

PHOTOVOLTAÏQUE

# GSE IN-ROOF SYSTEM™

In-Roof Integrated PV system for traditional Photovoltaic Panels

Simple, Quick, Aesthetic, Lightweight,  
Waterproof and Inexpensive



## CERTIFICATIONS AND INSURANCE COVER

**CEIAB**  
2012

**SMABTP**

**CSTB**  
le futur en construction

**certisolis**  
TEST - CERTIFICATION PHOTOVOLTAÏQUE

ORIGINE  
**FRANCE**  
GARANTIE

**RSA**

**PASS'INNOVATION VERT**  
CSTB N°2013-221 OCTOBRE 2013 - OCTOBRE 2015

**ETN**  
ENQUETE DE TECHNIQUES NOUVELLES  
APRES COMPLETION BT130093 / MARS 2014 - MARS 2017

V 1.7

[www.gseintegration.com](http://www.gseintegration.com)

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# The Groupe Solution Energie

## ■ ABOUT US...



The Group has managed more than 10,000 photovoltaic installations in France and has considerable expertise in the residential sector. We have now developed an integration system that meets all the requirements of installation technicians, distributors and end users.

The GSE Integration system is now approved by several dozen installation technicians and distributors. Through their confidence, more than 1200 systems are currently being installed every month, in France.

## ■ GROUPE SOLUTION ENERGIE KEY STATISTICS

| 2014 consolidated turnover | Number of employees | Year company formed |
|----------------------------|---------------------|---------------------|
| 45 M€                      | 300                 | 2008                |

## ■ CERTIFICATIONS



The Innovations trophies are awarded each year at the **EnerGaïa show**. They reward the best new developments in the field of renewable energy and building applications. The Groupe Solution Énergie won a prize at the 2012 show for its **“Pack Eco Plus LED”** project.

# Certifications & Qualifications

## ISO CERTIFICATIONS

The **Groupe Solution Energie** has selected only French companies for the sourcing of the manufacturing process, in order to have all the necessary certifications and qualifications :

### GSE PLATES

The GSE plate production plants are located in France and are certified :

**ISO TS 16949 et ISO 9001.**

| 2012 consolidated turnover | Number of employees | Year formed |
|----------------------------|---------------------|-------------|
| 413 M€                     | +2500               | 1963        |

### GSE EDGE JOINERS AND MOUNTINGS

The GSE kit edge joiner and mountings production plants are located in France and certified :

**ISO 9001.**

| 2011 consolidated turnover | Number of employees | Year formed |
|----------------------------|---------------------|-------------|
| 34 M€                      | 250                 | 1994        |



## MATERIALS

### POLYPROPYLENE PLATES

**Polypropylene (PP)** : is a highly polyvalent polymer that is used as both thermo-plastic and fibre. It is very easily coloured and doesn't absorb water. It is much used for moulded automotive equipment (bumpers, dashboards, interior finishing), for garden furniture and also for manufacturing tanks.

Polypropylene is also used to manufacture food containers that can be machine washed, as it doesn't melt below 160°C. PP now has a very broad range of applications, as it is chemically stable, excellent for preserving hygiene, is not subject to corrosion and can even be machined.

### ALUMINIUM ALLOY EDGE JOINERS

**Aluminium alloy (AL)** : The main advantages of aluminium alloy are its light weight, its excellent resistance to corrosion, its flexibility (easy to work if necessary, for example it can easily be drilled, folded or cut, etc.), and it can be recycled.

Furthermore, black pre-lacquered aluminium alloy offers enhanced corrosion resistance in corrosive atmospheres and the coating is extremely durable when subjected to UV radiation.

### STAINLESS MOUNTINGS

**Stainless steel (IN)** : The raw material used for the GSE Integration mounting system is stainless steel grade 304L C1000. Stainless steel 304L has great mechanical strength, is very light and offers excellent corrosion resistance (no surface treatment required).

In addition, stainless steel is electrically and chemically neutral in relation to most other roofing materials (no corrosion cell). Compared with aluminium alloy, stainless steel also offers the advantage of not breaking when stressed beyond its elastic limit (it will distort before breaking), while aluminium alloy suddenly fails without prior warning.

Grade C1000 is even stronger than standard grade stainless steel.

