

**MINISTRY OF REGIONAL DEVELOPMENT AND TOURISM
THE PERMANENT TECHNICAL COUNCIL FOR CONSTRUCTIONS**

*Technical Agreement in Constructions
Romania*



***Technical Agreement
016 – 01/211 – 2010***

***PREFABRICATED LOAD BEARING STRESSED SKIN PANELS WITH WOOD-
GREEN PANEL SIP***

Code 2.21

Manufacturer: S.C. GREEN PANEL S.R.L.
Innovations Business Park, Gladiolelor Street F.N., Clinceni Village
Clinceni Commune, Ilfov County
Phone: +40(21) 369 33 15; Fax: +40(21) 369 33 16, ROMANIA

HOLDER OF THE TECHNICAL AGREEMENT: S.C. GREEN PANEL S.R.L.
Innovations Business Park, Gladiolelor Street F.N., Clinceni Village
Clinceni Commune, Ilfov County
Phone: +40(21) 369 33 15; Fax: +40(21) 369 33 16, ROMANIA

**ELABORATOR OF THE TECHNICAL AGREEMENT
ICECON S.A.**

The Research Institute for Constructions Equipments and Technologies - Bucharest
266 Pantelimon Ave., 2nd District, Zip Code 021652, Phone: 255 07 34; Fax: 255 14 20
Specialized group no 1: “Structural elements and foundations”

**The present technical agreement is valid until the date of 06/30/2013 only if accompanied by the
TECHNICAL AGREEMENT of the Permanent Technical Council for Constructions
and it does not account for quality certificate**

THE PERMANENT TECHNICAL COUNCIL FOR CONSTRUCTIONS

The specialized group no 01 “Structural elements and foundations” within ICECON S.A. Bucharest, analyzing the request documentation for technical agreement submitted by S.C. GREEN PANEL S.R.L. from Clinceni Locality, Ilfov County, registered under no 09.10.055.016 as of 10/28/2009, regarding the “GREEN PANEL SIP – Prefabricated Load Bearing Panels with wood stressed skin” manufactured by S.C. GREEN PANEL S.R.L. company, hereby elaborates the present Technical Agreement no 016-01/211-2010, in compliance with the Romanian technical documents afferent to the field of reference.

1. Brief definition

1.1 Brief description

The prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP are made of a layer of PIR rigid thermal-insulating foam, plated on both sides with plane pressed agglomerated wood boards type OSB 3 (fig. no 1).

The OSB 3 boards have the technical characteristics according to EN 13986:2004 norm. The thickness of the board is minimum 15 mm.

The PIR rigid thermal-insulating foam representing the thermal-insulating core of SIP structural insulated panels is a polyisocyanate-based bi-component product with a density between 40 and 45 kg/m³.

The edges of the GREEN PANEL SIP panels are such made as to allow panels connection, both vertically and horizontally throughout resin wood connectors (brace/stanchion) with a 100 mm width and a thickness equal to the thickness of the PIR foam core (fig. no 1).

The prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP are manufactured with the following dimensions:

- length: 2800 ± 3 mm;
- width: 1250 ± 3 mm (minimum 120 mm);
- thickness: 120, 150, 180, 210, 240 ± 2 mm;

Upon request other dimensions may also be delivered.

Connection of OSB 3 boards to the connectors, braces and lintels is made through wood special nails.

The panels provided with window/door openings are made under the shape and sizes provided in the project, the edges of the window/door openings being stiffened on the entire perimeter, depending on the opening size, as follows:

- with resins wood profiles of 45 mm width and thickness equal to the thickness of the median insulating layer – for openings with sizes equal or smaller than 50 cm x 50 cm

- with two resins wood profiles of 45 mm width and thickness equal to the thickness of the median insulating layer – for openings with length equal or shorter than 280 cm (fig. no 2)
- with wood truss (the section of bottom cords, top cords and the truss diagonal being stable, depending on the stresses of the loads, by calculation) – for openings longer than 280 cm.

The panels are provided by manufacture with tubes for electrical cables.

1.2 Products identification

GREEN PANEL SIP panels are encoded, as follows:

- SIP 120 – structural insulating panels with 120 mm thickness (PIR foam core thickness of 90 mm);
- SIP 150 – structural insulating panels with 150 mm thickness (PIR foam core thickness of 120 mm);
- SIP 180 - structural insulating panels with 180 mm thickness (PIR foam core thickness of 150 mm);
- SIP 210 - structural insulating panels with 210 mm thickness (PIR foam core thickness of 180 mm);
- SIP 240 - structural insulating panels with 240 mm thickness (PIR foam core thickness of 210 mm);

The prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP are delivered as packaged in polyethylene foils and marked by a tag, including:

- name and address of the manufacturer;
- panel dimensions;
- thickness of the foam core;
- manufacturing date.

Each delivery shall be accompanied by the certificate of conformity with the present technical agreement.

2. Technical Agreement

2.1 Fields of application accepted in constructions

The prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP may be used for the execution of vertical and horizontal structural elements of buildings, under the following conditions:

- maximum height regime: GF + 1S + A;
- 1st exploitation class, characterized by the humidity contained by the wood material proper to a temperature of $20 \pm 2^\circ\text{C}$ and an air relative humidity higher or equal to 65%;
- design loads of maximum 200 daN/m^2 ;
- the wood beams of the floors are continuous;
- the construction conformation, especially regarding the maximum level height and the maximum distance between the load bearing walls (transversal and longitudinal) is made in compliance with the applicable technical regulations.

