209 Health and Safety during assembly |
| HS-210 Health and Safety during assembly |
| HS-211 Health and Safety during assembly |
| HS-212 Health and Safety during assembly |
| HS-213 Health and Safety during assembly |
| HS-214 Health and Safety during assembly |
| HS-215 Health and Safety during assembly |
| HS-216 Health and Safety during assembly |
| HS-217 Health and Safety during assembly |
| HS-218 Health and Safety during assembly |

### 16. PUBLIC TOUR (PT)

PT-001 Site accessibility
PT-101 House tour floor plan
PT-201 House Tour General Information
A mega infrastructure project called the Delhi-Mumbai Industrial Corridor (DMIC) has been proposed by the Government of India. The Dedicated Freight Corridor (DFC) is a 1,483 km long rail corridor connecting the Jawaharlal Nehru Port near Mumbai with Dadri near Delhi. The main aim of this project is to keep the GDP rate of India constant.

The proposal connects two of the biggest nodes in the country by road and rail, passing through six states in the country.

Conceived as a global manufacturing and trading hub, the project is expected to double employment potential, triple industrial output and quadruple exports from the region in five years. The total employment to be generated from the project is 3 million, the bulk of which will be in the manufacturing/processing sectors.
The above plan is shows the location of the Mumbai Trans-Harbour link that is proposed to connect Mumbai city to Navi Mumbai. There are 9 such mega projects being proposed around Uran making it an appropriate site for us to demonstrate the urban proposal. One such proposal is the Navi Mumbai International Airport.

Uran is located at 18.88°N 72.94°E. Uran has an average elevation of 21 metres (68 feet) and is covered by sea by three side. Uran is divided into 2 parts, viz. rural and urban. One of the nodes in urban Uran is Dronagiri which located to the west of the Jawaharlal Nehru Port Trust (JNPT), one of the largest ports in India.
The plan shown is the proposed development plan for Dronagiri, by CIDCO, the governing body in Navi Mumbai. Using the existing road and rail network proposed, Team Shunya has created a design for an energy efficient city.
The plan shows the proposed city design by team Shunya based on the following guidelines:

1. Laying down broad policies and directions of growth in the principal areas
2. Determining the hierarchy of roads and access ways
3. Determining the standards for common facilities like education, health, and social facilities for the resident population
4. Identifying the social and physical infrastructural needs of the township
5. Identifying the conservation of historic, ecologically sensitive and aesthetically important areas
6. Developing a mechanism for sustainable development harmonizing the needs of environment and development
7. Suggesting policies for integrating the neighbouring villages in the Master Plan.
TRANSIT ORIENTED SUSTAINABLE DEVELOPMENT

A TOD is defined as a mixed-use community within an average walking distance of a transit stop and core commercial area. The design, configuration and mix of uses emphasize a pedestrian-oriented environment and reinforce the use of public transportation. TODs mix residential, retail, office, open space and public uses within a comfortable walking distance, making it convenient for residents and employees to travel by transit, bicycle or foot as well as by car.
The neighborhoods have been designed with a radial plan to maximize walkability. However, as the scale of the commercial/industrial areas is far greater, the radius would not be walkable. Also, it must be accessible to the neighborhoods. Hence, it is a linear, elongated strip which extends throughout the city, reaching out with arm like projections into the neighborhoods.

The focus was to create a city with "no zones" in order to eliminate zones formed in a city which lead to residents traveling long distances to commercial area, thus increasing the carbon footprint of the city.
The cluster comprises of a number of buildings modeled around green belts. Each building would comprise of 2 or 3 apartments on a floor. Thus, playing with the number of apartments per floor would give rise to a variety of forms created and in turn would create dynamic spatial organization within the neighborhood.

Traditionally, Indian social communities have been very tight-knit, resulting in a greater importance given to shared spaces that lie between public and private. These encourage sharing of not only spaces, but resources as well. For centuries, Indian women have been using common courtyards for collective preparation of food and other activities like weaving, pottery, etc. together, which leads to an exchange of ideas and wisdom. It also leads to a greater output of work for a smaller investment per head. Hence, the Indian approach to sustainability through a strong community spirit shall be taken forward through the concept of urban farms.
Design Concern:
The residential buildings in the neighborhood cluster are ground and four upper stories. The aim of the cluster design was minimize the common spaces as they would add to the super built up area of the building. It is seen as a trend in the building industry in India that apartments are sold on the bases of the super built up area. Therefore, if the area of the common spaces increases; it increases the amount of area to be constructed and thus increasing the overall embodied energy as well as the cost of the house. Minimising the built up area also increases the amount of total land efficiency for construction.

Design:
The ground floor area includes the lift and staircase lobby along with a stilt area for circulation of vehicles. The main floor plate has 3 apartments and 2 additional apartments are design on the mezzanine level of the building. This makes a total of 5 apartments on a floor. It has been designed in a way that all flats are cross ventilated, the privacy of the individual flats is maintained with adequate access for all the services (plumbing, electrical, etc) to be accommodated.
GENERAL NOTES:
ALL DRAWINGS ARE IN M.I.N.I.E.S.S SPECIFI.
PROJECT / Solar Decathlon Europe
PROJECT DESCRIPTION: Hi Naught House

PLAN NUMBER: AR-002
COMPONENT: SITE PLAN
BLOCK: ARCHITECTURE

GENERAL NOTES:
ALL DRAWINGS ARE IN MM (UNLESS SPECIFIED).
DO NOT SCALE THE DRAWINGS; WRITTEN DIMENSIONS TO BE STRICTLY FOLLOWED.
DRAWINGS PRODUCED BY AUTODESK EDUCATIONAL PRODUCT.
ORIGIN 'O' IS CENTER OF COLUMN.
THE HOUSE IS TILTED 21 DEGREES TO THE PLOT FROM ORIGIN 'O'.

LEGEND
SITE PLAN CUT AT +1.2M
GROUND LVL @ -0.75M
SCALE 1:100

REVISED ON: 25/05/2014
DRAWN BY: SG

CLIENT
U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON EUROPE 2014
VERSAILLES

ACADEMY OF ARCHITECTURE
I.I.T BOMBAY

TEAM SHUNYA

AR-002
SITE PLAN
GENERAL NOTES:
ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
THE DRAWINGS ARE NOT TO BE SCALD AND THE WRITTEN DIMENSIONS ARE TO BE STRICTLY FOLLOWED.
ALL DRAWINGS ARE GENERATED USING AUTODESK EDUCATIONAL PRODUCT.

