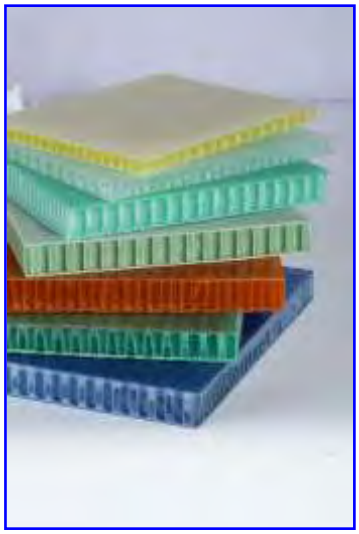
Name and Address of Certificate Holder:	Performance Appraisal Certificate No.
M/s Anjani Technoplast Ltd. **6A, Sector-40/41, Ecotech-I,** **Greater Noida, (UP) -- 201310,**	PAC No **1023-P/2015** Issue No. **01** Date of Issue: **16.11.2015**



Plastic Honeycomb Toilet Structures

User should check the validity of the Certificate by contacting Member Secretary, BMBA at BMTPC or the Holder of this Certificate.

Building Materials & Technology Promotion Council
Ministry of Housing & Urban Poverty Alleviation
Government of India
Core 5A, First Floor, India Habitat Centre,
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PERFORMANCE APPRAISAL CERTIFICATE

FOR

PLASTIC HONEYCOMB TOILET STRUCTURES

ISSUED TO

M/s ANJANI TECHNOPLAST LTD.

STATUS OF PAC 1023-P/2015

S.No.	Issue No.	Date of Issue	Date of renewal	Amendment		Valid up to (Date)	Remarks	Signature of authorized signatory
				No.	Date			
1.	2.	3.	4.	5.	6.	7.	8.	9.
1	1	16-11-2015	16-11-2016	--	--	15-11-2016		

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PART 1 CERTIFICATION

1.1 Certificate Holder: M/s Anjani Technoplast Ltd.

6A, Sector-40/41, Ecotech-I,
Greater Noida, (UP) -- 201310,
Tel: 120-4789000
Email: atl@anjani.com

1.2 Description of Product

1.2.1 *Name of the Product* – Plastic Honeycomb Toilet Structures

1.2.2 *Brief Description* –Lightweight thermoplastic honeycomb structures are produced using polypropylene. The honeycomb panels are thermo formed into shape in combination with fibre reinforced polymer composite skins to create structural parts. As these pre-fabricated components are ready made and self-supporting, shuttering and scaffolding is eliminated and can be installed immediately. Walls made out of these panels shall be designed to withstand all kinds of weathers. Paint is generally not required on the walls. However, if required, different finishes like teak wood, checker board and marble etc. can be provided. The roof of the honeycomb panels – toilets shall be either self-supportive tapered or flat.

These panel structures are suitable for toilets, security booth, office cabin, taxi booth etc.

1.3 Type of Toilet Structures

Various type of toilet structures made from panels of thickness 15 mm/ 30 mm are Men's toilet, low cost toilet, 20 boys & girls toilet, 20 to 40 boys/girls toilet, 40 to 80 boys/girls toilet, 80 boys/girls toilet, bio-digester, farm house toilet etc.

Typical toilet structures for men's toilet, 40 to 80 boys/girls toilet and 80 80 boys/girls toilet are shown in Figs. 1 to 4.

1.4 Assessments

1.4.1 *Scope of Assessment* – Suitability of Honeycomb panel structures for use as walls, ceilings & roofs for toilets, office and cabins, security booth, vending kiosks etc.

1.4.2 *Basis of Assessment*

The assessment is based on the results & reports of

(i) Inspection of the factory
(ii) Inspection of the manufacturing equipment used
(iii) Assessment of quality assurance procedures implemented in the factory

(iv) Tests certificates of polypropylene carried out by the manufacturer M/s Reliance Industries Ltd.

(v) Tests got done on the samples of the product namely Flammability test, Compressive strength, Shear strength, Shear modulus, Flexural strength and Water absorption from March to May 2015 by the manufacturer from Shriram Institute for Industrial Research, Delhi

(vi) Tests got done on the samples of the product collected by the IO during inspection of the plant from Shriram Institute for Industrial Research, Delhi

1.4.3 *Scope of Inspection* – Scope of inspection included the verification of production, performance and testing facilities at the factory including competence of technical personnel and status of quality assurance in the factory.

1.5 M*anufacturing Process*

1.5.1 The manufacturing process of honeycomb panel is as follows:

1.5.1.1 *Honeycomb Core*

i) Polypropylene (PP) granules shall be fed into the Honeycomb forming machine.

ii) The extruded material shall be fed on the fleece roller to get the specific shape by vacuum forming. This material shall be collapsed to form the honeycomb core.

iii) The valve of vacuum pump shall be opened and the temperature for polypropylene shall be set at 60ºC.

iv) The gap between the roller and the T-die should be approx. 15mm.

v) The location of knife shall be so placed that it cuts the core from the bottom end and meets the width requirement.

vi) The Melt flow index (MFI) shall be checked for each lot of material before start of machine.

vii) The hopper gate valve shall be closed before starting the heating of barrel.

viii) The mesh should be changed once the temperature reaches the set parameter and the machine set as per the control chart.

ix) The motor shall be started and T-die material placed between the rubber teeth.

x) Once T-die material passes through the rubber gear, the vacuum closer valve attached to the honeycomb roller shall be

switched on first and then the vacuum suction valve switched on to get the thermoformed honeycomb core.

1.5.1.2 *Honeycomb panel*

i) The thermoformed extruded material is fed into the honeycomb lamination machine.

ii) The extruded material shall be fed on the skin roller to get the specific shape by vacuum forming and panels are produced.

iii) The guides for core shall be aligned from the centre of machine and shall have max. 5mm clearance.

iv) The collapsing roller gear shall be checked first and belt drive gear and steel roller gear shall be as per the core size and the gap in heating and cooling bed shall be set accordingly.

v) The valves for water supply and heating oil circulation shall be opened before switching on the heating.

vi) The belt should be in continuous running position during the heating.

vii) The side trimming saw shall be placed at the specific width. The cross cutting saw shall also be checked so that it cuts the panels to specific length.

viii) Once the heating comes to its setting level, feeding of core through side gauge shall be started into the feed roller. The speed set be set gradually between 1.4 m/mm to 2.0m/mm.

ix) The guides for core and both skins shall be aligned from the center of machine and shall have 5mm clearance. The core and skin rolls shall be aligned with respect to machine center.

x) Once the heating comes to its setting level, feeding of core through side gauge shall be started into the feed roller and look for the collapsing. The collapsing shall be started by giving a hand break to core coming from the collapsing unit.

xi) As the collapsed core starts coming out of the collapsing unit, feeding of both skins shall be started and aligned with the belt. The belt shall be kept at 0.5m/mm during skin feeding. Once the skin starts moving, the speed shall be gradually increased.

Manufacturing Process flow chart is given in Annex II.

1.6 Design of the Toilet structures made of Plastic Honeycomb panels

1.6.1 *Design*

The toilet structures made from the honeycomb panels are custom designed for both super structures and bio-digester's to meet the

needs of the customer requiring lightweight, structurally strong, high strength, adaptable for extreme weather conditions.

1.7 ***Conditions of Certification***

1.7.1 *Technical Conditions* – Raw materials and the finished product shall conform to the requirements of the prescribed specifications.

1.7.2 *Quality Assurance* – The Certificate Holder shall implement & maintain a quality assurance system in accordance with Scheme of Quality Assurance (SQA) given in the Annex I attached with this Certificate.

1.7.3 *Brochure/ Guidelines* – The Certificate holder shall provide a Brochure giving the guidelines/instructions for using the panels effectively.

1.7.4 *Handling of User Complaints*

1.7.4.1 The Certificate holder shall provide quick redressal to consumer/user complaints proved reasonable & genuine and within the conditions of warranty provided by the customer/ purchaser.

1.7.4.2 The Certificate holder shall implement the procedure included in the SQA. As part of PACS Certification he shall maintain data on such complaints with a view to assess the complaint satisfaction and suitable preventive measures taken.

1.8 **Certification**

1.8.1 On the basis of assessment given in Part 3 of this Certificate & subject to the Conditions of Certification, use & limitations set out in this Certificate and if selected, installed & maintained as set out in Part 1 & 2 of this Certificate, Plastic Honeycomb Panel Structure covered by this Certificate is fit for use set out in the Scope of Assessment.

PART 2 CERTIFICATE HOLDER'S TECHNICAL SPECIFICATIONS

2.1 ***General***

2.1.1 The PAC holder shall manufacture the Plastic Honeycomb panel structures in accordance with the requirements specified in relevant Indian and other Standards. In addition it shall follow Company standards specifying requirements of various materials used in the manufacture of the product (See 2.2)

2.2 **Specifications of the Product and Performance Criteria**

2.2.1 *Technical Specifications*

2.2.1.1 *Raw materials*

i) Polypropylene granules manufactured by M/s Reliance Industries shall conform to the following properties:

a. Melt mass-flow rate (MFR) shall conform to IS 13360 (Part 4, Sec 1):2000
b. Tensile strength at yield shall conform to IS 13360 (Part 5, Sec 2):1996
c. Notched izod impact strength shall conform to IS 13360 (Part 5, Sec 4):2013
d. Heat deflection temperature shall conform to IS 13360 (Part 6, Sec 3):2013
e. Flexural modulus shall conform to 13360 (Part 5, Sec 7):1996

ii) Master batch shall conform to the manufacturer's specifications
iii) U V Master batch shall conform to the manufacturer's specifications
iv) F R Master batch shall conform to the manufacturer's specifications

2.2.3 *Performance Criteria*

Plastic Honeycomb panel structures shall meet the following performance criteria:

S.No	Properties	Test Method	Requirement
1.	Flexural strength (MPa)	IS 13360 (Part 5, Sec 7):2013	1.92 min.
2.	Compressive strength (MPa)	IS13360 (Part 5, Sec 8):1996/ ASTM D 790	0.88 min.
3.	FR test, (V2 level)	Ul 94	Pass
4.	Shear strength (MPa)	ASTM C 273	0.56 min.
5.	Shear modulus (MPa)	ASTM C 273	12.8 min.
6.	Compressive modulus (MPa)	ASTM C 365	95.2 min.
7.	Water absorption (%)	IS 13360 (Part 8, Sec 1):1997 /ASTM D 570	0.80 min.