The walls made of GREEN PANEL SIP panels shall be placed on a concrete base plate with minimum 40 cm height.

The external side of the walls should be protected by finishing waterproof layers (usually, on the outdoor side a thermal-system made by the manufacturer of the panels is applied, over a waterproof and breathable membrane).

The resistance elements of the floor made of GREEN PANEL SIP panels are made of wood beams.

GREEN PANEL SIP panels allow the application of finishing layers, as for example:

- on the inside – one or two boards of dry-wall of minimum 12.5 mm thick, as the case may be, fireproof or humidity resistant, with or without thermal-insulating layer of mineral or glass wool, mechanically fixed to the indoor OSB 3 layer;
- on the outside – EVOTHERM thermal-system (double layer boards – external side made of magnesite and PIR rigid foam) according to the technical agreement 016-04/959-2009 or EVOTHERM PLUS thermal-system (three-layered boards – external sides made of magnesite and thermal-insulating core made of PIR rigid foam) according to the technical agreement 016-04/960-2009.

The products are only applied following an execution project drafted in compliance with Law 10/1995 on Quality in constructions, with its further changes and completions and the applicable technical regulations.

2.2 Product evaluation

2.2.1 Exploitation aptitude in constructions

By the construction conformation and by seismic protective measures against fire, thermal, acoustic, according to the technical regulations provided in the present technical agreement, the 6 essential requirements in Law no 10/1995 “Law on the quality in constructions”, with its further changes and completions, may be satisfied.

- Mechanical resistance and stability

Maximum vertical loads of the prefabricated load bearing stressed skin panels with wood GREEN PANEL SIP, corresponding to the limit state of normal exploitation (deformations of maximum $L/250$; $L = 2800 \text{ mm}$; $L/250 = 11.2 \text{ mm}$), are according to table no 1.

Table no 1

Element type	Uniform distributed load compared to:	Uniform vertical distributed load intensity
Structural wall	Panel length, expressed in “m”	Max. 5000 daN/m
Floor panel	Panel area, expressed in “m”	Max. 285 daN/m

- Fire security

The prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP are not leading to fire and explosion hazard in exploitation.

The prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP are framing, according to tables no 2.1 and 2.4 in the Regulation on the classification and framing of the construction products by fire security performances – Order 1882/394/2004, into the fire reaction class D-s2, d0 (C4 combustibility class).

The fire resistance limit of GREEN PANEL SIP panels is less than 15 minutes.

The fire resistance limit may be increased by covering the walls and floors made of GREEN PANEL SIP panels, on their entire area with

fireproof products (i.e. fireproof dry-wall panels etc).

- Hygiene, health and environment

The prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP are not spreading polluting substances and they are not a risk for people health and environment.

GREEN PANEL S.R.L. company Clinceni – Ilfov County is currently in process of certifying the Environment Management System in compliance with ISO 14001:2004 standard (Agreement with ALL CERT) and the Health and Occupational Security Management System in compliance with norm OHSAS 18001:2007 (Agreement with ALL CERT).

- Safety in exploitation

The visible layers of GREEN PANEL SIP panels are not creating risks of injuring by wedging, hurting or hitting the user.

- Noise protection

The acoustic protection index of GREEN PANEL SIP panels is in compliance with table no 2.

Table no 2

Panel thickness	Panel unit weight	Acoustic protection index ¹⁾
mm	(kg/m ²)	(dB)
120	39.5	38
150	46.0	39
180	53.0	40
210	59.5	41
240	66.0	42

¹⁾ for 500 Hz frequency

The acoustic protection index may be improved by applying acoustic treatments (for example, covering with dry-wall, between the floor and the board being placed a layer of phonic-absorbent products etc)

- Energy and thermal insulation saving

The thermal calculation of GREEN PANEL SIP panels is made in compliance with normative deed C107-2005.

For the thermal calculation the following values of the thermal conductivity coefficient are considered, on a +10°C temperature:

- 0.022 W/(mK) – for PIR foam
- 0.17 W/(mK) – for wood profiles and OSB faces.

By proper choice of the panel thickness the requirement regarding the energy and thermal insulation saving is met.

2.2.2 Durability (viability) and maintenance

The main criteria of durability are referring to the maintenance of the mechanical features, the water and air tightness as well as the preservation of thermal-phonic-insulating features.

Maintenance and repairing of construction elements made of GREEN PANEL SIP panels is made by usual measures.

The lifecycle of GREEN PANEL SIP panels , under normal exploitation conditions, is of minimum 50 years.

The warranty granted by the manufacturer for the executed works will be set forth by contract, yet it shall not be less than 1 year.

2.2.3 Manufacturing and control

Execution of the prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP is made on the manufacturing line of GREEN PANEL S.R.L. company in Clinceni – Ilfov County.