PROJECT DESCRIPTION:
H Naught house

DATE: 28/05/2014

DRAWN BY: EB

PLAN NUMBER: AR O11

COMPONENT: SOLAR ENVELOPE

PLAN NUMBER: AR O11

CLIENT: SOLAR DECATHLON EUROPE 2014

VERSAILLES

DRAWING TITLE: AR 011
THE HOUSE IS TILTED 21 DEGREES TO THE PLOT FROM ORIGIN 'O'.
THERE ARE TWO SIZES OF FOOTINGS,
1. 900 X 900MM
2. 250 X 250MM

FOOTING AREA

SITE PLAN CUT AT +1.2M
SCALE 1:100

PLAN NUMBER: AR-014
COMPONENT: ARCHITECTURAL FOOTPRINT
DRAWN BY: SG
REVIEWED ON: 25/03/2014

PROJECT DESCRIPTION:
H naught house
PROJECT:
Solar Decathlon Europe
DRAWN BY: SG
PLAN NUMBER: AR-014
COMPONENT: ARCHITECTURAL FOOTPRINT

GENERAL NOTES:
ALL DRAWINGS ARE IN MM UNLESS SPECIFIED.
DO NOT SCALE THE DRAWINGS, WRITTEN DIMENSIONS TO BE STRICTLY FOLLOWED.
DRAWINGS PRODUCED BY AUTODESK EDUCATIONAL PRODUCT.
ORIGIN 'O' IS CENTER OF COLUMN.
The house is tilted 21 degrees to the plot from origin 'O'.
There are two sizes of footings,
1. 900 x 900mm
2. 250 x 250mm

LEGEND
FOOTING AREA
PROJECT: Solar Decathlon Europe
PROJECT DESCRIPTION: H Naught House

DRAWN BY: SG
PLAN NUMBER: AR-017
COMPONENT: MEASURABLE AREA
BLOCK: ARCHITECTURE

GENERAL NOTES:
ALL DRAWINGS ARE IN MM (UNLESS SPECIFIED).
DO NOT SCALE THE DRAWINGS, WRITTEN DIMENSIONS TO BE STRICTLY FOLLOWED.
DRAWINGS PRODUCED BY AUTODESK EDUCATIONAL PRODUCT.

MEASURABLE AREA (62.00 SQ.M)
BUILT-UP AREA

FLOOR PLAN CUT AT +1.2M SHOWING MEASURABLE AREA
GROUND LVL @ -0.75M
SCALE 1:50

LEGEND
MEASURABLE AREA  (62.00 SQ.M)
BUILT-UP AREA

PLAN NUMBER: AR-017
COMPONENT: MEASURABLE AREA
BLOCK: ARCHITECTURE
REvised ON: 25/05/2014
DRAWN BY: SG

CLIENT
U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON EUROPE 2014
VERSAILLES

DRAWING TITLE
AR-017
MEASURABLE AREA
PROJECT: Solar Decathlon Europe
PROJECT DESCRIPTION: H naught house

PLAN NUMBER: AR-031
COMPONENT: ROOF PLAN

DRAWN BY: SG
PLAN-LEVEL: 4-FLOOR
SCALE: 1:50

GENERAL NOTES:
ALL DRAWINGS ARE IN MM (UNLESS SPECIFIED).
DO NOT SCALE THE DRAWINGS, WRITTEN DIMENSIONS TO BE STRICTLY FOLLOWED.
DRAWINGS PRODUCED BY AUTODESK EDUCATIONAL PRODUCT.
PROJECT: Solar Decathlon Europe
PROJECT DESCRIPTION: HNaught house

GENERAL NOTES:
- All drawings are in mm (unless specified).
- Do not scale the drawings, written dimensions to be strictly followed.
- Drawings produced by Autodesk Educational Product.


LEGEND
- UNMARKABLE AREAS
- MEASURABLE AREA (62.00 SQ.M)

PLAN NUMBER: AR-051
COMPONENT: MEASURABLE AREA

FLOOR PLAN CUT AT +1.2M SHOWING MEASURABLE AREA COMPLIANCE WITH RULE 6.2

DRAWING TITLE: AR-051
MEASURABLE AREA

DRAWN BY: SG
REVISED ON: 25/05/2014
Project: Solar Decathlon Europe
Project Description: H naught house

General Notes:
- All drawings are in mm (unless specified).
- Do not scale the drawings, written dimensions to be strictly followed.
- Drawings produced by Autodesk Educational Product.

Drawn by: SG

Date: 25/05/2014

EAST ELEVATION
GROUND LVL @ -0.75M SCALE 1:50
SOUTH ELEVATION
GROUND LVL -0.75M
SCALE 1:50

SOUTHERN TERRACE
+3.83 M

SOLAR THERMAL SYSTEM

WATER TANK

LEGEND

ALL DRAWINGS ARE IN MM (UNLESS SPECIFIED).
DO NOT SCALE THE DRAWINGS, WRITTEN DIMENSIONS TO BE STRICTLY FOLLOWED.

DRAWINGS PRODUCED BY AUTODESK EDUCATIONAL PRODUCT.

DRAWN BY: SG

REVISED ON: 25/05/2014

CLIENT:
U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON EUROPE 2014
VERSAILLES

DRAWING TITLE
AR-114
BUILDING ELEVATION
SECTION X'X''
GROUND LVL @ -0.75M
SCALE 1:50

GENERAL NOTES:
ALL DRAWINGS ARE IN MM (UNLESS SPECIFIED).
DO NOT SCALE THE DRAWINGS, WRITTEN DIMENSIONS TO
BE STRICTLY FOLLOWED.
DRAWINGS PRODUCED BY AUTODESK EDUCATIONAL
PRODUCT.