2.3 Installation Process of Walls, Roof, Toilet fixtures Doors & Services

2.3.1 The process of installation of toilets and fixtures thereon is given below:

i. *Foundation* – As per customer requirement Polypropylene (PP) honeycomb panels shall be cut in to desired sizes as per the requirement. Thickness of the panels manufactured is 15 mm & 30 mm.

ii. *Fabrication of Base* – On the basis of the design of the toilets, panel size shall be cut and attached with the supports to the

base to attain specific height of the toilet. Distribution of base supports should be as such that the load gets uniformly distributed. All the provisions and openings for the sanitary fittings should be done prior to fabrication. Aluminum checker sheet of 0.5mm shall be pasted on the base after making provisions.

iii. *Fabrication of Walls* – Panels shall be cut according to size by using wire cut & butt welding as per the specifications and SS, GI or Wood finish lamination shall then be fixed. All the openings shall be cut and the walls placed around base with tack weld.

iv. *Fabrication of Roof* -- Similarly as done for base and walls, all the provisions, openings and interior finish shall be done. Depending upon type of roof such as single tapered, double tapered and flat, the adjustments shall be made in panel size and shape. Aluminum edging shall be provided all around the roof. A trapezium type honeycomb transparent sheet shall be used on the top for the purpose of maximum light to pass through during daytime.

v. *Tacking of Base with Wall and Wall with Roof* – After the initial tacking, all the components shall be assembled and base shall be tack weld with walls first and then walls with roof. The roof does not need any further reinforcement.

vi. Plastic Extrusion Welding – The whole process shall be completed with plastic extrusion welding. Whenever there is joining of two different parts of the toilets of PP honeycomb material, plastic extrusion welding shall be used. The resultant 'green' product is thermally stable up to 80°C hence suited for all types of weathers.

vii. *Door* – Door panel size shall be cut as per the requirement. Then aluminum framing of door shall be done. After that fixing of hinges take place in which door shall be attached with the door frame or walls. Fixing of door handle, lock, grab bar shall be done prior to all this. SS door handles of 150 mm are provided two in the front door and two of 100 mm in the service room.
If any fabrication of rivets, nuts or bolts for the purpose of fixing handles and hinges has to be done, following procedure shall be adopted:

a. First 4 mm carbide drill shall be used for the identification of the actual spot where the fixing has to be done.
b. After that 8mm carbide drill shall be used to enlarge the holes.
c. Then polypropylene in its pure form shall be inserted by using Leister machine thereby maintaining specified temperature. It shall be left to cool for 5 to 10 minutes so

that it becomes hard. It shall be made sure that the drill does not go all the way through the honeycomb.

d. Then again 4 mm carbide drill shall be used to create the hole for the screw; finally the screw or rivet shall be fixed.

viii. *Sanitary Items* –SS sheet shall be pasted on the honeycomb panel with the help of adhesive. With the help of circular drill the holes shall be made as per the requirement. Tap shall be of stainless steel. For joining of CPVC pipes, silibond adhesive shall be used. For cutting of pipes, hexa-blade or multi machine/vibrator cutter shall be used. To ensure that there is no leakage in the pipes, high quality sealant (3m 540) shall be used. To ensure that there is no leakage in the SS pipes, Teflon tape shall be used. To fix the accessories such as stand, wash basin etc., SS screws shall be used for fixing them in the honeycomb wall as per the procedure given below:

a. Drill of 4 mm carbide shall be used for making the holes first and then using 8 mm carbide drill these holes are extended.
b. After that with the help of Leister machine, pure PP shall be inserted using heat in the specified holes. This is done so that the screws hold tightly and properly in the honeycomb.
c. Finally again using 4mm carbide, the holes are drilled again on the same area and the accessories shall be placed on the right place and the screws are fixed.
d. For making the drainage holes, circular cutters shall be used. For urinals, CPVC pipes of 40 mm shall be used. The stand which is below the wash basin has an opening in which a waste bin shall be kept for use.

ix. *Electrical fitting* – For fixing of electrical fittings, two solar panels, one tubular battery and one UPS are required. According to the size of the fitting, marking shall be done and with the help of multi machine/vibrator cutter, specified piece in the honeycomb shall be cut. The wiring goes from the top and through the wall and then to the light. Six lights usually of 6 watts each shall be used out of which 4 are motion sensor. These lights shall have battery backup of around 8 to 10 hours after 4 to 6 hours of charging from the sunlight.

x. Wiring -- High quality IS marked PVC insulated copper wires shall be used and it shall be ensured that the joints are minimum.

xi. *Service room* -- On the back side provision for service room shall be given having a service window.

xii. *Window and Ventilation ducts* -- Two windows in the door and four ventilators on top of the walls shall be provided for the purpose of ventilation.

xiii. *Water tank* – Water tank shall also be made up of PP honeycomb panels and shall be joined using Leister machine. The temperature during heating of the machines and in the pasting process shall be kept between 160 to 200˚C.

xiv. Painting

a. Paint solution shall be prepared by mixing paint and thinner in the specified ratio.

b. Sanding by using 320 no. sand paper shall be done on the panel on which painting is to be done.

c. The panel shall be cleaned with fresh white cloth dipped in thinner.

d. One coat of primer shall be applied on the polypropylene panel and kept dry.

e. Second and third coat (if required) of paint shall be applied on the polypropylene panel and kept dry.

f. The panel shall be left untouched for 72 hours to become fully dry.

Fixing details of the wall, roof, door, fixtures plumbing and electrical are services shown in Figs. 6 to 14.

The above procedure does not purport to address all of the safety measures, if any associated with its use. It shall be the responsibility of the user to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2.4 Production & Inspection

P*roduction* – Honeycomb shall be thermoformed into shape in combination with fibre reinforced polymer composite skins to create structural parts. The design of honeycomb provides a solution for aerospace and other industries seeking to reduce weight while maintaining strength and stiffness

2.4.2 *Inspection* -- Inspection shall be done at appropriate stages of manufacturing process. The honeycomb panels shall be stored properly to ensure that no damage occurs during transportation. As part of quality assurance regular in-process, inspection shall be carried out by the trained personnel of the PAC holder.

2.5 Selection & Installation

2.5.1 The user is responsible for the proper use of the product at site. PAC holder shall provide required guidance and instructions for usage of the product at site.

2.5.2 *Good practice for installing the product at site* – Plastic honeycomb panel structures shall be used in accordance with the applicable specifications, instructions and guidelines of the manufacturer. The user shall also follow the Brochure of the system supplied by the manufacturer.

2.6 **Skills needed for Installation –***S*pecial skills of a fabricator, plumber, carpenter etc. shall be required for installation of these panel structures also.

2.7 **Guarantees/ Warranties provided by the PAC Holder**- The manufacturer shall furnish a guarantee/warranty of the panel structures. A brochure giving relevant warrantee details shall be made available to the client.

2.8 Services Provided by the PAC Holder to the Customer

2.8.1 The PAC holder shall provide pre-sale advisory regarding the product. Customer/user may obtain from the PAC holder details of the advice that may be provided to him.

2.8.2 Users/Customers should ascertain from the PAC holder the type of service, the PAC holder is prepared to provide.

Part 3 BASIS OF ASSESSMENT AND BRIEF DESCRIPTION OF ASSESSMENT PROCEDURE

3.1 Basis of Assessment

3.1.1 *Factory Inspection*

The factory was inspected by the technical representative of the Council. During inspection the entire manufacturing process along with the equipment was inspected. The in-process inspection and the inspection of the finished product were in accordance with the SQA approved as a part of the requirements for grant of this PAC.

3.2 Laboratory Tests Done for Assessment

3.2.1 *Testing of samples* -- The performance tests for Plastic Honeycomb panels have been carried out by Shriram Institute for Industrial Research, Delhi on samples of the product collected by the IO during inspection of the plant. The samples conform to the tests as per the performance characteristics and specifications given by the manufacturer.

S.No	Properties	Test Method	Test Result
1.	Flammability test	UL-94	Conforms to grade 94V-2
1.	Flexural strength (MPa)	IS14856:1996	1.8 MPa
2.	Compressive strength (MPa)	ASTM C 365-2011	1 MPa
3.	Water Absorption	ASTM D 570-2010	0.04%
4.	Cold brittleness temperature test (ºC)	ASTM D 746 -2013	-66ºC
5.	Shear strength (MPa)	ASTM C 273 - 2011	0.5 MPa
6.	Thermal conductivity (W/mK) at 27ºC	IS0 22007 (Part 2):2008	0.03 (W/mK)

3.3 Supply of the Plastic Honeycomb Toilet Structures

Details of the Toilet Structures supplied by the manufacturer are given below:-

S.No.	Customer and Location	Type/Quantity	Period of supply
1.	NBCC, New Delhi	Bio-digestor -- 4	August 2014
2.	Delhi Urban Art Commission, New Delhi	Hi Tech Public -- 1	October 2014
3.	Ashish Engg. Works, Chattisharh	Honcorz Prefab toilet -- 50	July 2015
4.	Delhi Urban Shelter Improvement Board, Delhi	Honcorz Prefab toilet -- 14	July 2015
5.	M/s Kesri Innovation Pvt. Ltd., New Delhi	Honcorz Prefab toilet -- 50	August 2015

PART 4 STANDARD CONDITIONS

The certificate holder shall satisfy the following conditions:

4.1 The certificate holder shall continue to have the product reviewed by BMBA.

4.2 The product shall be continued to be manufactured according to and in compliance with the manufacturing specifications and quality assurance measures which applied at the time of issue or revalidation of this certificate. The Scheme of Quality Assurance separately approved shall be followed.

4.3 The quality of the product shall be maintained by the certificate holder.

4.4 The product user should install, use and maintain the product in accordance with the provisions in this Certificate.

4.5 This certificate does not cover uses of the product outside the scope of this appraisal.

4.6 The product is appraised against performance provisions contained in the standards listed in Part-V. Provisions of any subsequent revisions or provisions introduced after the date of the certificate do not apply.

4.7 Where reference is made in this Certificate to any Act of Parliament of India, Rules and Regulations made there under, statutes, specifications, codes of practice, standards etc. of the Bureau of Indian Standards or any other national standards body and the International Organization for Standardization (ISO), manufacturer's company standards, instruction/manual etc., it shall be construed as reference to such publications in the form in which they were in force on the date of grant of this Certificate (and indicated in Part V to this Certificate)

4.8 The certificate holder agrees to inform BMBA of their distributors / licensees whenever appointed by him and agrees to provide to BMBA a six monthly updated list thereof.

4.9 The certificate holder agrees to provide to BMBA feedback on the complaints received, the redressal provided, and the time taken to provide redressal on complaint to complaint basis as soon as redressal is provided. BMBA agrees to provide the certificate holder the user feedback received by it, if any.

4.10 If at any time during the validity period, PACH is unable to fulfill the conditions in his PAC, he should on his own initiative suspend using the PAC and notify Chairman, TAC the date from which he has suspended its use, the reason for suspension and the period by which he will be able to resume. He shall not resume without the prior permission of BMBA. He shall also inform, simultaneously, his agents, licensees, distributors, institutional, government, public sector buyers, other buyers and all those whom he has informed about his holding the PAC. He shall also inform all those who buy his product(s) during the period of suspension. He shall provide to BMBA at the earliest the list of who have been so informed by him.

4.11 In granting this Certificate, BMBA takes no position as to:

(a) The presence or absence of patent or similar rights relating to the product;
(b) The legal right of the Certificate holder to market, install or maintain the product;
(c) The nature of individual installations of the product, including methods of workmanship.

4.12 BMTPC and the Board of Agreement of BMTPC (BMBA) take no position relating to the holder of the Performance Appraisal Certificate (PACH) and the users of the Performance Appraisal Certificate (PAC) respecting the patent rights / copy rights asserted relating to the product / system / design / method of installation etc. covered by this PAC. Considerations relating to patent / copy rights are beyond the scope of the Performance Appraisal Certification Scheme (PACS) under which this PAC has been issued. PACH and users of this PAC are expressly advised that determination of the Claim / validity of any such patent rights / copy rights and the risk of infringement of such rights are entirely the responsibility of PACH on the one hand and that of the users on the other.

4.13 It should be noted that any recommendations relating to the safe use of the product which are contained or referred to in this Certificate are the minimum standards required to be met with when the product is installed, used and maintained. They do not purport in any way to restate or cover all the requirements of related Acts such as the Factory Act, or of any other statutory or Common Law duties of care, or of any duty of care which exist at the date of this Certificate or in the future, nor is conformity with the provisions of this Certificate to be taken as satisfying the requirements of related Acts.