The technological flow of products manufacturing involves:

- a) Fixing the OSB 3 boards of minimum 15 mm thickness (as the case may be, at standard dimensions or debited at dimensions provided in the execution project) into the foaming machine's moulds, the distance between faces being adjusted depending on the thickness of the rigid PIR foam core.
- b) Coupling the foaming machine's hoses to the moulds' connection holes
- c) Dosing and mixing the components of the PIR thermal-insulating foam (this operation, including maintaining the containers of liquid components at a temperature between 18 and 23°C is automated made, by programming the computer of the foaming machine)
- d) Foam injecting into the space between OSB faces fixed onto the foaming machine's moulds (the quantity of foam, the temperatures of application and enforcement as well as the duration of hardening are automated made, by programming the foaming machine)
- e) Releasing the panels from the foaming machine's moulds (after foam hardening) and transporting the panels into the inscription and packaging area.

In order to provide quality constancy, the manufacturer shall monitor:

Inside the unit

The process of production according to the provisions of SR EN ISO 9001:2001 standard.

The GREEN PANEL S.R.L. manufacturer provides throughout the internal control, upon materials reception, that they are accompanied by conformity certificates and comply with the requirements imposed by the technological process.

Outside the unit

GREEN PANEL S.R.L. company Clinceni – Ilfov County is currently under process of certifying the Quality management System in compliance with SR EN ISO 9001:2001 standard (Agreement with ALL CERT).

2.2.4 Commencement

Commencement of prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP is made in compliance with the execution project and the mounting technology elaborated by the manufacturing company.

GREEN PANEL SIP panels may be commenced, with no particular difficulties, within a normal precision level work.

Commencement of GREEN PANEL SIP panels involves the following main operations:

A. Wall panels

- as the case may be, fixing the “anchor bolt” anchors before concrete casting into the base plate or drilling the “anchor bolt” anchors gripping holes after concrete casting;
- posing and gripping the wood grid into the concrete base plate of the foundation, over the horizontal hydro-insulating layer (throughout “anchor bolt” anchors);
- placing the GREEN PANEL SIP panels according to the shop drawings provided in the execution project, by fixing the wood profiles between the OSB faces;
- placing the wood profiles at the upper side of the panel (by introducing it into the free longitudinal space of the upper edge);
- fixing the panel onto the wood profiles by wood special nails;
- fixing the inside layers of protection and finishing onto the OSB 3 faces of the panels;
- fixing, on the external side of the panel of a waterproof breathable membrane (the manufacturer recommends TYVEK type membranes).

On the outside, the manufacturer recommends the utilization of the EVOTHERM thermal-system (double layer boards – external side made of

magnesite and PIR rigid foam) according to the technical agreement 016-04/959-2009 or EVOTHERM PLUS thermal-system (three-layered boards – external sides made of magnesite and thermal-insulating core made of PIR rigid foam) according to the technical agreement 016-04/961-2009.

An example of mounting the wall panels is given in figure no 3.

In figures no 4 and 5 there are given examples of intersections of walls made of GREEN PANEL SIP panels .

In figure no 6 an example of panels fixing to the foundation is given.

The joinery elements are fixed on wood perimeter profiles of the panel/s adjacent to the joinery gaps. The panel protection in front of the door and windows openings is made of profiles or boards (for example zinc-plated sheet jambs, on the outside, dry-wall boards on the inside).

B. Panels for floors or roof

- fixing – on the upper side of the panels to the walls – of the wood beams constituting the bearing structure of the panels to the floor by special metallic pieces;
- fixing the floor boards onto the wood beams structure, fixing of the panels to the wood beams being made by SIP screws.

In figures no 7 and 8 examples of roof panels mounting are presented.

2.3 Technical prescriptions book

2.3.1 Conception conditions

The prefabricated load bearing stressed skin panels with wood– thermal-insulating GREEN PANEL SIP are conceived as panels for execution of load bearing walls and floors.

GREEN PANEL SIP are also conceived such as to allow application of additional protection and finishing layers contributing to the improvement of the thermal, acoustic and fire safety performances.

Upon the elaboration of designs of buildings made of GREEN PANEL SIP boards, there will be considered both the manufacturer’s recommendations and the provisions of the following Romanian technical regulations on actions in constructions:

- Group of standards SR EN 1995:2004 – Eurocor 5 “Wood structures design”;
- Group of standards SR EN 1995:2008 “National appendix to Eurocor 5” – Eurocor 5 “Wood structures design”;

- CR 0-2005 – “Design Code. Basics of construction structures design”;
- P100-1/2006 – “Seismic Design Code. 1st Part. Buildings design provisions”;
- NE 019-2003 – “Calculation and structure of wood resistance structures placed within seismic areas (completion for the normative deed for anti-seismic design of dwellings, social-cultural and industrial buildings P 100-92 in chap. IX regarding wood constructions”;
- EN 019-1997 – “Guide for calculation on limit states of the wood structural elements”;
- NP 082-2004 – “Design code regarding the basics of design and actions on constructions. Wind action”;
- CR 1-1-3-2005 – “Design code. Assessment of snow action on constructions”;
- “Constructions fire safety normative deed” – indicative P 118-99;
- NP 068-02 – “Normative deed on civil constructions design considering the requirements for safety in exploitation”;
- C125-2005 – “Normative deed on design and execution of phonic insulation and acoustic treatments on buildings”;
- C107-2005 – “Normative deed on thermal-technical calculation of the construction elements of the buildings”;
- NP040-2002 – “Normative deed on design, execution and exploitation of hydro-insulations on buildings”;
- STAT 10101/0A-77: “Actions in constructions. Classification and grouping of actions for civil and industrial constructions”;
- STAT 10101/1-78: “Actions in constructions. Technical loads and permanent loads”;
- STAT 10101/2A1-87: “Actions in constructions. Loads due to the exploitation process for civil, industrial and agro-zoo technical constructions”;
- STAT 10101/20-90: “Actions in constructions. Loads given by the wind”;
- STAT 10101/21-92: “Actions in constructions. Loads given by snow”;
- STAT 10101/23A-78: “Actions in constructions. Loads given by external temperature in civil and industrial constructions”;
- SR 12025/2-94: “Effects of vibrations on buildings or parts of building. Admissible limits”;