PLAN NUMBER: AR-201
COMPONENT: LONGITUDINAL SECTION
BLOCK: ARCHITECTURE
DRAWN BY: SG
REVISED ON: 25/05/2014

PROJECT: Solar Decathlon Europe
PROJECT DESCRIPTION: H naught house

CLIENT: U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON EUROPE 2014 VERSAILLES

DRAWING TITLE: AR-201
LONGITUDINAL SECTION

TERRACE LVL:
3.583 M
PLINTHER LVL:
0.2 M
GROUND LVL:
-0.75 M

LEVELS:
-0.75 M
+2.35 M
+3.583 M
+6.9 M

DETAIL ON SHEET AR-321 AND AR-341

LEGEND:
90MM TWIGA FIBER GLASS WOOL INSULATION PANEL (WITH ALUMINIUM FOIL LAMINATION)
75MM THK V-PANEL WITH INSULATION PANEL
135MM THK THE X-PANEL WITH INSULATION
1200MM X 2350MM FIRE RESISTANT DOOR
### WINDOW SCHEDULE

<table>
<thead>
<tr>
<th>NAME</th>
<th>SIZE (w x h)</th>
<th>DESCRIPTION</th>
<th>DESIGN</th>
<th>GLASS</th>
<th>QUANTITY</th>
<th>THERMAL TRANSMITTANCE</th>
</tr>
</thead>
</table>
| W1   | 1200mm x 1500 mm | UPVC window frame 2 shutters, side hinges |  | SGG SCN 165 | 3 | THE U VALUE : 1.6 W/m²K  
SOLAR HEAT GAIN COEFFICIENT (SHGC) : 0.35  
VIBRAGE LIGHT TRANSMITTANCE : 0.66 |
| W2   | 900mm x 1000 mm | UPVC window frame 2 shutters, side hinges |  | SGG SCN 165 | 2 | THE U VALUE : 1.6 W/m²K  
SOLAR HEAT GAIN COEFFICIENT (SHGC) : 0.35  
VIBRAGE LIGHT TRANSMITTANCE : 0.66 |
| W3   | 2000mm x 1500 mm | UPVC window frame 2 shutters, side hinges |  | SGG SCN 165 | 1 | THE U VALUE : 1.6 W/m²K  
SOLAR HEAT GAIN COEFFICIENT (SHGC) : 0.35  
VIBRAGE LIGHT TRANSMITTANCE : 0.66 |
| W4   | 600mm x 1500mm | One way shutter, side hinges UPVC casement window, side hinges |  | SGG SCN 165 | 2 | THE U VALUE : 1.6 W/m²K  
SOLAR HEAT GAIN COEFFICIENT (SHGC) : 0.35  
VIBRAGE LIGHT TRANSMITTANCE : 0.66 |
| W5   | 600mm x 1500mm | Single shutter UPVC casement window, vertical hinges window : Provision of exhaust fan |  | Frosted Glass | 1 | THE U VALUE : 1.6 W/m²K  
SOLAR HEAT GAIN COEFFICIENT (SHGC) : 0.35  
VIBRAGE LIGHT TRANSMITTANCE : 0.66 |
| W6   | 3700mm x 500mm | Ventilator, with hung window and vertical hinges |  | SGG SCN 165 | 1 | THE U VALUE : 1.6 W/m²K  
SOLAR HEAT GAIN COEFFICIENT (SHGC) : 0.35  
VIBRAGE LIGHT TRANSMITTANCE : 0.66 |
| W7   | 1800mm x 500mm | Ventilator, with hung window and vertical hinges |  | SGG SCN 165 | 1 | THE U VALUE : 1.6 W/m²K  
SOLAR HEAT GAIN COEFFICIENT (SHGC) : 0.35  
VIBRAGE LIGHT TRANSMITTANCE : 0.66 |

### Building Component

**Windows**

<table>
<thead>
<tr>
<th>Component</th>
<th>Area (m²)</th>
<th>Heat Material</th>
<th>Resistance Coefficient (m²-K/W)</th>
<th>Solar Heat Gain Coefficient (SHGC)</th>
<th>Visible Light Transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows</td>
<td>10</td>
<td>Clear Glass</td>
<td>4</td>
<td>0.20</td>
<td>0.59</td>
</tr>
<tr>
<td>Air Gap</td>
<td>12</td>
<td>Clear Glass</td>
<td>4</td>
<td>0.20</td>
<td>0.59</td>
</tr>
<tr>
<td>Other Glass</td>
<td>4</td>
<td>Clear Glass</td>
<td>4</td>
<td>0.20</td>
<td>0.59</td>
</tr>
</tbody>
</table>
## Door Schedule

<table>
<thead>
<tr>
<th>Name</th>
<th>Size (h x w x d)</th>
<th>Description</th>
<th>Design</th>
<th>Quantity</th>
<th>Thermal Transmittance</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>2350 mm X 900mm X 140mm</td>
<td>Laminated door, fire proof (2 h) design: laminated core; extra insulated laminate colour: Wenge</td>
<td>![Door Diagram]</td>
<td>2</td>
<td>U Value: 0.6 W/m²K</td>
</tr>
<tr>
<td>D2</td>
<td>2350 mm X 750mm X 140mm</td>
<td>Laminated door, type: flush door design: commercial core: tubular/elliptical laminate colour: Wenge</td>
<td>![Door Diagram]</td>
<td>1</td>
<td>U Value: 0.6 W/m²K</td>
</tr>
<tr>
<td>D3</td>
<td>2350 mm X 750mm X 114mm</td>
<td>Toilet door, type: flush door design: commercial core: summarised laminate colour: Wenge</td>
<td>![Door Diagram]</td>
<td>2</td>
<td>U Value: 0.6 W/m²K</td>
</tr>
<tr>
<td>D4</td>
<td>2350 mm X 900mm X 114mm</td>
<td>Master bedroom type: sliding door design: commercial core: tubular/elliptical laminate colour: Wenge</td>
<td>![Door Diagram]</td>
<td>1</td>
<td>U Value: 0.6 W/m²K</td>
</tr>
<tr>
<td>D5</td>
<td>2350 mm X 900mm X 114mm</td>
<td>Kids bedroom type: sliding door design: commercial core: tubular/elliptical laminate colour: Wenge</td>
<td>![Door Diagram]</td>
<td>1</td>
<td>U Value: 0.6 W/m²K</td>
</tr>
</tbody>
</table>
**Drawing Title**: AR-341

**Project**: Solar Decathlon Europe 2014

**Title**: WALL SECTIONS AND CONSTRUCTION DETAILS

**Client**: U.S. Department of Energy

**Versailles**: WALL SECTIONS AND CONSTRUCTION DETAILS

**Description**: H naught house

**Scale**: 1:5

**Legend**:

- C Cleat
- TW STILE (200 x 150)
- TW DOOR FRAME (200 x 150)
- 12MM TH FIBRE CEMENT BOARD
- 15 MM TH GYPSUM BOARD
- 90MM GLASSWOOL INSULATION
- 15MM TH GYPSUM BOARD
- 13MM TH FIBRE CEMENT BOARD
- 90MM GLASSWOOL INSULATION

**General Notes**:

- All drawings are in mm (unless specified).
- Do not scale the drawings, written dimensions to be strictly followed.
- Drawings produced by Autodesk Educational Product.