4.14 In granting this Certificate, BMTPC and BMBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the use of this product.

4.15 The certificate holder indemnifies BMBA, its officers and officials involved in this assessment against any consequences of actions taken in good faith including contents of this certificate. The responsibility fully rests with the certificate holder and user of the product

4.16 The responsibility for conformity to conditions specified in this PAC lies with the manufacturer who is granted this PAC. The Board (BMBA) will only consider requests for modification or withdrawal of the PAC.

4.17 The PAC holder shall not use this certificate for legal defense in cases against him or for legal claims he may make from others.

Dr. Shailesh Kr. Agarwal
Chairman, TAC
& Member Secretary, BMBA
Building Materials and Technology Promotion Council
Ministry of Housing & Urban Poverty Alleviation, (Govt. of India)
Core 5A, India Habitat Centre, Lodhi Road,
New Delhi-110 003

Place: New Delhi Chairman, TAC & for and on behalf of

Date of issue 16.11.15 Member Secretary, BMBA

PART 5 LIST OF STANDARDS AND CODES USED IN ASSESSMENT

5.1 Standards - These Standards are referred for carrying out a particular test only and do not specify the requirement for the whole product as such.

5.1.1 IS 13360 (Part 4, Sec 1):2000 – Determination of Melt Mass Flow Rate (MFR)

5.1.2 IS 13360 (Part 5, Sec 2):1996 – Determination of tensile properties for moulding & extrusion plastics

5.1.3 IS 13360 (Part 5, Sec 4):2013 – Determination of Izod impact strength

5.1.4 IS 13360 (Part 5, Sec 7):1996 – Determination of flexural properties

5.1.5 IS 13360 (Part 5, Sec 8):2013 – Determination of compressive properties

5.1.6 IS 13360 (Part 6, Sec 3):2013 -- Determination of temperature of deflection under load

5.1.7 IS 13360 (Part 8, Sec 1): 1997 -- Determination of water absorption

5.1.8 ISO 2007(Part 2):2008 – Method of determination of thermal conductivity of materials by means of heat flow meter

5.1.9 ASTM C 273:2011 -- Standard test method for shear properties of sandwich core materials

5.1.10 ASTM C 365:2011 -- Standard test method for flatwise compressive properties of sandwich cores

5.1.11 ASTM D 570:2010 -- Standard test method for determination of water absorption

5.1.12 ASTM D 638 -- Standard test method for tensile properties of plastics-- modulus of elasticity & elongation

5.1.13 ASTM D 648 -- Standard test method for determination of temperature of deflection under heat

5.1.14 ASTM D 746:2013 -- Standard test method for brittleness of temperature of plastics and elastomers

5.1.15 ASTM D 790 A -- Standard test method for flexural properties of unreinforced & reinforced plastics and electrical insulating materials

5.1.16 UL 94 -- Standard test method for flammability of plastic materials for parts

5.2 Company Standards of the PAC holder – The branded design & specifications of the raw materials and finished product are as submitted by the manufacturer. The PAC holder has to make available the company standards to the consumers according to which testing have been done.

CERTIFICATION

In the opinion of Building Materials & Technology Promotion Council's Board of Agreement (BMBA), **Plastic Honeycomb Toilet Structures** bearing the mark manufactured by M/s Anjani Technoplast Ltd. is satisfactory if used as set out above in the text of the Certificate. This Certificate **PAC No. 1023-P/2015** is awarded to **M/s Anjani Technoplast Ltd., Greater Noida (UP).**

The period of validity of this Certificate is as shown on Page 1 of this PAC. This Certificate consists of a cover page and pages 1 to 34.

Dr. Shailesh Kr. Agarwal
Chairman, TAC
& Member Secretary, BMBA
Building Materials and Technology Promotion Council
Ministry of Housing & Urban Poverty Alleviation, (Govt. of India)
Core 5A, Ist Floor, India Habitat Centre,Lodhi Road,
New Delhi-110 003

Embossing Seal of BMBA

On behalf of BMTPC Board of Agreement Chairman, Technical Assessment Committee (TAC) of BMBA & Member Secretary, BMTPC Board of Agreement (BMBA) Under Ministry of Housing and Urban Poverty Alleviation, Government of India.

Place: New Delhi

Date: 16.11.2015

PART 6 ABBREVIATIONS

Abbreviations

BMBA	Board of Agreement of BMTPC
BMTPC	Building Materials and Technology Promotion Council
CPWD	Central Public Works Department
ED	Executive Director of BMTPC
IO	Inspecting Officer
MS	Member Secretary of BBA
PAC	Performance Appraisal Certificate
PACH	PAC Holder
PACS	Performance Appraisal Certification Scheme
SQA	Scheme of Quality Assurance
TAC	Technical Assessment Committee (of BMBA)

Performance Appraisal Certification Scheme - A Brief

Building Materials & Technology Promotion Council (BMTPC) was set up by the Government of India as a body under the Ministry of Housing &Urban Poverty Alleviation to serve as an apex body to provide inter-disciplinary platform to promote development and use of innovative building materials and technologies laying special emphasis on sustainable growth, environmental friendliness and protection, use of industrial, agricultural, mining and mineral wastes, cost saving, energy saving etc. without diminishing needs of safety, durability and comfort to the occupants of buildings using newly developed materials and technologies.

During the years government, public and private sector organizations independently or under the aegis of BMTPC have developed several new materials and technologies. With liberalization of the economy several such materials and technologies are being imported.

However, benefits of such developments have not been realized in full measure as understandably the ultimate users are reluctant to put them to full use for want of information and data to enable them to make informed choice.

In order to help the user in this regard and derive the envisaged social and economic benefits the Ministry of Housing &Urban Poverty Alleviation has instituted a scheme called Performance Appraisal Certification Scheme (PACS) under which a Performance Appraisal Certificate (PAC) is issued covering new materials and technologies. PAC provides after due investigation, tests and assessments, amongst other things information to the user to make informed choice.

To make the PACS transparent and authentic it is administered through a Technical Assessment Committee (TAC) and the BMTPC Board of Agreement (BMBA) in which scientific, technological, academic, professional organizations and industry interests are represented.

The Government of India has vested the authority for the operation of the Scheme with BMTPC through Gazette Notification No. 1-16011/5/99 H-II in the Gazette of India No. 49 dated 4th December, 1999.

Builders and construction agencies in the Government, public and private sectors can help serve the economic, development and environmental causes for which the people and Government stand committed by giving preference to materials and technologies which have earned Performance Appraisal Certificates.

Further information on PACS can be obtained from the website: www.bmtpc.org

ANNEX I

(Clause 1.6.2)

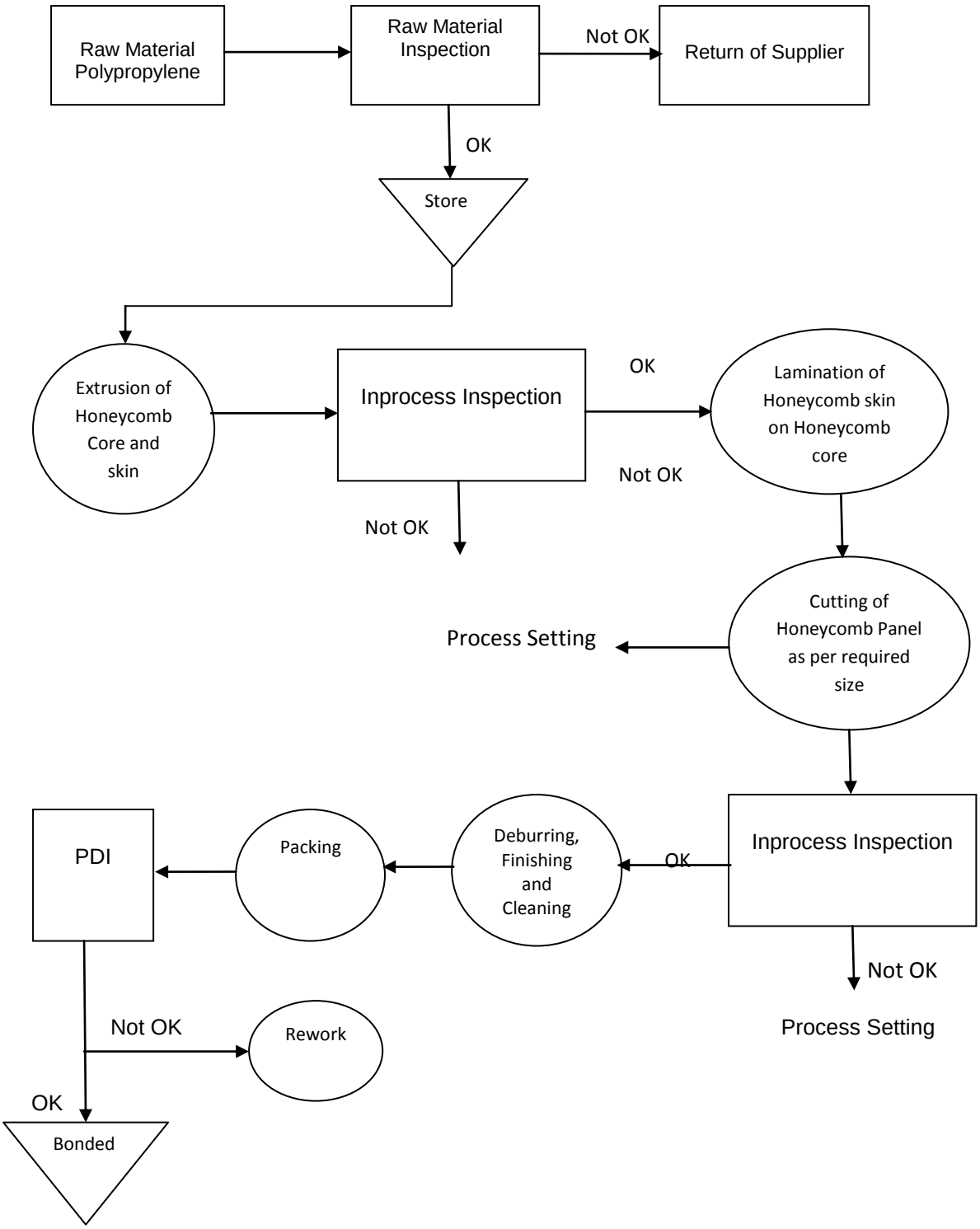
QUALITY ASSURANCE PLAN FOR PLASTIC HONEYCOMB TOILET STRUCTURES

S. No.	Performance Characteristics	Test Method	Requirement	Frequency of Testing
I.	**Raw Materials**			
1.	Melt Mass-flow Rate (MFR) (230ºC/2.16kg) g/10min	IS 13360 (Part 4,Sec1):2000/ ASTM D 1238	1.9 g/10 min	Every batch
2.	Tensile strength at yield (50 mm/ min) MPa	ASTM D 638	20 MPa	3 samples/batch
3.	Elongation at yield (50 mm /min) %	ASTM D 638	11%	3 samples/batch
4.	Notched izod impact strength (23ºC) J/m	IS 13360 (Part 5,Sec 4):2013/ ASTM D 256	200 J/m	Once in six months
5.	Heat deflection temperature) (455 kPa) ºC	ASTM D 648	90ºC	Once in six months
6.	Flexural Modulus (1% scant) MPa	ASTM D 790 A	900 MPa	Once in six months
II.	**Panels**			
1.	Compression strength test (MPa)	ASTM C 365	0.88 MPa min.	3 samples/batch
2.	Flexural strength test (MPa)	IS 13360 Part 5, Sec 7):1996	1.92 MPa min.	3 samples/batch
3.	F R test (V2 level)	UL 94	Pass	3 samples/batch
4.	Cold brittleness temperature test, (ºC)	ASTM D 746	-30ºC	Once in six months
5.	Shear strength test (MPa)	ASTM C 273	0.56 MPa min.	Once in six months
6.	Thermal conductivity (W/mk)	ASTM C 177	0.12 W/mK	Once in six months
7.	Water Absorption %	ASTM D 570	0.80 % min.	Once in six months
III.	**Routine Tests**			
1.	Paint chip-off test	ASTM D 3359	No peel off during cross cutting test	2 samples/batch
2.	Skin lamination strength of PP panel (Bend test)	ASTM D 790 A	No skin delamination up to 20º bend	2 samples/batch
3.	Extruded welding strength of PP panel	EN 12814	80% strength of parent material	2 samples/batch
4.	Bulk Density	ASTM D 1622	160 ±10 Kg/m^3	2 samples/batch