# MCS 012 - BBA Report

## CERTIFICAT NO: MCS BBA 0156 - CONFIRMED

### BBA TECHNICAL ANALYSIS

#### GSE INTEGRATION system's components :

GSE INTEGRATION plate

Wedges

Lateral flashings

EPDM Joint

Clamps

#### Type of installation :

Roof integration

#### Roof slope :

15° to 50°

#### Elements of covering :

Tiles or slates

#### Resistance to maximal wind uplift (kPa) : 1,5

calculated by dividing the resistance characteristics  
to wind uplift by the partial indicated security's coefficient :  
1,1

#### Fire classification :

Broof T4



## FILE ETN BT130003 VALIDATED

### TECHNICAL ANALYSIS FROM ALPES CONTRÔLES

#### 1/ APPLICATION

- This system allows the installation of photovoltaic panels on any type of roof type attached with small roofing elements (curved tiles, interlocking tiles, flat tiles, slate) for a new building or being renovated. It attaches in portrait format as well as in landscape.
- GSE integration attaches on timber structures and can be settled on lath or other battens sized according to climate issues.
- GSE integration can be fixed on roof pitches going from 12° to 50° (21% to 119%) depending on the testing done, while enforcing the minimal and maximal slopes coming from the connection.

#### 2/ GEOGRAPHIC AREA

- GSE integration is applicable in metropolitan France and in the five regions listed in the wind map in the following application fields and under certain conditions.

#### 3/ ROOF TYPES

- The GSE integration system is adapted for different types of cold roofing for a partial coverage attached to small elements of cover.
- It is compatible with the roof types such as : curved tiles, interlocking tiles, flat tiles, slate)

#### 4/ TIMBER STRUCTURES TYPES

The wood timber structures with lath or other battens. The type of timber structure aimed is a traditional timber structure type purlin, rafter, batten according to DTU 31.1.

#### 5/ STABILITY TO CLIMATE CHARGES AND FROM OWN WEIGHT

| PORTRAIT AND LANDSCAPE                                     |   |   |
|--|---|---|
| Upward entreaties<br>Single and double<br>standards clamps | Windproof/resistant<br>under extreme wind<br>(Pa1) <sup>(1)</sup> | 1860 Pa for 4 double<br>standards clamps, 2000 Pa<br>for 6 single standards clamp,<br>2400 Pa for 6 single reinforced<br>clamps, 2400 Pa for 6 double<br>reinforced clamps. |
| Upward<br>entreaties                                       | Snowproof/ resistant<br>under extreme snow<br>(1)                 | 2400 Pa or 5400 Pa<br>to correlate with the<br>certification of the<br>manufacturer's module.   |

(1) Nota : This tab does not include the resistance of the wood battens associated, sized according to the current calculations' codes.



**Under these conditions, an ETN is awarded for the GSE integration process.**

# CSTB Pass'Innovation Report

## GREEN PASS'INNOVATION N°2013-221 CONFIRMED

### CSTB TECHNICAL ANALYSIS

#### 1/ APPLICATION

- Used in the main part of the roof, together with channel, structural and flat tiles, and slates.
- Slope: with roof gradients between 17° and 50°. Roof gradients must not be less than the minimum values specified in the regulatory technical requirements for the related roofings.

#### 2/ WATERPROOFING

- The tests conducted confirm that the process is waterproof on the main part of the roof if the gradients and slope lengths specified in the application section are respected.

#### 3/ DURABILITY

- The durability of the process, in relation to temperature, UV radiation and humidity, has been tested and found to be satisfactory.

#### CONCLUSION

The documents that have been submitted confirm that risks are properly managed in the above-mentioned field of application.

- On buildings with a roof slope between 17° and 50°,
- With an under-roof screen installed in compliance with regulatory technical requirements,
- With battens fixed at the plate mounting points and at the plate overlapping.

**Under these conditions, a “Green” Pass’Innovation label is awarded to the GSE Integration process.**

**CSTB**  
le futur en construction

**PASS'INNOVATION VERT**  
CSTB N°2013-221 OCTOBRE 2013 - OCTOBRE 2015

**PASS'INNOVATION**  
Numéro de référence : 2013-221

**A LA DEMANDE DE :** **SVH ENERGIE**  
95 Avenue Achille Peretti  
92200 NEUILLY SUR SEINE

CENTRE SCIENTIFIQUE ET TECHNIQUE DU BATIMENT  
ETABLISSEMENT DE GRENOBLE : 24 RUE JOSEPH FOURNIER - 38000 SAINT-MARTIN D'HERES  
TEL. 0033 04 76 76 22 25 - FAX. 0033 04 76 88 00 04 - 0033 04 76 88 220 000 00 - www.cstb.fr  
40000000 - 0033 04 76 76 22 25 - 0033 04 76 88 00 04 - 0033 04 76 88 220 000 00