- STAT 6156-86: “Protection against noise in civil and industrial constructions. Admissible limits and phonic insulation parameters”;

2.3.2 Manufacturing conditions

Manufacturing shall be made in compliance with the technology set forth by the manufacturer.

The quality constancy is provided by internal and external control, according to the regulations in force.

The quality internal control consists mainly of:

- verification of raw materials;
- verification of the faces made of OSB 3 boards from the perspective of thickness, smoothness and, as the case may be, debiting dimensions;
- verification of foaming machine’s parameters;
- verification of the dimensions of the GREEN PANEL SIP panel, generally.

The periodical control on the quality of finished products refers to the determination of physical-mechanical characteristics.

Periodical verifications on finished products shall be carried out in authorized/accredited laboratories.

The quality of GREEN PANEL SIP panels is guaranteed by manufacturer by quality certificates issued by lots.

2.3.3 Delivery terms

Upon delivery, the products should be accompanied by the certificate of conformity with the present technical agreement, according to SR EN 17050-1:2005 “General criteria for the conformity certificate given by manufacturer”.

For short-term and long-term storage, the manufacturer shall mention the data regarding the storage conditions (temperature, hazard class etc, including the packaging afferent ones).

2.3.4 Commencement conditions

Commencement of the prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP shall be made in compliance with the manufacturer’s recommendations and the execution design.

Upon commencement, there will be verified:

- if the panels fixing anchors onto the foundation base plate were gripped;
- if the panels were mounted according to the shop drawings, especially within the joinery gaps area;
- the panels fixing method;
- the smoothness, verticality and dimensions of the panel joints;

- application of the protection and finishing layers on panel faces.

Upon works execution there will be taken preventive measures against products humidification, both during transportation, storage, handling and during the application process.

Upon commencement there will be considered the provisions in the following Romanian technical documents:

- C 300-94 “Normative deed for fire prevention and extinction during construction works and afferent installations execution”;
- “Regulation on labor protection in constructions”;

Conditions

- The quality of the component materials and manufacturing method were examined and found satisfactory and should be maintained at such standard during the entire validity period of the present agreement.
- Granting this agreement, the Permanent Technical Council for Constructions does not involve itself in the presence and/or absence of the company’s legal rights to sell, commence or maintain the products.
- Any recommendation relative to the utilization under safety conditions of such product, consisted or referred to in this technical agreement, represents the minimum commencement requirements.
- ICECON S.A. Bucharest is liable for the accuracy of data recorded in the Technical Agreement and for the tests such data were based on. The technical agreements do not exonerate the suppliers and/or users of the liabilities they assume according to the regulations in force.
- Verification of the maintenance of products application aptitudes shall be carried out according to the schedule set forth by ICECON S.A. Bucharest, as follows:
 - verifications every 18 months – inspection, under the aspect of exploitation behaviour (aspect and functionality) of the buildings made by using prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP, with minimum three clients.
- Actions included in the schedule and their method of execution will comply with the normative deeds and technical regulations in force.

- “General norms of labor protection” approved by the Ministry of Labor by Order no 508 as of 11/20/2002 and by the Ministry of Health by Order no 933 as of 11/25/2002.

Conclusions

Global opinion

• Utilization of “prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP”, in the accepted fields of application is **appreciated as favorable**, under specific conditions in Romania, if the provisions of the present technical agreement are complied with.

- ICECON S.A. Bucharest shall inform the Permanent Technical Council for
- Constructions on the result of verifications, and should they not prove the maintenance of application aptitudes, it shall request PTCC to proceed with the technical agreement suspension action.
- Suspension is also triggered in case of observing, throughout verifications by the competent bodies, of the incompliance with the constant maintenance of the manufacturing and utilization conditions of the products;
- In case the technical agreement holder does not comply with such provisions the technical agreement withdrawing procedure shall be initiated.

Validity 06/30/2013

Extension of validity or revision of the present technical agreement should be requested minimum three months before the expiry date. In case of non-extension of the validity, the technical agreement is automatically cancelled.

For specialized group no 01

Chairman,

Dr. Eng. **Liana Manolache**

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General Director Chairman

Univ. Prof. Dr. Eng. Dr. h.c.

Polidar BRATU

Member of the Academy of Technical Sciences in
Romania

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3. Specialized group complementary remarks

The specialized group no 01 within ICECON S.A. Bucharest examined the documentation and the results of the trials regarding the “Prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP” made by S.C. GREEN PANEL S.R.L. in Clinceni Commune – Ifov County, concluding the following:

- the products making the object of the present technical agreement present the characteristics corresponding to the field of application (according to point 2.1 in the technical agreement);
- following the technical inspection on the manufacturing line of the prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP, carried out by specialists within S.C. ICECON S.A., it resulted that S.C. GREEN PANEL S.R.L. company has the areas, automated equipments and monitoring equipments adequate to the production process, as well as the qualified human resources, creating the premises of the execution of quality products.