ANNEX II

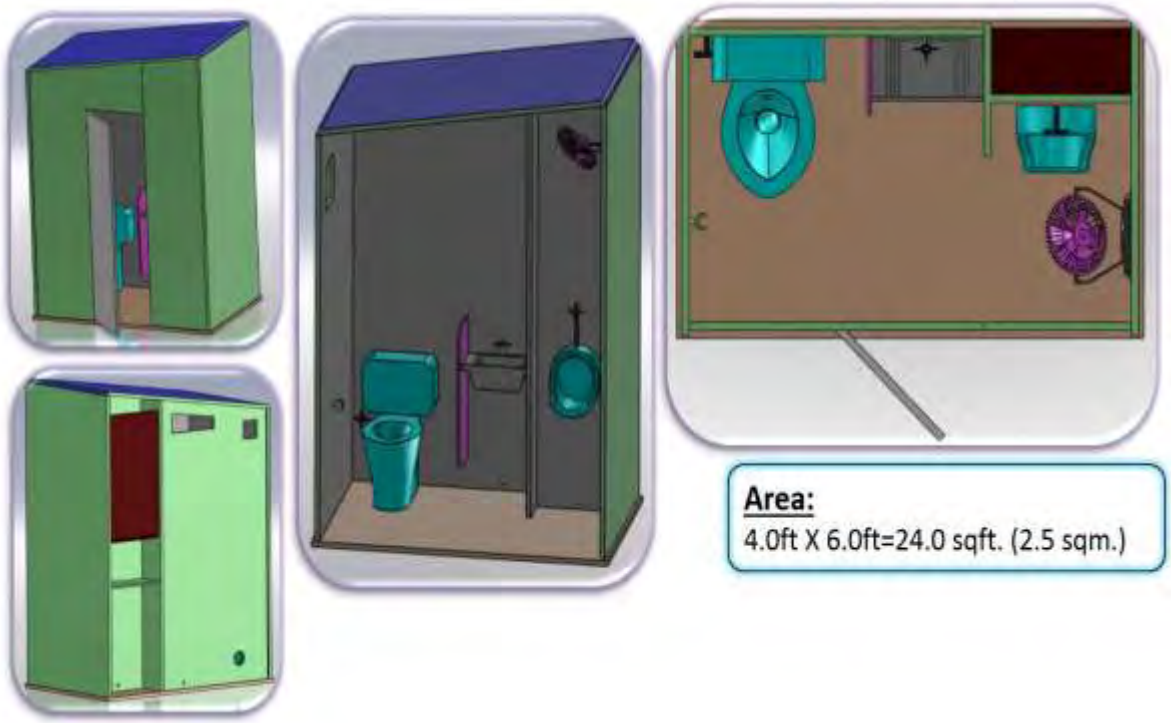
(Clause 1.6)