**Building Components**

<table>
<thead>
<tr>
<th>Building Component</th>
<th>Area (m²)</th>
<th>Layer Material</th>
<th>Thickness (mm)</th>
<th>Normal Heat Capacity (W/mK)</th>
<th>Specific Heat Capacity (J/kgK)</th>
<th>Effective U Value (W/m²K)</th>
<th>Effective U Value With Bridging (W/m²K)</th>
<th>Density (kg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General wall</td>
<td>17</td>
<td>Fiber Cement Board</td>
<td>12</td>
<td>0.21</td>
<td>1.800</td>
<td>0.038</td>
<td>0.33</td>
<td>1300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fiber Cement Board</td>
<td>12</td>
<td>0.34</td>
<td>1.800</td>
<td>0.038</td>
<td>0.33</td>
<td>1200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fiber Cement Board</td>
<td>15</td>
<td>0.24</td>
<td>1.872</td>
<td>0.038</td>
<td>0.33</td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fiber Cement Board</td>
<td>12</td>
<td>0.34</td>
<td>1.800</td>
<td>0.038</td>
<td>0.33</td>
<td>1200</td>
</tr>
</tbody>
</table>

**Drawing Details**

- Plan showing connection between door and wall
- Section showing the connection between wall, column, and floor

**Scale**: 1:5

**Plan Number**: AR-341

**Revised on**: 25/05/2014

**Drawn by**: SG

**Team Shunya**
**Drawing Title:** AR-351

**Component:** Partition Details

**Description:**

**Building Component:** Partition

<table>
<thead>
<tr>
<th>Area (m²)</th>
<th>Glazing Material</th>
<th>Thickness (mm)</th>
<th>Thermal Conductivity (W/mK)</th>
<th>Specific Heat Capacity of Glazing (J/kg-K)</th>
<th>Effective U-Value (W/m²K)</th>
<th>Effective U-Value With Bridging (W/m²K)</th>
<th>Density (kg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>20 mm Plywood</td>
<td>20</td>
<td>0.21</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>18 mm Greco Board Jali</td>
<td>20</td>
<td>0.21</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
<td></td>
</tr>
</tbody>
</table>

**General Notes:**

- All drawings are in mm (unless specified).
- DO NOT SCALE THE DRAWINGS, THE WRITTEN DIMENSIONS TO BE STRICTLY FOLLOWED.
- Drawings produced by Autodesk Educational Product.

**Plan Showing Internal Partition**

- Indicative False Ceiling Line
- 20 mm Plywood Board
- T.W. Frame
- 18 mm Greco Board Jali
- Opening for Light Fixtures

**Legend:**

- Internal Partition
- Plan at AA
- Plan at BB
- Section CC
- Section DD
For the warm and humid climate of Mumbai, the diffuse fraction of solar radiation is quite high due to cloud cover, and the radiation can be intense on clear days. Hence, the diurnal variation in temperature is quite low. In summer, the temperatures can reach as high as 30 - 35 °C during the day, and 25 - 30 °C at night. In winter, the maximum temperature is between 25 to 30 °C during the day and 20 - 25 °C at night. Although the temperatures are not excessive, the high humidity causes discomfort.

An important characteristic of this region is the relative humidity, which is generally very high, about 70 - 90% throughout the year. Precipitation is also high, being about 1200 mm per year, or even more. Hence, the provision for quick drainage of water is essential in this zone.

The wind is generally from one or two prevailing directions with speeds ranging from extremely low to very high. Wind is desirable in this climate, as it can cause sensible cooling of the body.

The main design criteria in the warm and humid region are to reduce heat gain by providing shading, and promote heat loss by maximising cross ventilation. Dissipation of humidity is also essential to reduce discomfort.

**Observations:**
1. The wind direction is North to South and West to East for the most part of the year. Cross ventilation of spaces in these directions would provide passive cooling.
SUN PATH ANALYSIS FOR MUMBAI

WARM AND HUMID REGION

OBJECTIVES
1) Resist heat gain
   - Decrease exposed surface area
   - Increase thermal resistance
   - Increase buffer spaces
   - Increase shading
   - Increase surface reflectivity
2) Promote heat loss
   - Ventilation of appliances
   - Increase air exchange rate (Ventilation throughout the day)
   - Decrease humidity levels

PHYSICAL MANIFESTATION
- Orientation and shape of building
- Roof insulation and wall insulation.
- Reflective surface of roof.
- Balconies and verandahs
- Walls, glass surfaces protected by overhangs, fins and trees
- Pale colour, glazed china mosaic tiles, etc.

OBSERVATIONS:
1. Sun stays on the south side for the most part of the year. Overhangs on south are an important passive feature for reducing the heat gain and the glare.
2. Clerestory windows on the East let the morning sun in and provide daylighting to the active spaces of the house.
Sun-shading of windows required to reduce heat gain and glare.
Cooling and dehumidification required during the day.
Inverter based ACs can be used during peak hours.
Fan induced cross ventilation could reduce discomfort due to high humidity.
Software used: Climate Consultant version 4
Cooling and dehumidification needs lesser.
Energy efficient fan induced ventilation should be comfortable, reducing the energy needs as well.
Software used: Climate Consultant version 4

**Legend**

- 100% Comfortable
- 50% Comfortable
- 0% Not Comfortable

**Psychrometric Chart for a Summer Night for Mumbai for the Month of May**

**Design Strategies: May**

- 1. Control - ASHRAE 55/IE93 (Avoid discomfort)
- 2. Non-Spotting of Windows
- 3. High Thermal Mass (High)
- 4. High Thermal Mass: Heat in Summer
- 5. Direct Evaporation Cooling (High)
- 6. Zero Energy Design: Solar (High)
- 7. Adaptive Comfort: Ventilation (Hot)
- 8. Fan Forced: Ventilation Cooling (Hot)
- 9. Internal Zone Control (Hot)
- 10. Passive Solar: Direct Gain Low Mass (Low)
- 12. Mixed Protection of Outdoor: Spacens (Low)
- 13. Humidification: Cold (Hot)
- 14. Dehumidification: Warm & Hot

**General Notes:**

- All drawings are in mm (unless specified).
- Drawings produced by Autodesk Educational Product.
Fan induced ventilation should suffice.