Any change of the manufacturing procedure of the prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP, of new components introduction, shall be notified to the technical agreement elaborator.

Trial reports synthesis

There are presented in table no 3 the values resulted following the trials carried out on GREEN PANEL SIP panels .

Table no 3

No	Characteristic	Measurement unit	Reference level	Determined value	Determination method	Performer
0	1	2	3	4	5	6
GREEN PANEL SIP panels (2 panels on natural scale vertically connected) Panel dimensions: length 1250 mm, height 2800 mm, thickness 120 mm Static scheme: gripping on bottom side, free edge on upper side						
1	Reaction on vertical loads parallel to the board faces - load that produced a deformation of: <ul style="list-style-type: none"> • H/300 • H/250 • H/200 • rupture 	daN/m	5000	5000 5600 13600 15472	ICECON method	ICECON test
2	Reaction on horizontal loads parallel to the board faces - load that produced a deformation of: <ul style="list-style-type: none"> • H/300 • H/250 • H/200 • rupture 	daN	2000	1490 1650 1890 2486	ICECON method	ICECON test
GREEN PANEL SIP floor Panel dimensions: length 1250 mm, height 2800 mm, thickness 120 mm Static scheme: simple rest on 2 supports Opening 2700 mm						
3	Reaction on uniformly distributed loads perpendicular on the surface - load that produced a deformation of: <ul style="list-style-type: none"> • H/300 • H/250 • H/200 	daN/m	285	230 300 360	ICECON method	ICECON test
4	Fire reaction class	D-s2, d0 - according to tables no 2.1 and 2.4 in the Regulation on the classification and framing of the construction products by fire security performances – Order 1882/394/2004				

4. Appendixes

◆ **Excerpts from the minutes no 211 as of 04/30/2010 of the deliberation meeting of the specialized group no 01 within ICECON S.A.**

The specialized group no 01 “Structural and foundation elements” within ICECON S.A., consisting of:

- Chairman: Dr. Eng. Ioan Pepenar
- Reporter: Dr. Eng. Adrian Tabrea
- Members: Dr. Eng. Liana Manolache
Eng. Mircea Mandescu

analyzing:

- the request for technical agreement registered under no 09.10.055.016 from the date of 10/28/2009 of S.C. GREEN PANEL S.R.L. company, as applicant, regarding the “prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP”, along with:
- the applicant’s preliminary file
- the trial reports
- the conclusion of the inspections carried out by the members of the specialized group
- the technical agreement project,

proposes:

- approval by PTCC of the technical agreement no 016-01/211-2010 “Prefabricated load bearing stressed skin panels with wood– GREEN PANEL SIP”, with validity term 06/30/2013.

Extension of validity or revision of the present technical agreement should be requested minimum three months before the expiry date. In case of non-extension of the validity, the technical agreement is automatically cancelled.

◆ **The technical file of the technical agreement no 016-01/211-2010 consisting of 24 pages is integrant part of the present technical agreement.**

Specialized group no 01 reporter

Dr. Eng. Adrian Tabrea

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◆ **Members of the specialized group no 01:**

Eng. Mircea Mandescu	Illegible signature
Eng. Cristina Dima	Illegible signature
Eng. Laura Ularu	Illegible signature