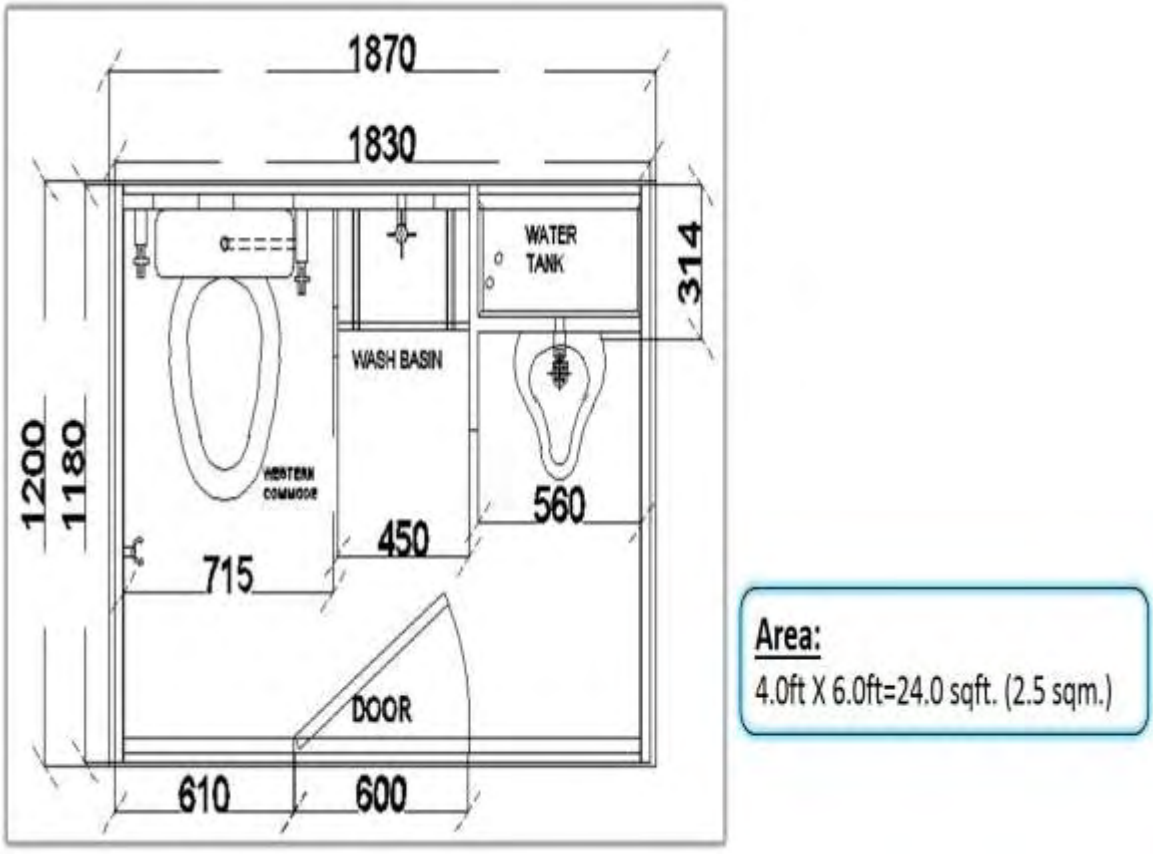
MANUFACTURING PROCESS FLOW CHART



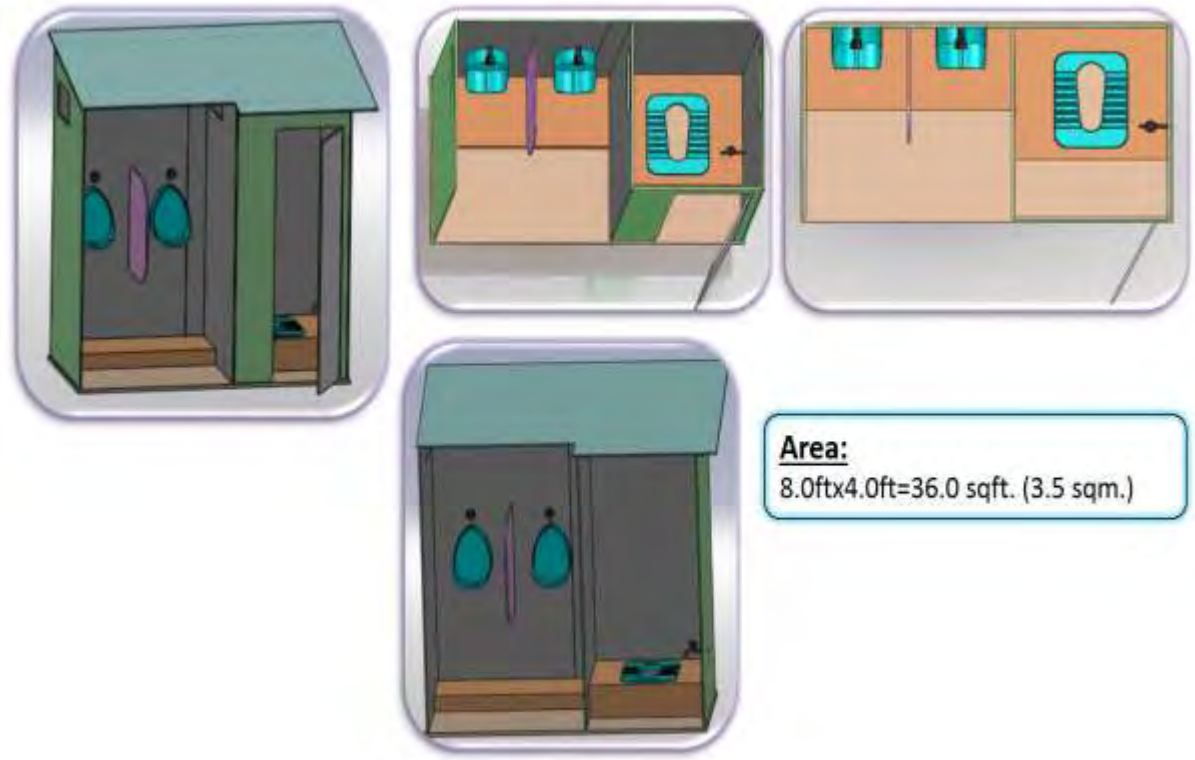
ANNEX III

(Drawings) *(Clause 1.3)*

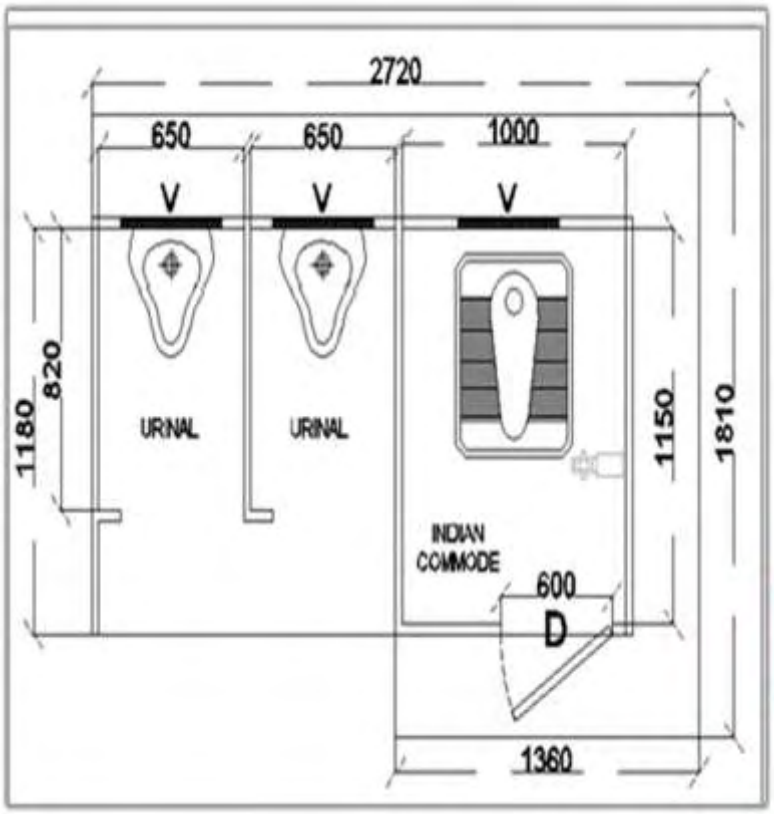




Men's Toilet Structure **Fig. 1**



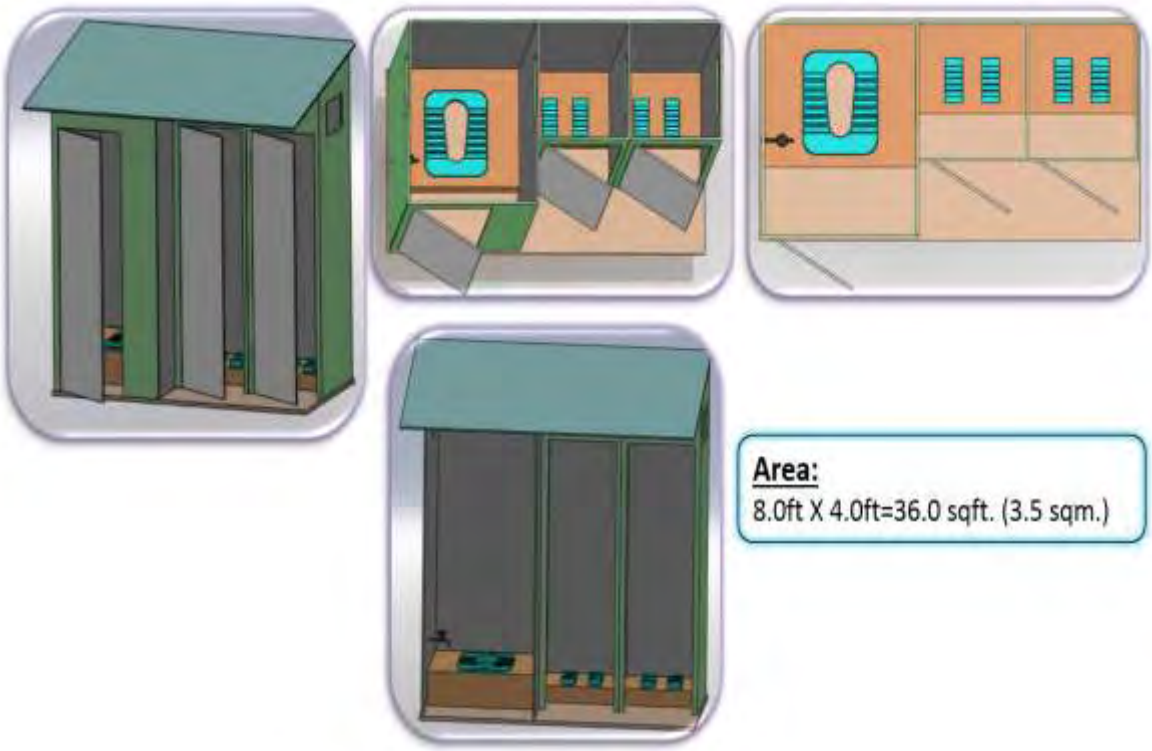
Area:
8.0ftx4.0ft=36.0 sqft. (3.5 sqm.)



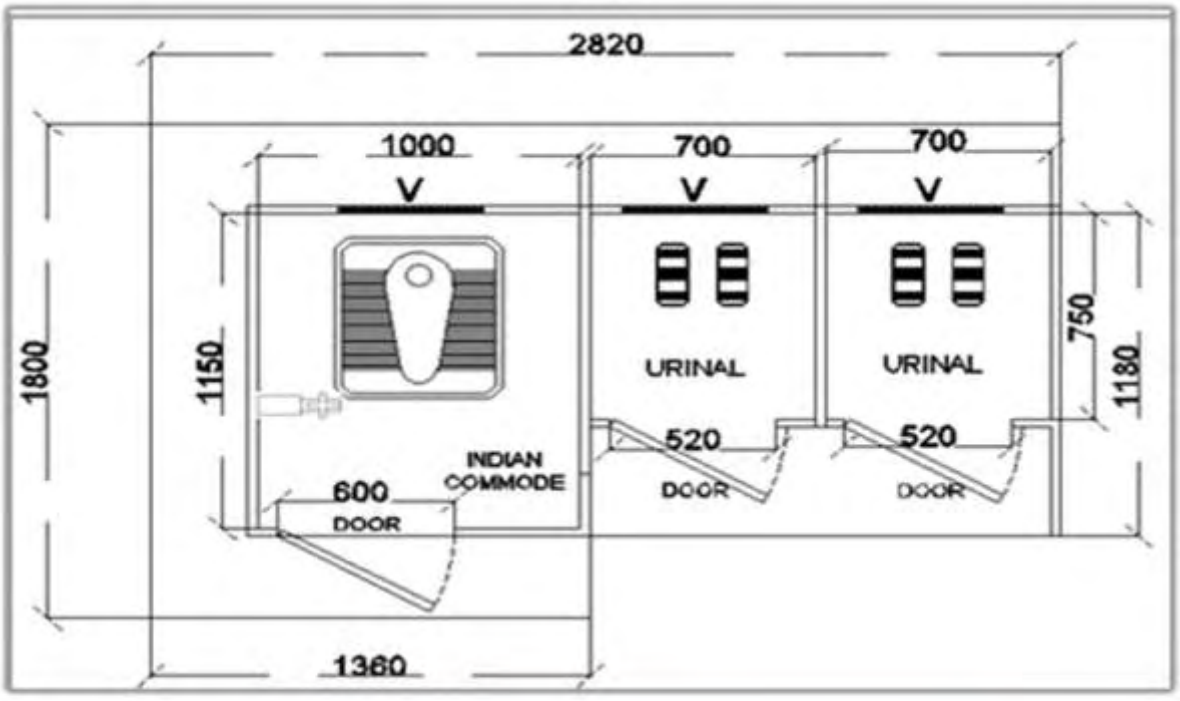
Area:
8.0ftx4.0ft=36.0 sqft. (3.5 sqm.)

Toilet Structure for 40 to 80 Boys

Fig. 2



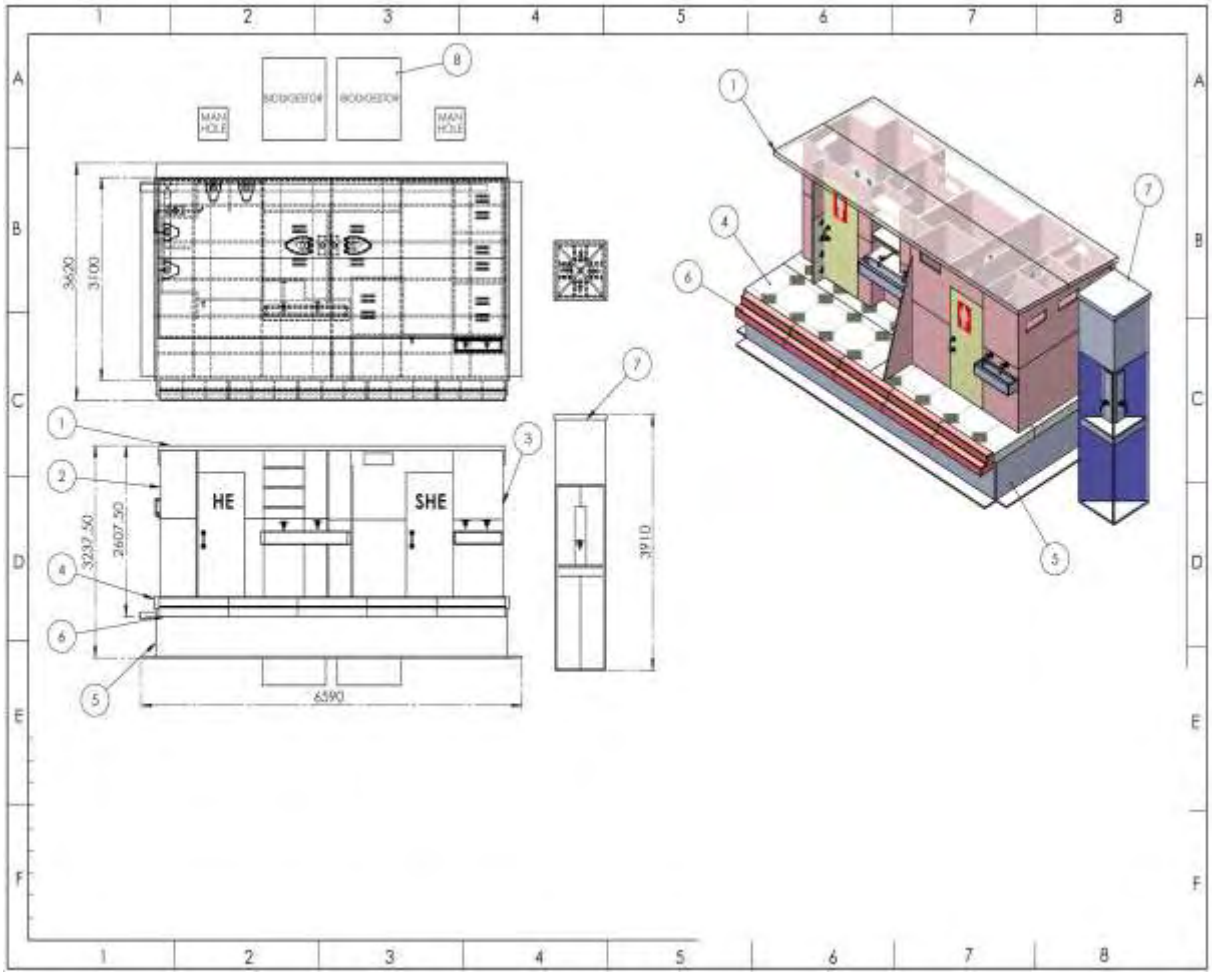
Area:
8.0ft X 4.0ft=36.0 sqft. (3.5 sqm.)



Area:
8.0ft X 4.0ft=36.0 sqft. (3.5 sqm.)