Software used: Climate Consultant version 4
Fan induced ventilation should suffice as cross-ventilation would reduce the discomfort due to high humidity.

Software used: Climate Consultant version 4
Energy efficient fan induced cross ventilation should take care of discomfort due to high humidity and cause cooling. Inverter based ACs could be used during peak hours. Software used: Climate Consultant version 4
A good passive design could lead to reduction of the load by 50% and to 35% by the use of energy efficient air-conditioning.

The Passive Design of the house promotes cross ventilation for the North to South and West to East Winds for Mumbai climate. This reduces the discomfort due to high humidity.
LAYOUT OF SPACES WITH RESPECT TO VAASTU SHASTRA, THE ANCIENT SCIENCE OF CONSTRUCTION.

(Vaastu Shastra concepts are in sync with Passive Solar Architecture)
EFFECTS OF CLERESTORY ON MUMBAI’S DAYLIGHTING

The clerestory windows in the east let the daylight reach interiors of the active spaces.
TWIGA Glass Wool with its outstanding Acoustic performance has excellent acoustic absorption characteristics. 48 kg/m³ 50 mm thick Twiga Insulation has Noise Reduction Coefficient (100 to 8000 Hz) of 0.72. The thermal conductivity of Twiga Glasswool is 0.033 W/mK.

EFFECTS OF GLASSWOOL ON H-NAUGHT'S ACOUSTIC PERFORMANCE
EFFECTS OF GLASSWOOL ON H-NAUGHT’S ACOUSTIC PERFORMANCE

EFFECTS OF GLASSWOOL ON THERMAL PERFORMANCE OF THE BUILDING
USE OF KIND AND SIZE OF TREES AS A PASSIVE DESIGN STRATEGY

AIR MOVEMENT BY CROSS VENTILATION CAN REDUCE DISCOMFORT

HIGH HUMIDITY AND HIGH TEMPERATURE CAUSES DISCOMFORT IF PERSPIRATION IS NOT DISSIPATED.
LIVING ROOM NORTH ELEVATION

SAINT GOBAIN GYPLINER FALSE CEILING

12MM THK GRECO BOARD SHUTTER WITH MERINOLAM LAMINATE FINISH CODE:10882 V CAFE WALNUT

LCD TELEVISION

CANE SOFA FROM MAYUR

CANE CENTER TABLE FROM MAYUR

CANE TV UNIT FROM MAYUR

FLOOR FINISH 3MM ECO SOFT CARPET TILES CODE:FF-78

WALL FINISH ADORNIS FUSION WALLPAPER

LINGEL WINDOWS

5MM THICK GLASS TOP

PHILIPS WALL MOUNTED LIGHTS CODE:QWG300

GENERAL NOTES:

ALL DRAWINGS ARE IN MM UNLESS SPECIFIED.

DRAWINGS PRODUCED BY AUTODESK EDUCATIONAL PRODUCT

PROJECT DESCRIPTION:
H-naught house

PROJECT:
Solar Decathlon Europe

CLIENT:
U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON EUROPE 2014
VERSAILLES
LIVING ROOM EAST ELEVATION

SCALE 1:50

PROJECT DESCRIPTION:
H naught house

GENERAL NOTES:
ALL DRAWINGS ARE IN MM (UNLESS SPECIFIED). DRAWINGS PRODUCED BY AUTODESK EDUCATIONAL PRODUCT.

CLIENT
U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON EUROPE 2014
VERSAILLES

DRAWING TITLE
IN 202
ELEVATION
PROJECT: Solar Decathlon Europe
PROJECT DESCRIPTION: Pinnaclot house

CLIENT: U.S. Department of Energy
SOLAR DECATHLON EUROPE 2014
VERSAILLES

DRAWING TITLE
LIVING ROOM SOUTH ELEVATION
SCALE 1:25

ELEVATION NUMBER: IN 203
COMPONENT: ELEVATION
INDEX:

DATE: 24/2/2014
DRAWN BY: PS

GENERAL NOTES:
ALL DRAWINGS ARE IN MM (UNLESS SPECIFIED)
DRAWINGS ARE PRODUCED BY AUTODESK EDUCATIONAL PRODUCT

SAINT GOBAIN
GYPLINER FALSE CEILING

PAINTING
12MM THK GREECO BOARD
JAALI
20MM PLYWOOD FRAME
(DARK POLISH FINISH)

PHILIPS SUSPENDED LIGHTS

50MM THICK MATTRESS

20MM PLYWOOD PLATFORM FINISH: DARK POLISH

25MM THICK PLYWOOD POLISH

MASTER BEDROOM DOOR WITH MERROLAM LAMINATE FINISH
CODE: 109/115 STRAIGHT WALNUT

SAINT GOBAIN GYPLINER FALSE CEILING

WALL FINISH: ADORNIS FUSION WALLPAPER

PHILIPS SUSPENDED LIGHTS

20MM PLYWOOD FRAME
(DARK POLISH FINISH)

SAINT GOBAIN GYPLINER FALSE CEILING

MASTER BEDROOM DOOR WITH MERROLAM LAMINATE FINISH
CODE: 109/115 STRAIGHT WALNUT

25MM THICK PLYWOOD POLISH

FLOOR FINISH: 3MM ECO SOFT CARPET TILES
CODE: FF-78

WALL FINISH: ADORNIS FUSION WALLPAPER

WALL FINISH: ADORNIS FUSION WALLPAPER

FLOOR FINISH: 3MM ECO SOFT CARPET TILES
CODE: FF-78
TEAMS HUNYA ACADEMY OF ARCHITECTURE I.I.T BOMBAY

LEGEND

---

DATE: 24/2/2014
DRAWN BY: PS

GENERAL NOTES:
ALL DRAWINGS ARE IN MM UNLESS SPECIFIED.
DRAWINGS ARE PRODUCED BY AUTODESK EDUCATIONAL PRODUCT.