SCREW NAILS
ACCORDING TO
CALCULATIONS

2 CM

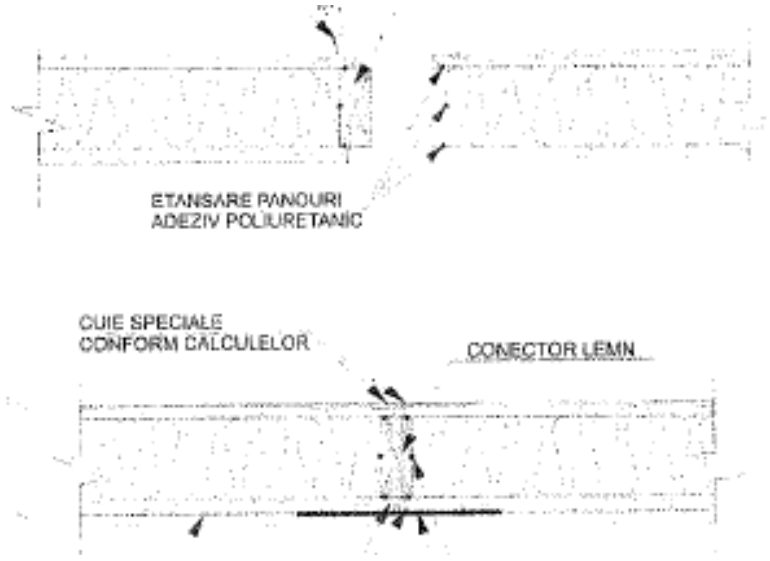
WOOD CONNECTOR

Panel thickness

PANELS SEALING
POLYURETHANE
ADHESIVE

SCREW NAILS
ACCORDING TO
CALCULATIONS

Panel thickness



CONNECTOR

GYPSUM BOARD
MAGNESIUM BOARD

SCREW NAILS
ACCORDING TO
CALCULATIONS

PANELS SEALING
POLYURETHANE ADHESIVE

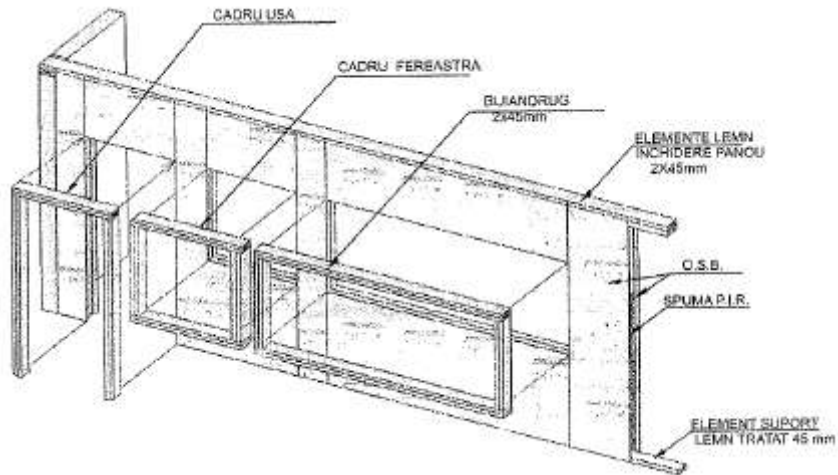
SPECIAL SEALING
STRIP (GREEN PANEL)

Figure no 1

Door frame

Window frame

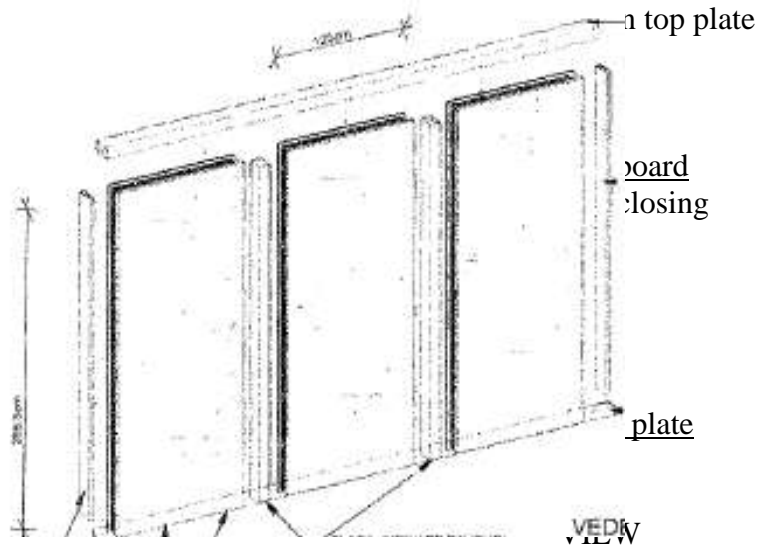
Lintel
2x45mm



Wood elements
Panel
closing
2 x 45mm
OSB
PIR foam

Support element
Treated
wood 45mm

Figure no 2



Wood board
Panel closing

Joint panel plate

GREEN PANEL screw nails
ACCORDING TO CALCULATIONS
(distance between them not more than 15 cm)