Toilet Structure for 40 to 80 Girls

Fig. 3

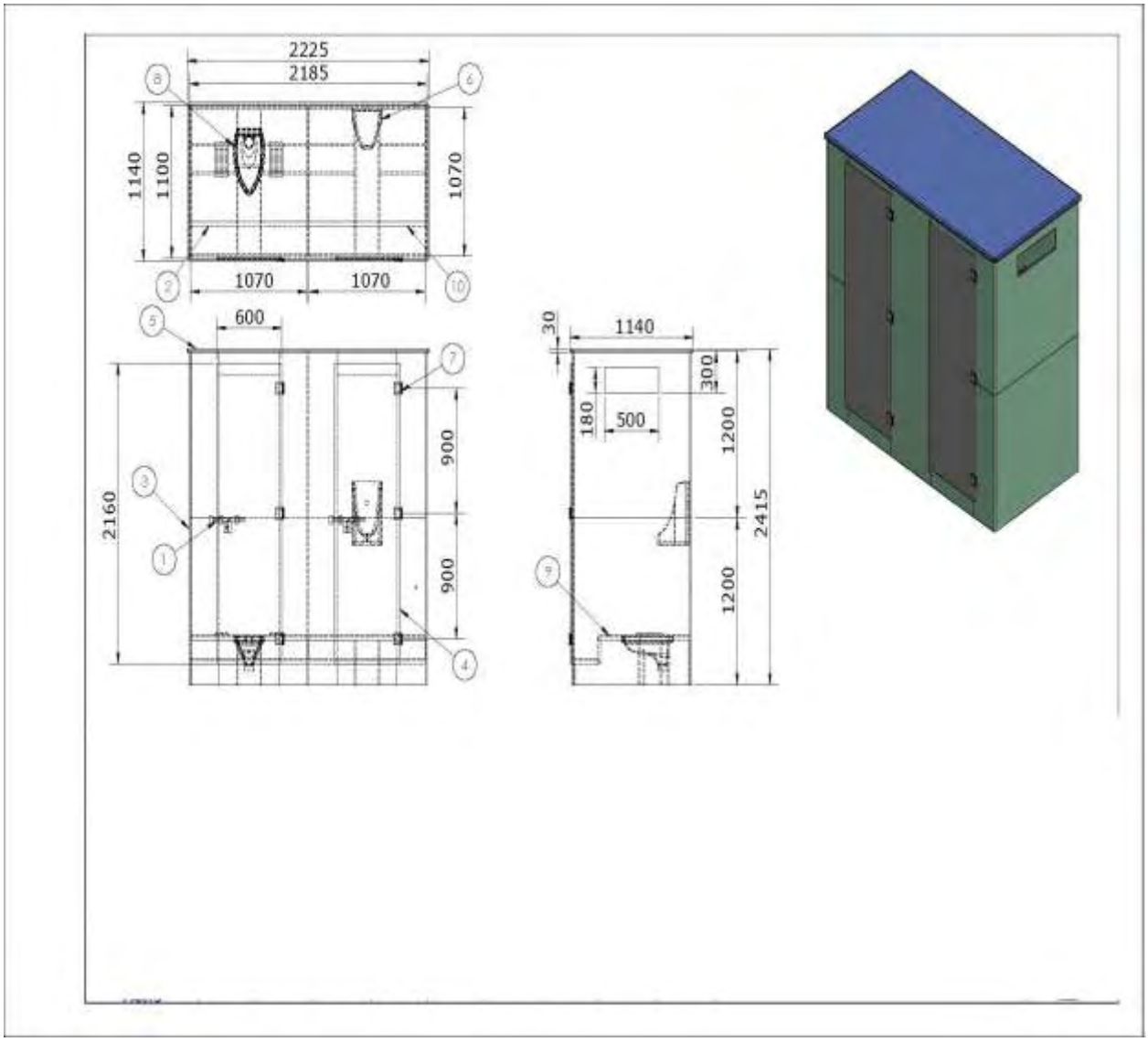


Nomenclature

Sl. No.	Item
1.	Roof Assembly
2.	Boys Toilet
3.	Girls Toilet
4.	Base Assembly
5.	Foundation Assembly
6.	Stairs
7.	Water tank
8.	Bio Digester 1.2 m x 1.25 m

80 Boys & 80 Girls Toilet Structure

Fig. 4

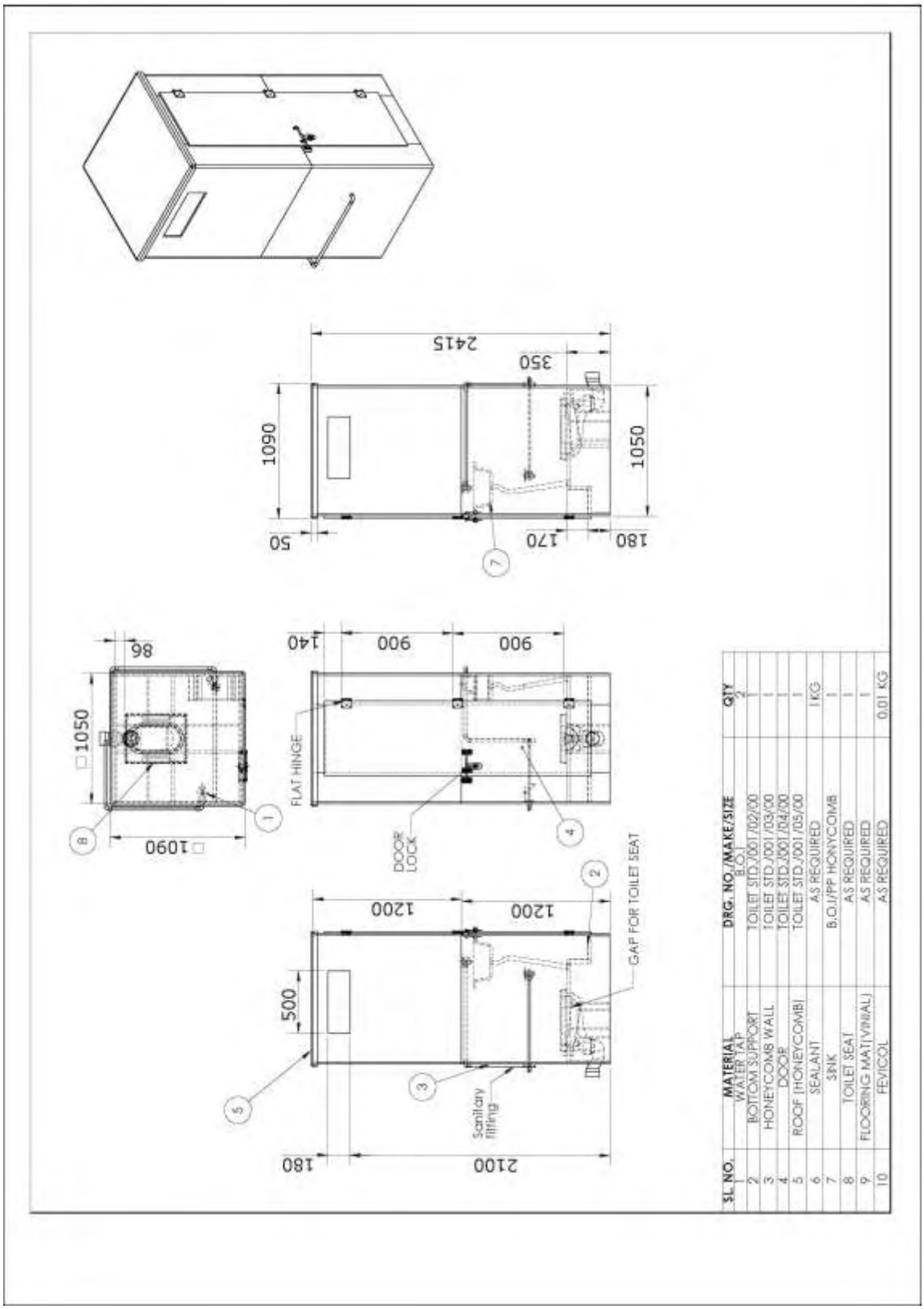


Nomenclature

Sl. No.	Item	Sl. No.	Item
1.	Door lock	6.	Urinal
2.	Bottom Support	7.	Roof (honeycomb)
3.	Honeycomb wall	8.	Toilet seat
4.	Door	9.	Flooring
5.	Roof (Honeycomb)	10.	Bottom support