CLIENT: US DEPARTMENT OF ENERGY
SOLAR DECATHLON EUROPE 2014
VERSAILLES

DRAWING TITLE: LIVING ROOM WEST ELEVATION
SCALE 1:25

PROJECT DESCRIPTION:
H Naught House
PROJECT: Solar Decathlon Europe

IN 204 ELEVATION

SAINT GOBAIN GYPSUM FASILE CEILING

WALL FINISH: ADOBE WALLS FUSION WALLPAPER

12MM THK GRECO BOARD SHUTTER WITH ADOBE WALLS FUSION WALLPAPER

LCD TV

5MM THICK GLASS

CANE TV UNIT FROM MAYUR

FLOOR FINISH: 5MM ECOBOARDS CARPET TILES CODE: FF-78
MASTER BEDROOM NORTH ELEVATION

SCALE 1:25

12MM THK GRECO BOARD SHUTTER WITH MERINOLAM LAMINATE FINISH
CODE:100118 MYSTIQUE WALNUT

12MM THK GRECO BOARD SHELF
FLOOR FINISH
3MM ECOOSFT CARPET TILES
CODE:FF-78

100MM SKIRTING

DRAWING TITLE

GENERAL NOTES:
ALL DRAWINGS ARE IN MM UNLESS SPECIFIED.
DRAWINGS ARE PRODUCED BY AUTODESK EDUCATIONAL
PRODUCT

LEGEND

DATE: 24/2/2014
DRAWN BY: VH
PLAN NUMBER: IN 205
COMPONENT: ELEVATION
BLOCK: INTERIORS
CLIENT
U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLION EUROPE 2014
VERSAILLES
MASTER BEDROOM EAST ELEVATION

SAINT GOBAIN
GYPLINER FALSE
CEILING

12MM THK GRECO BOARD SHUTTER
WITH MERINOLAM LAMINATE FINISH
CODE:10811 MYSTIQUE WALNUT

WALL FINISH
ADORNIS
FUSION WALLPAPER

FLOOR FINISH
3MM ECOSOFT CARPET TILES
CODE:FF-78

100MM SKIRTING

CODE:

FLOOR FINISH
3MM ECOSOFT CARPET TILES
CODE:FF-78

GENERAL NOTES:
ALL DRAWINGS ARE IN MM (UNLESS SPECIFIED).
DRAWINGS ARE PRODUCED BY AUTODESK EDUCATIONAL PRODUCT.

DATE: 24/2/2014
DRAWN BY: VH
PLAN NUMBER: IN 206
COMPONENT: ELEVATION
BLOCK: INTERIORS

PROJECT DESCRIPTION:
H naught house
PROJECT:
Solar Decathlon Europe

VERSAILLES
U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON EUROPE 2014
ACADEMY OF ARCHITECTURE
I.I.T BOMBAY

SCALE 1:25
MASTER BEDROOM SOUTH ELEVATION

SCALE 1:25
12MM THK GRECO BOARD SHELF

ALUMINIUM ROD

12MM THK GRECO BOARD SHUTTER WITH MERINOLAM LAMINATE FINISH CODE: V CAFE WALNUT 10882

FLOOR FINISH
3MM ECO SOFT CARPET TILES CODE: FF-78

KIDS BEDROOM SOUTH SECTION

SCALE 1:25
SAINT GOBAIN GYPLINER FALSE CEILING

3MM ECO SOFT CARPET TILES CODE: FF-78

SCALE 1:25

PROJECT: Solar Decathlon Europe
PROJECT DESCRIPTION: Pinnacl housing

TEAM SHUNYA

DATE: 24/2/2014
DRAWN BY: SP

PLAN NUMBER: IN 210
COMPONENT: ELEVATION

GENERAL NOTES:
ALL DRAWINGS ARE IN MM UNLESS SPECIFIED.
DRAWINGS ARE PRODUCED BY AUTODESK EDUCATIONAL PRODUCT

CLIENT
U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON EUROPE 2014
VERSAILLES

DRAWING TITLE
IN 210
ELEVATION
PROJECT DESCRIPTION:
H naught house

PROJECT:
Solar Decathlon Europe

IN 401

GENERAL NOTES:
ALL DRAWINGS ARE IN MM UNLESS SPECIFIED.
DRAWINGS ARE PRODUCED BY AUTODESK EDUCATIONAL PRODUCT

LEGEND

DATE: 24/2/2014
DRAWN BY: SK

CLIENT
U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON EUROPE 2014
VERSAILLES

SCALE 1:20
NORTH

KITCHEN PLAN

KITCHEN (3.7x2.5M)
LEVEL: +750MM
FLOOR FINISH: CARPET TILES
(ROYAL ENTERPRISES, ECO CARPET, CODE: FF-78)

COUNTER TOP
20MM GRECO BOARD WITH MERINO LAMINATE FINISH CODE: 16882 Y CAPE WALNUT

REFRIGERATOR
BOSCH CODE: KGW49AI41G
OPENING ON TOP TO PREVENT HEAT TRANSFER

INSULATED PUFF PANEL ATTACHED TO 18MM GRECO BOARD TO PREVENT HEAT TRANSFER

SOLAR OVEN BELOW COUNTER TOP
FABER FIBO 59L 4F (595 X 573 X 595)

SIEMENS BUILT IN DISHWASHER BELOW COUNTER TOP
CODE: SKFRM533EU

STAINLESS STEEL KITCHEN SINK

KITCHEN CHIMNEY ABOVE INDUCTION COOKTOP

EXIT

600

900

1700

2500

800

2560

530

610

1200

1200

500

900

2400

3000

500

500

400
ST. GOBAIN GYPLINER FALSE CEILING

18 MM GRECO BOARD WITH MERINOLAM LAMINATE FINISH CODE: 21028 CHOCOLATE XTRE MATTE FINISH

SUSPENDED LIGHTS PHILIPS CODE: 37165/31/86

20 MM GRECO BOARD WITH MERINOLAM LAMINATE FINISH CODE: 10882 V CAFE WALNUT

18 MM GRECO BOARD WITH MERINOLAM LAMINATE FINISH CODE: 10882 V CAFE WALNUT

FLOOR FINISH 3MM CARPET TILES CODE: FF-78 ECOSOFT

INSULATED PUFF PANEL ATTACHED TO 18MM GRECO BOARD TO PREVENT HEAT TRANSFER

REFRIGERATOR BOSCH CODE: KGN4242S01

12 MM GRECO BOARD SHELVES

KITCHEN DRAWERS

100 MM HIGH SKIRTING WITH MERINOLAM LAMINATE FINISH CODE: 21028 CHOCOLATE XTRE MATT FINISH

KITCHEN NORTH ELEVATION SCALE 1:25

GENERAL NOTES:
ALL DRAWINGS ARE IN MM UNLESS SPECIFIED.
DRAWINGS ARE PRODUCED BY AUTODESK EDUCATIONAL PRODUCT
TOILET PLAN
SCALE 1: 20
VIEWS OF THE LIVING ROOM
VIEWS OF THE DINING AREA
VIEWS OF THE MASTER BEDROOM
VIEWS OF THE KIDS ROOM
PLAN AT EL. +750 (FLOOR)
ELEVATION ON GRID-4
PLAN FOR DECK
SOUTH ELEVATION
GROUND LVL @ -0.75M
SCALE 1:50
LEGEND:

- BALL VALVE
- DIRECTION OF FLOW
- GRUNDFOS PUMP
- GREY WATER TANK 1410 x 1005 x 440MM
- GREY WATER PIPE 20MM DIA

SOUTH ELEVATION
GENERAL NOTES:
ALL DRAWINGS ARE IN MM UNLESS SPECIFIED.
DRAWINGS PRODUCED BY AUTODESK EDUCATIONAL PRODUCT.