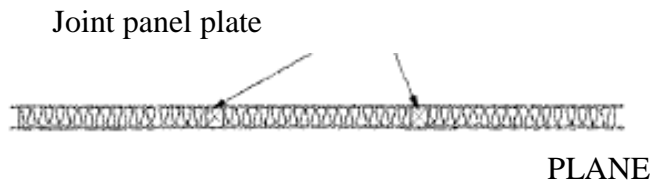


Figure no 3

Gypsum board
MAGNESIUM BOARD

Panel thickness

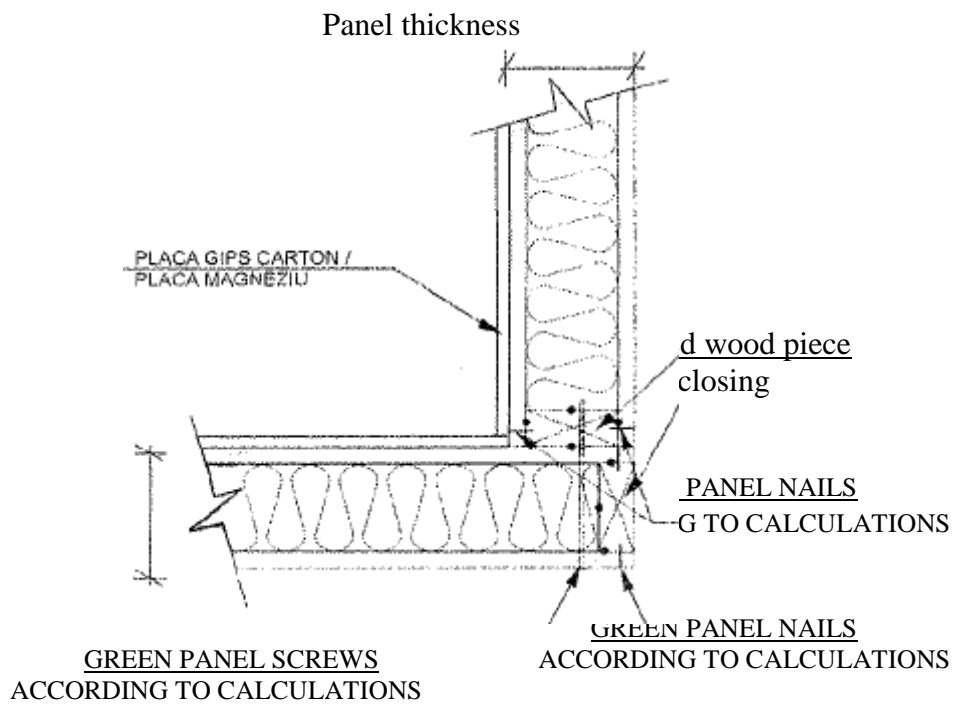


Figure no 4

Panel thickness

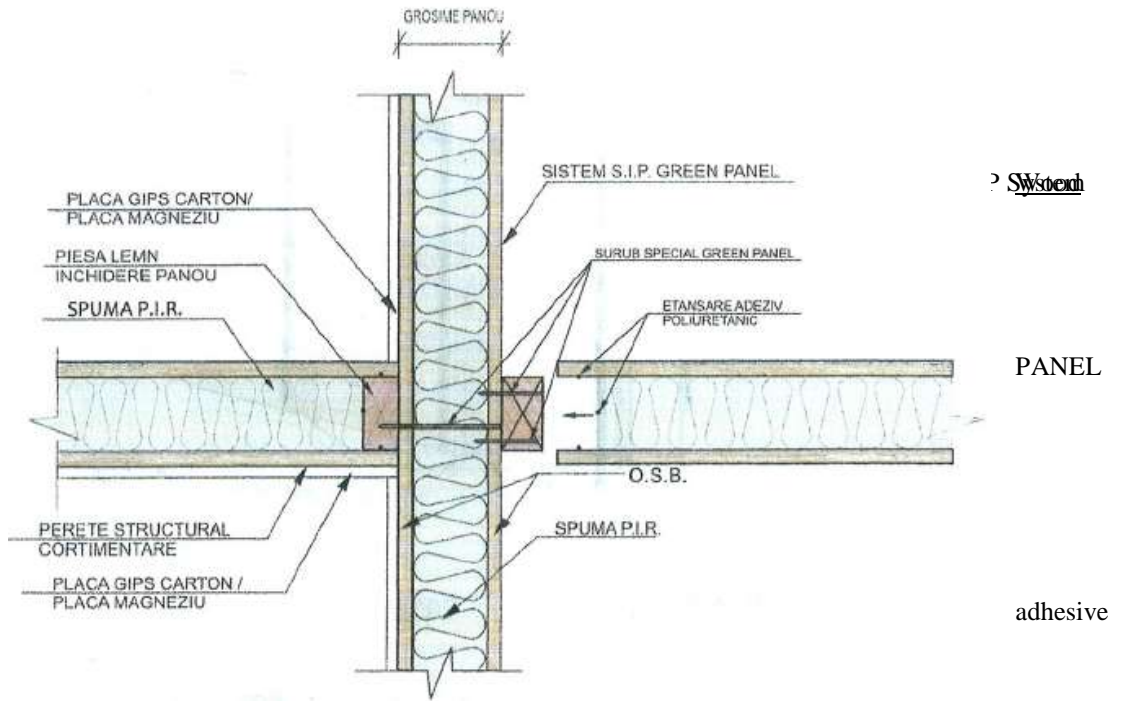
GYPSUM board
MAGNESIUM BOARD

piece
Panel closing

GREEN
special screw

PIR foam

Polyurethane
sealing



Structural wall
Dividing

GYPSUM board
MAGNESIUM BOARD

PIR foam

Figure no 5

HORIZONTAL
MEMBRANE

MAGNESIUM BOARD
GYPSUM BOARD

SUPPORT BOARD
(treated wood)