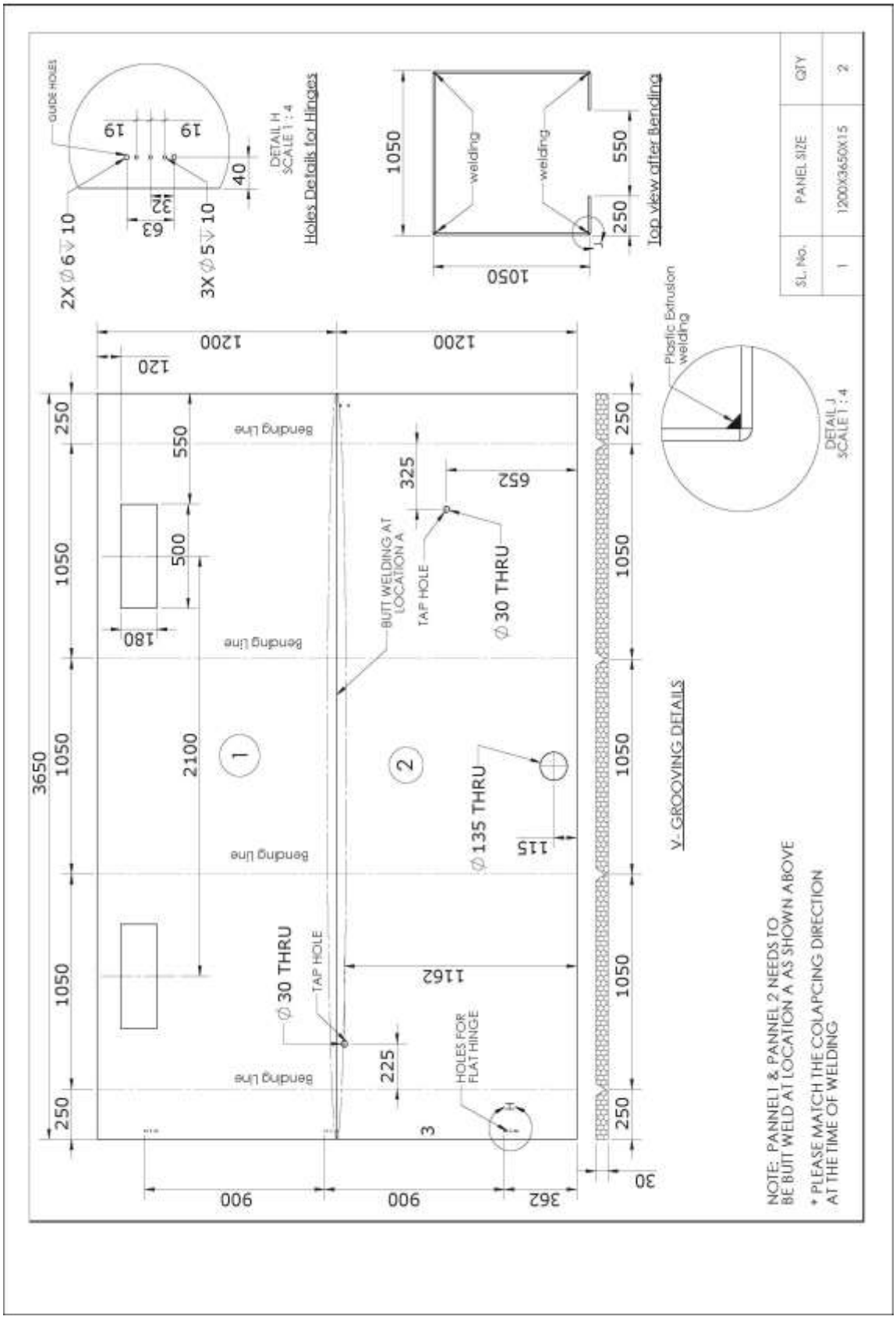
5 x 5 Toilet Structure

Fig. 5



Standard Toilet

Fig. 6

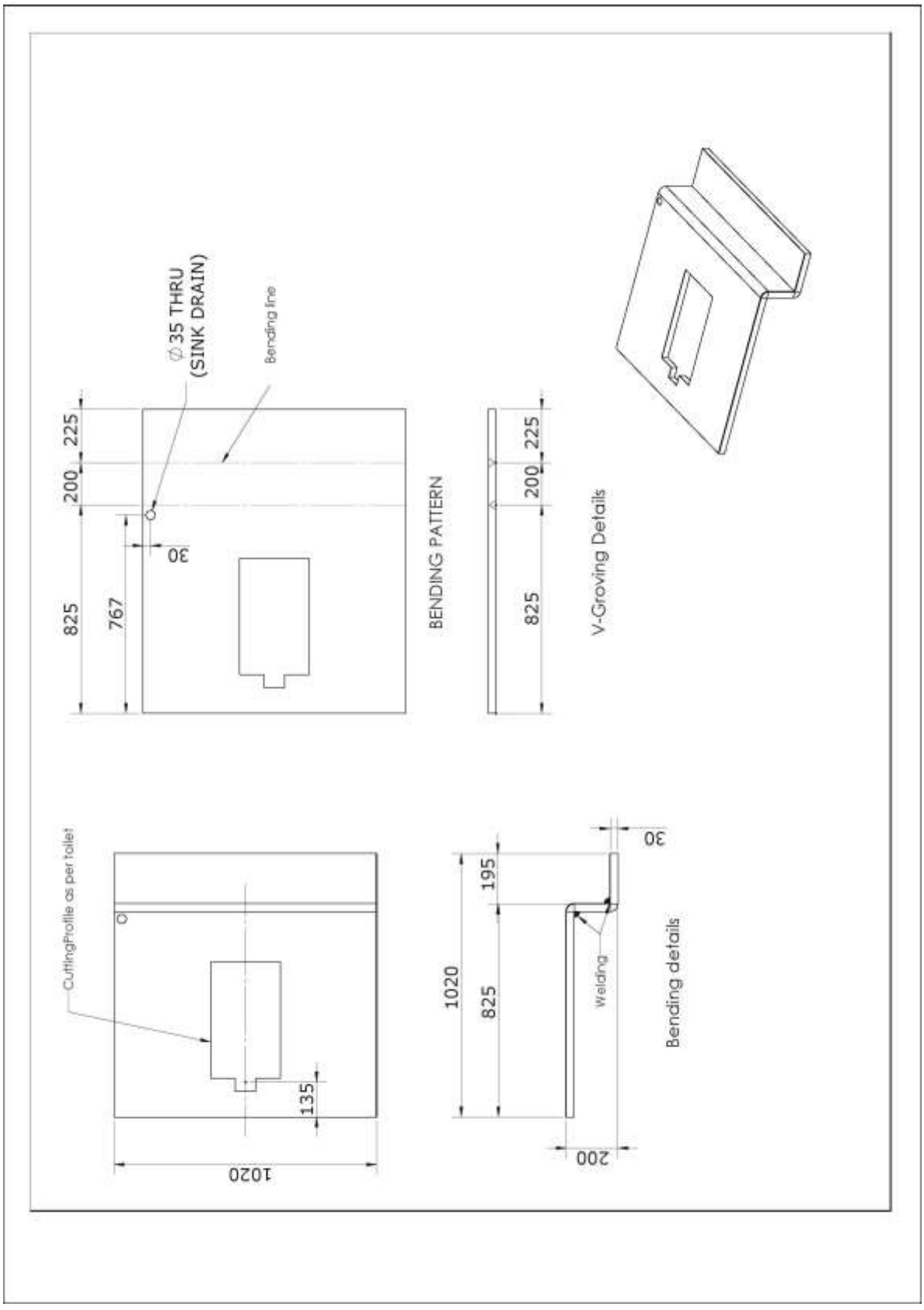


Joining Details of Walls

Fig. 7

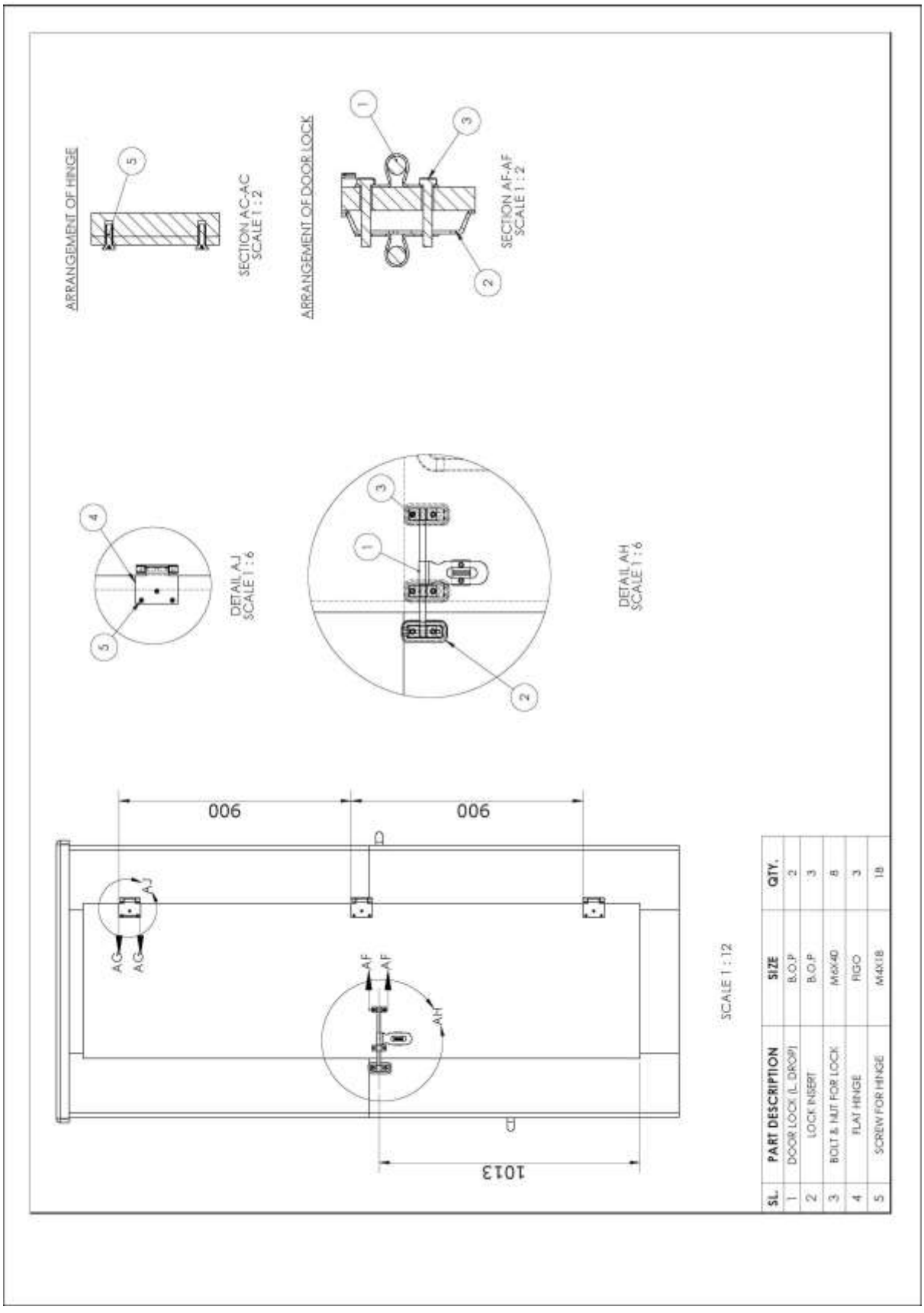
Base Support

Fig. 8



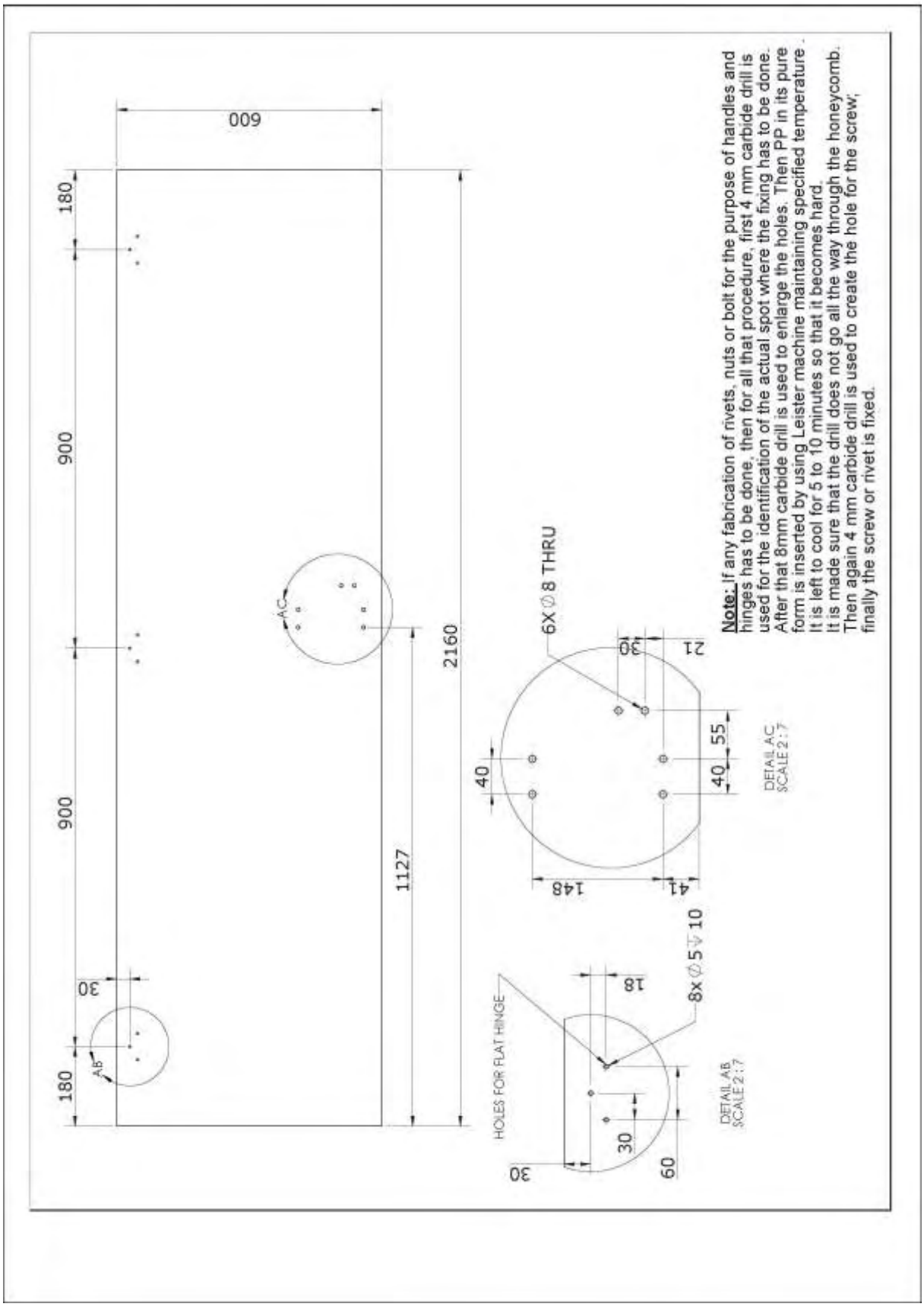