PLAN NUMBER: ME-021-031
DRAWING TITLE: ME-021-031
COMPONENTS: HEATING - COOLING
BLOCK: MECHANICAL
DATE: 2/15/2014
DRAWN BY: SS

ME-021 HEATING SCHEMATIC PLAN
ME-031 COOLING SCHEMATIC PLAN

KIDS' BEDROOM IS COOLED THROUGH RAW INDUCED NATURAL VENTILATION. IF THE DOOR OF MASTER BEDROOM OR LIVING ROOM OPENS, IT CAN BECOME A PART OF THAT ZONE AS WELL.
NOTE:
FAN INDUCED NATURAL VENTILATION
WOULD BE USED FOR PASSIVE DAYS IN THE
COMPETITION AND MOST OF THE YEAR IN
THE LOCAL CONTEXT OF MUMBAI.
HIGH WALL AC UNIT
L835XH330XD265

DRAIN PIPE 16Ø

AC DUCT 60Ø

OUTDOOR UNIT
L910XH600XD365

ELEVATION OF HEAT PUMP LOCATED IN MASTER BEDROOM

OUTDOOR UNIT
L910XH600XD365

AC DUCT 60Ø

HIGH WALL AC UNIT
L835XH330XD265

ELEVATION OF HEAT PUMP LOCATED IN LIVING ROOM
SCHEMATIC OF ENERGY RECOVERY VENTILATOR
REFERENCE: UNITech

SCHEMATIC FOR CEILING FAN
REFERENCE: WWW.SUPERFAN.IN
AIR CONDITIONING CYCLE
REFERENCE: GOOGLE IMAGES
REVERSE CYCLE HEAT PUMP - COOLING CYCLE

AIR CONDITIONING CYCLE FOR TEAM SHUNYA'S TRANE 1 TR HEAT PUMP UNITS

REFERENCE: GOOGLE IMAGES
Names of parts

**Indoor unit**
1. Front panel
2. Air inlet
3. Air filter
4. Air outlet
5. Horizontal air flow grille
6. Vertical air flow louver (inside)
7. Display panel

**Outdoor unit**
8. Connecting pipe
9. Connecting cable
10. Stop valve

**NOTE:**
All the pictures in this manual are for explanation purposes only. The actual shape of the indoor unit you purchased may be slightly different on front panel and display window. The actual shape shall prevail.

**Indication lamp**

- **OPERATION** indication lamp
  This lamp illuminates when the air conditioner is in operation.

- **TIMER** indication lamp
  Lights up during Timer operation.

- **DEFROST** indication lamp
  (Enabled on cooling & heating models only):
  Lights up when the air conditioner starts defrosting automatically or when the warm air control feature is activated in heating operation.

- **Temperature indicator**
  - Displays the temperature settings when the air conditioner is operational.
  - Displays the malfunction code.
Intelligent control panel

Functions

- Temperature display
  - Selected display for room air, outdoor air, suction air and supply air temperature
- Automatic bypass
  - Bypass opens automatically when the outdoor air temperature stays in the setting temperature range, the opening temperature can be set
- Electrical heater
  - Reserved port for connect electrical heating box, temperature can be set with this function
- Defrosting
  - Automatically defrosting, the defrosting temperature and defrosting interval can be set
- Smart alarm
  - Defrost (flickering alarm)
  - Frost (flickering alarm)
  - CO2 concentration control
- External ON/OFF
  - Reserved port to connect to the central controlling system

Features of the remote controller buttons

- Performance Features
  1. Operating Mode: AUTO, COOL, DRY, HEAT and FAN
  2. Timer Setting Function in 24 hours
  3. Indoor Setting Temperature Range: 17°C–30°C
  4. Full function of LCD (Liquid Crystal Display)

NOTES:
- 14th and 15th buttons are not available for models RGS51M2(C)/E.
- 7th, 14th and 15th buttons are not available for models RGS51M3(C)/E and RGS51M3/BG(C)/E.
- 15th button is not available for models of R51M1(C)/E, R51M1/BGE, R51M1/BGE-IN.
- 4th, 8th, 14th, 15th buttons are not available for models RGS51M9(C)/E.
- 6th, 7th, 14th, 15th buttons are not available for models RGS51M8(C)/E.

AC REMOTE CONTROLS

ERV CONTROLS

FAN CONTROLS
ISOMETRIC DISTRIBUTION OF HEAT PUMPS AND FANS
From MDB (AC)

From PV

All Ceiling fans

Control Logic
3 Watt light
**Main Distribution Box**

- **63 A MCB**
  - **25 A, 30 mA RCCB**
  - **40 A, 30 mA RCCB**
  - **6 A**

**Fuses & MCBs**

- **6 A** AC/DC
- **16 A**
- **25 A**
- **63 A, 30 mA RCCB**
- **40 A, 30 mA RCCB**

**Electrical Components**

- **All Ceiling fans,**
- **Supply-return +grey water pumps**
- **Refrigerator & general purpose sockets.**
- **Home automation system**
- **Cloths Dryer+corresponding**
- **Hot water supply pump**
- **Dish washer +corresponding**
- **Hot water supply pump**
- **Oven + Chimney**
- **Induction cook top**
- **Washing machine+**
- **Hot water supply pump**
- **Entertainment system + Laptop**
- **Lighting circuit**
- **Each MCB rating is 6 A**
- **Back up water heater**
- **Air conditioner**
- **ERV**

**Diagrams & Systems**

- **ERV**
- **Induction cook top**
- **Cloths Dryer+corresponding Hot water supply pump**
- **Oven + Chimney**
- **Washing machine+ Hot water supply pump**
- **Entertainment system + Laptop**
- **Lighting circuit**
- **Each MCB rating is 6 A**
- **Back up water heater**
- **Air conditioner**
- **ERV**