SPECIAL NAILS
ACCORDING TO CALCULATIONS

ANCHORING PIECE

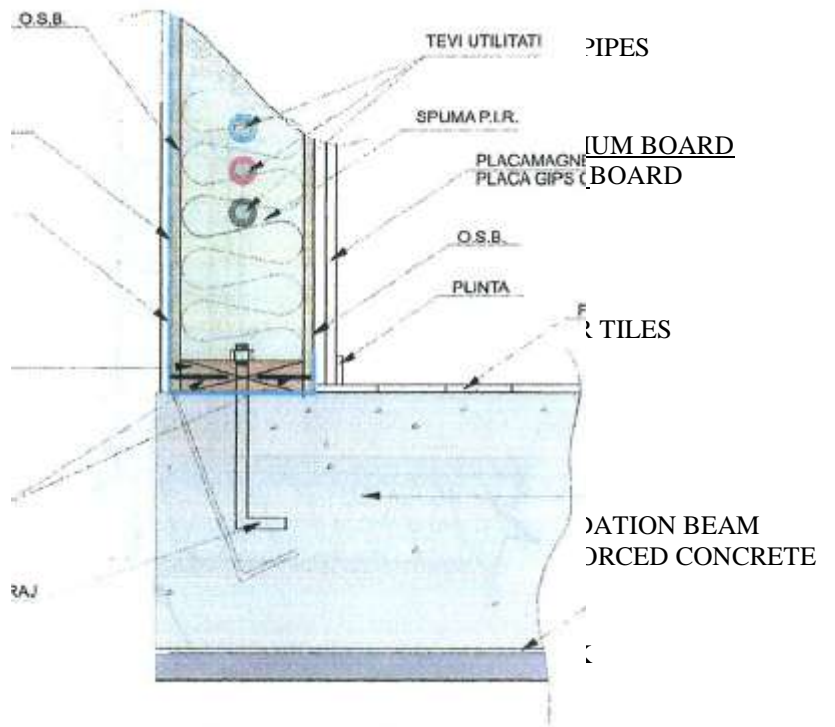


Figure no 6

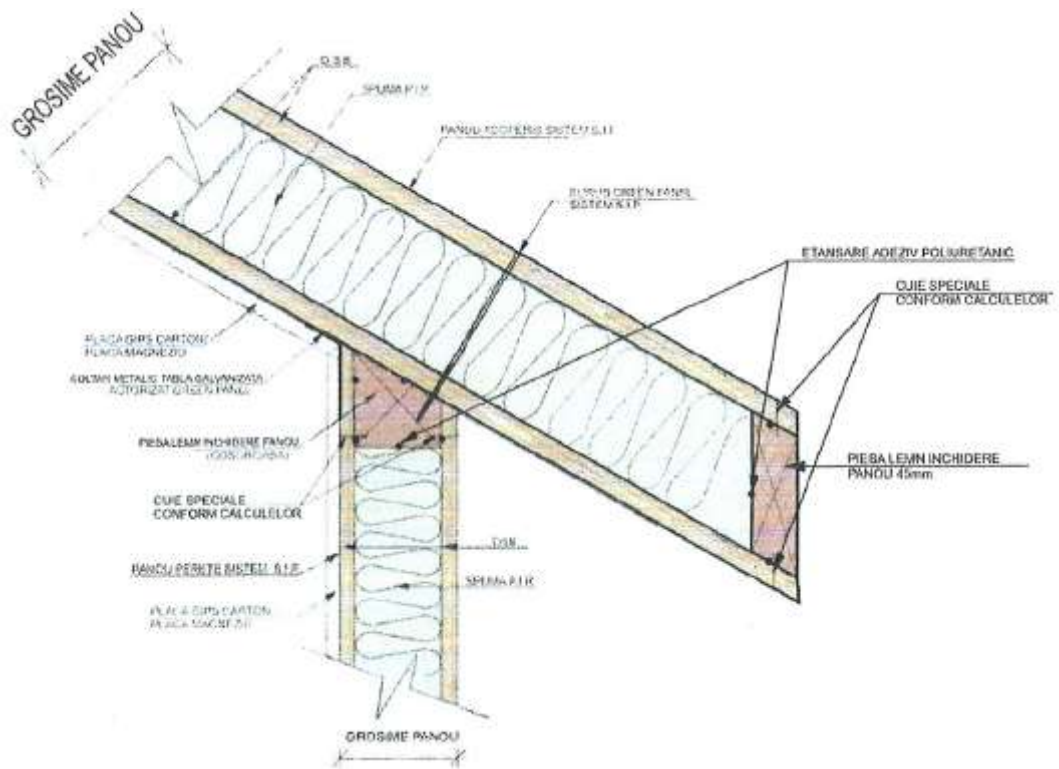


Figure no 7

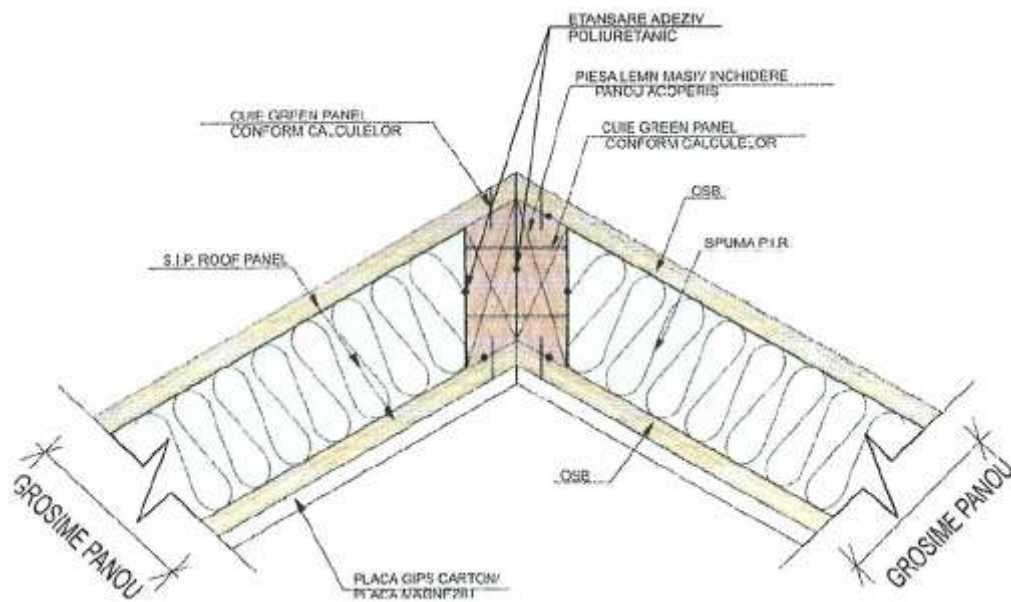


Figure no 8