Base Support for Plate

Fig. 9



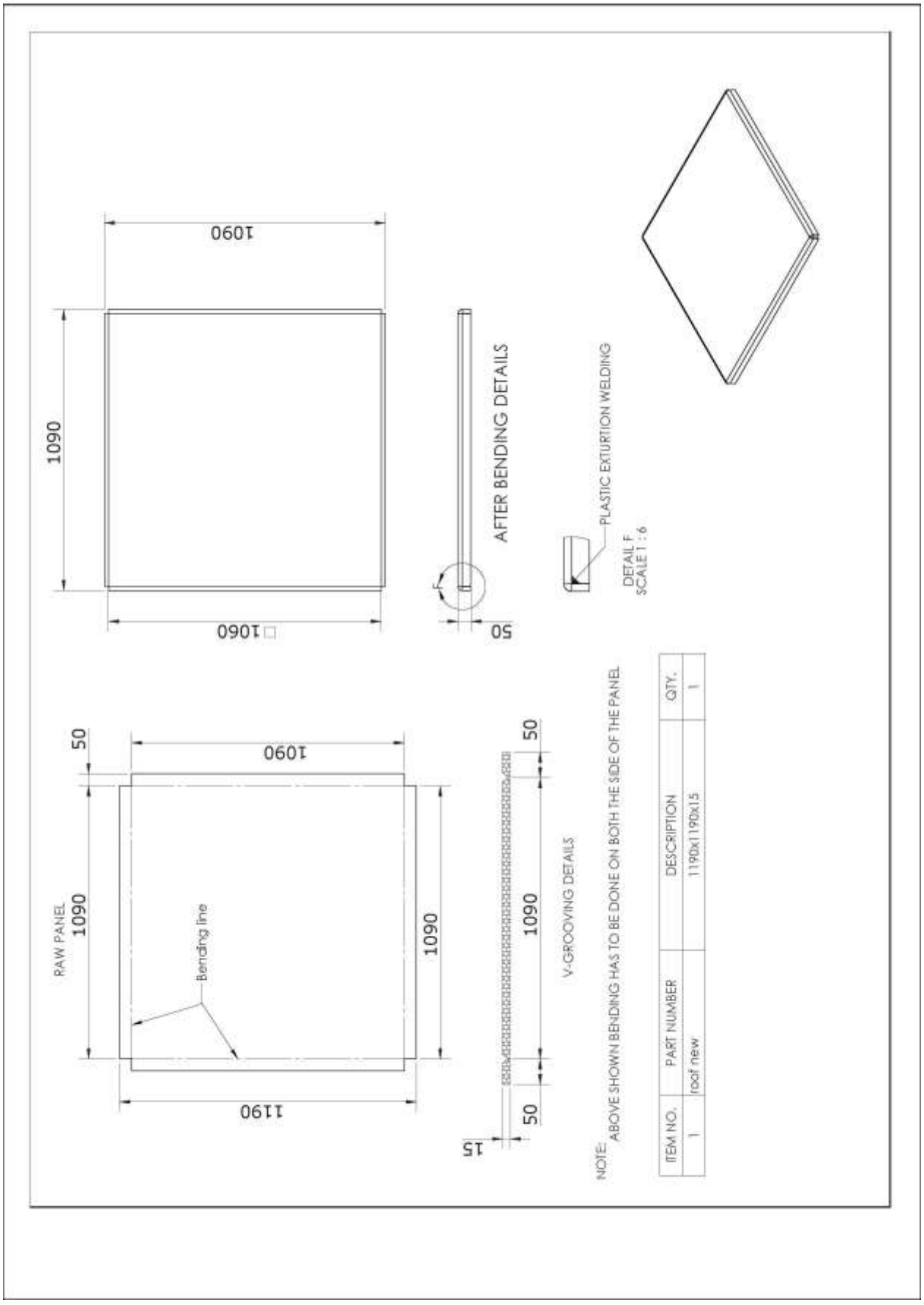
Door Fixture Details

Fig. 10

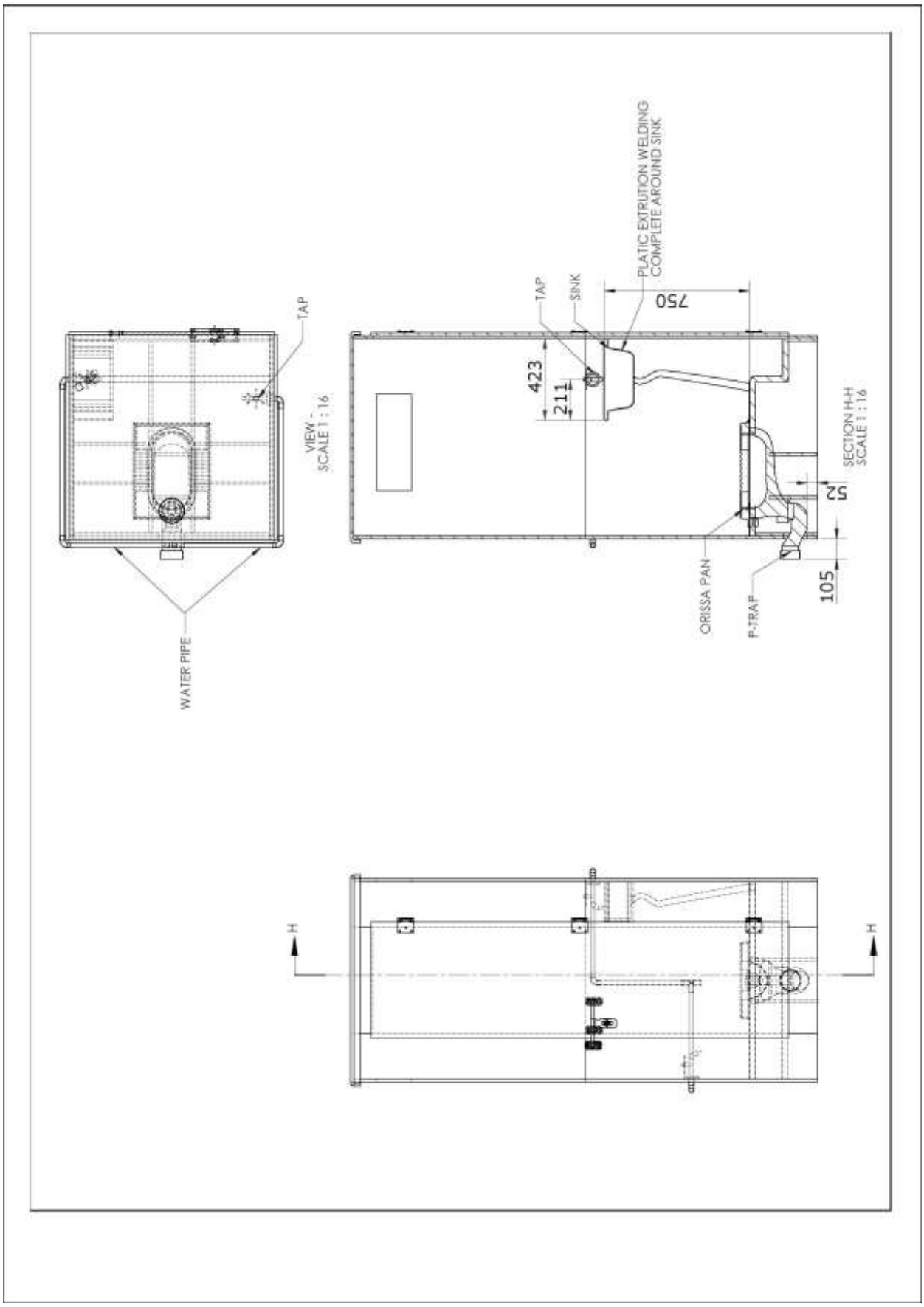


Door Details

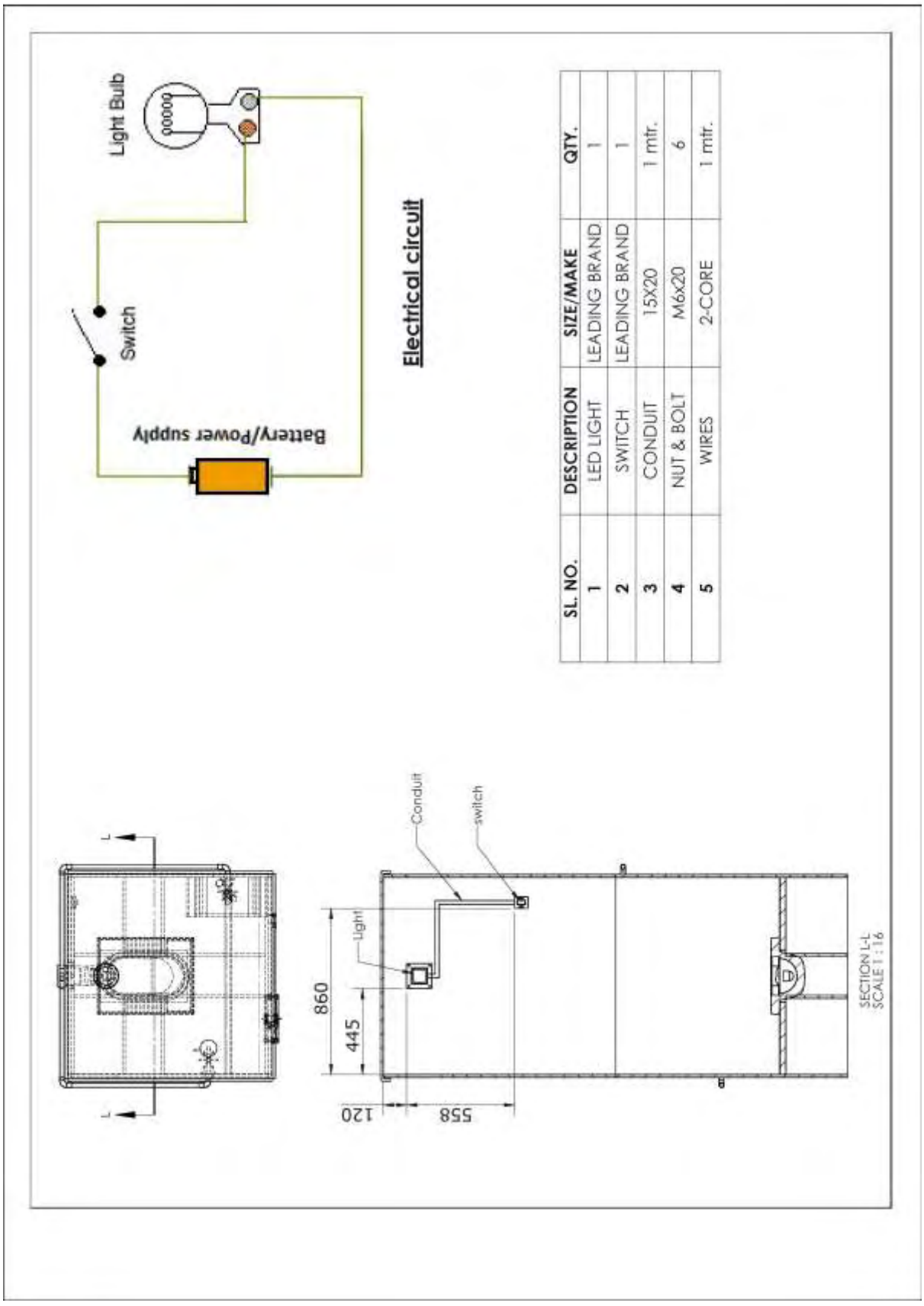
Fig. 11



Toilet Roof **Fig. 12**



Plumbing Details **Fig. 13**



Electrical Details

Fig. 14