**Additional Systems**

- **Air conditioner**
- **Supply+return +grey water pumps**
- **Refrigerator & general purpose sockets.**
- **Home automation system**
- **Cloths Dryer+corresponding**
- **Hot water supply pump**
- **Dish washer +corresponding**
- **Hot water supply pump**
- **Oven + Chimney**
- **Induction cook top**
- **Washing machine+**
- **Hot water supply pump**
- **Entertainment system + Laptop**
- **Lighting circuit**
- **Each MCB rating is 6 A**
- **Back up water heater**
- **Air conditioner**
- **ERV**
SOLAR WATER HEATERS (ETC)

PV TRACKER

WATER TANK

PV MODULES

ELEVATION: GROUND + 3.5 M

FRONT VIEW OF ROOFTOP (FROM SOUTH SIDE)

PV TRACKER

DC JUNCTION BOX

INVERTER (POWERONE)

ELEVATION: GROUND + 3.5 M

SECTION A-A OF FIGURE IN SHEET 1
ORGANISER'S TJ MONITOR BOX

BREAKER
ELECTRIC PLUG
AC/DC POWER SUPPLY
UPS

TJ MONITOR
ACQUISITION MODULES

NOTE: SDE ORGANISER'S SHALL SUPPLY THE TJ MONITOR BOX SO INTERNAL CONNECTIONS OF THE TJ MONITOR BOX ARE NOT SHOWN HERE

MAIN DISTRIBUTION BOX

(REFER DWG. NO. EL-501)

FROM AC JUNCTION BOX
(REF. DWG. NO. PV-021)

GRID POWER LINE

PV kWh
LOAD kWh

NET kWh

AC POWER CABLE (3 CORE, 16 SQ.MM.)

AC POWER CABLE
CABLE: 3 CORE (1PH+N+E), 16 SQ.MM
CORE MATERIAL: MULTI-STRANDED COPPER
INSULATION: XLPE
SHEATH: FLEXIBLE

AC POWER CABLE
CABLE: 3 CORE (1PH+N+E), 16 SQ.MM
CORE MATERIAL: MULTI-STRANDED COPPER
INSULATION: XLPE
SHEATH: FLEXIBLE

GENERAL NOTES:
ALL DRAWINGS ARE IN MM UNLESS SPECIFIED.
DO NOT SCALE THE DRAWINGS, WRITTEN DIMENSIONS TO BE STRICTLY FOLLOWED.
DRAWINGS PRODUCED BY AUTOESK EDUCATIONAL PRODUCT.

LEGEND

PV MODULE
MINIATURE CIRCUIT BREAKER (MAGNETIC & THERMAL)
RESIDUAL CURRENT BREAKER WITH OVERLOAD PROTECTION
SURGE PROTECTION DEVICE

PLAN NUMBER: PV-012
SOLAR DECACTION EUROPE 2014
DRAWN BY: SADWAT

PROJECT: SOLAR DECATION EUROPE 2014
TEAM: SHUNYA

client: US DEPARTMENT OF ENERGY
DRAWING TITLE: PV-022
PV SYSTEM - GRID INTERCONNECTION

Academv of Architecture
1ST RANKED
PROJECT: Solar Decathlon Europe 2014
PROJECT DESCRIPTION: H Naught House
client: Solar Decathlon Europe 2014 Versailles

GENERAL NOTES:
DRAWINGS PRODUCED BY AUTODESK EDUCATIONAL PRODUCT.

LEGEND
- REPRESENTATION OF THE ROUTING OF THE SDE SENSOR CABLES FROM THE CABLE TRAY IN TO THE MONITORING PANEL.
ALL DRAWINGS ARE IN MM (UNLESS SPECIFIED),
DRAWINGS ARE PRODUCED BY AUTODESK
EDUCATIONAL PRODUCT.
GENERAL NOTES:
ALL DRAWINGS ARE IN MM UNLESS SPECIFIED.
LOT AND SURROUNDINGS
ARRIVAL OF TRUCK: Speed of the truck should be within the limits and one person will walk in front of the truck and one person on back. They will guide the truck driver in order to minimise the risk generated during transportation.
PHASE 1: SITE PREPARATION
First of all we will install fence around the site in order to minimise the risk that can be generated from the surrounding sites. After that house plan will be made on 1:1 ratio followed by levelling and placing of column stubs.
PLACING OF COLUMNS: After the levelling, columns will be placed.
PHASE 3: Placing of plinth beams and floor structure
FIXING OF FLOOR GRIDS TO PUT FLOORS ON IT
EXTERNAL WALLS: After the fixing of beam column structure external walls will be fixed.
TRUSS PANELS: After fixing of wall panels, truss panels will be fixed to resist the lateral load which is coming due to high wind speed.
Safety against fall
INTERNAL WALLS: After the outer shell, assembly of internal walls will be done.
Fixing of wardrobe in master bedroom and kid’s bedroom

Safety against fall
Fixing of roof beams

Safety against fall
Assembly of roof panels after roof beams

Safety against fall
Fixing of PV structure over roof

Safety against fall
Footings and levelling of deck stubs
Structural system for the deck
Structural system for the deck
Structural system for the deck
Fixing of WPC tiles of deck
Assembly of the WPC tiles and interiors
Disassembly of the interiors and WPC tiles of deck
Disassembly of the WPC tiles
Disassembly of the structural system of deck
Safety against fall

Full disassembly of the deck
Disassembly of the PV structure

Safety against fall
Disassembly of the roof panels

Safety against fall
Disassembly of the roof beams
Disassembly of the wardrobe of master bedroom and kid’s bedroom

Safety against fall
Disassembly of the internal walls

Safety against fall
Safety against fall
Disassembly of truss panels
Disassembly of wall panels
Disassembly of secondary beams of floor
Disassembly of plinth beams
Disassembly of columns
Disassembly of full structure
DO NOT SMOKE
NO UNAUTHORISED ACCESS
DO NOT RUN
DO NOT PASS UNDER LOAD
BACK INJURIES

FIRE EXTINGUISHER
DO NOT MADE FIRE
BACK INJURIES
ASSEMBLY POINT
FALL OF OBJECT
SAFETY GOGGLES
HAND GLOVES
HARD HAT
EAR PLUGS

SAFETY SHOES
SAFETY MASK
REFLECTIVE JACKET