|            |       |      |      |      |     |
|------------|-------|------|------|------|-----|
| 3          | 49.96 | 1284 | 21.5 | 19.9 | 8.2 |
| 4          | 50.27 | 1520 | 20.3 | 19.2 | 5.7 |
| 5          | 50.00 | 1501 | 20.4 | 19.6 | 7   |
| Moyenne    | -     | 1520 | 20.9 | 19.6 | 7.0 |
| Ecart type | --    | 154  | 0.5  | 0.6  | 1.3 |

Tableau 1 : Caractéristiques en traction des échantillons témoins

**PASS'INNOVATION VERT**  
**CSTB** le futur en construction **N°2013-221** OCTOBRE 2013 - OCTOBRE 2015

## ■ FIRE EXPOSURE TESTS BROOF T1, T3, T4 APPROVED

The **WarringtonFire laboratories** based in Belgium and in England have validated the GSE INTEGRATION system's fireproofing.

The system passed all the current tests according to the different necessary configurations for the French, Belgian, German, Dutch and English construction.

### ■ DETAILS OF THE DIFFERENT TESTS

#### 1/ BROOF T1 : German, Dutch, and Belgian Standard

- 4 x models with different configurations
- Test time until the end of combustion of the firebrands, wood fibers , etc.
- Use of burning firebrands, ablaze and radiant heat wood fiber.

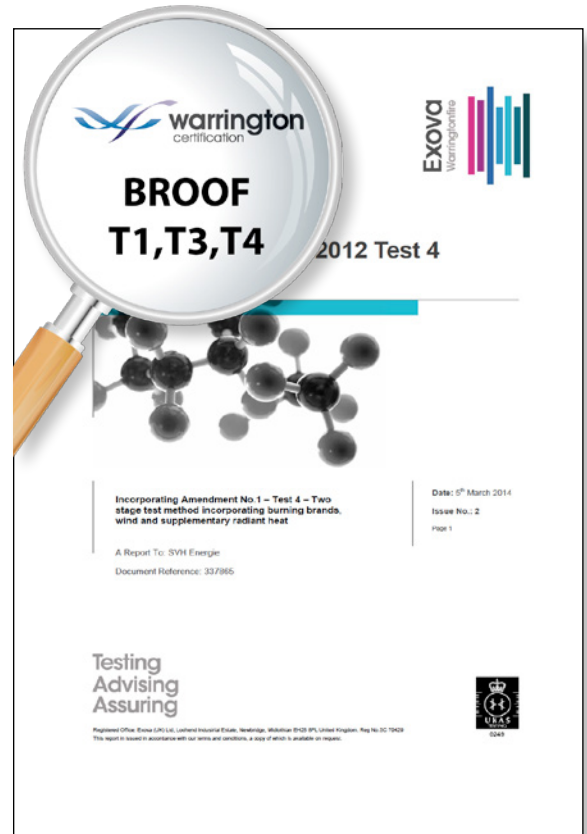
#### 2/ BROOF T3 : French Standard

- 2 x models with different configurations
- 2 x 30 minutes of test
- Use of burning firebrands, radiant wind and heat
- Validation for 10° to 70° roof in accordance with the paragraph 11 “activity sector” of the testing protocol.

#### 3/ BROOF T4 : English Standard

- 4 x models with different configurations
- 4 x 1 hour of test
- The fire did not get through the structure during the allotted time.

**Videos of the fire exposure tests are available on our website [www.gseintegration.com](http://www.gseintegration.com)**



### CONCLUSION

**The GSE Integration system is not therefore flame-retardant according to the DD CEN/TS 1187: 2012, Test 1, Test 3 et Test 4 standard.**



# CSTB Waterproofing analysis report

## ANALYSIS OF WATERPROOFING AND WIND RESISTANCE OF THE SVH ÉNERGIE PHOTOVOLTAIC PANELS SYSTEM

### WATERPROOFING TESTS IN RAIN

#### CONCLUSIONS

The “GSE Integration” kit, with ZNshine Solar photovoltaic panels, was effectively waterproof under severe rain/wind conditions (rainfall 130 mm/h with a wind speed of 14 m/s) and a shallow roof slope.

### TESTS OF REMOVAL BY WIND

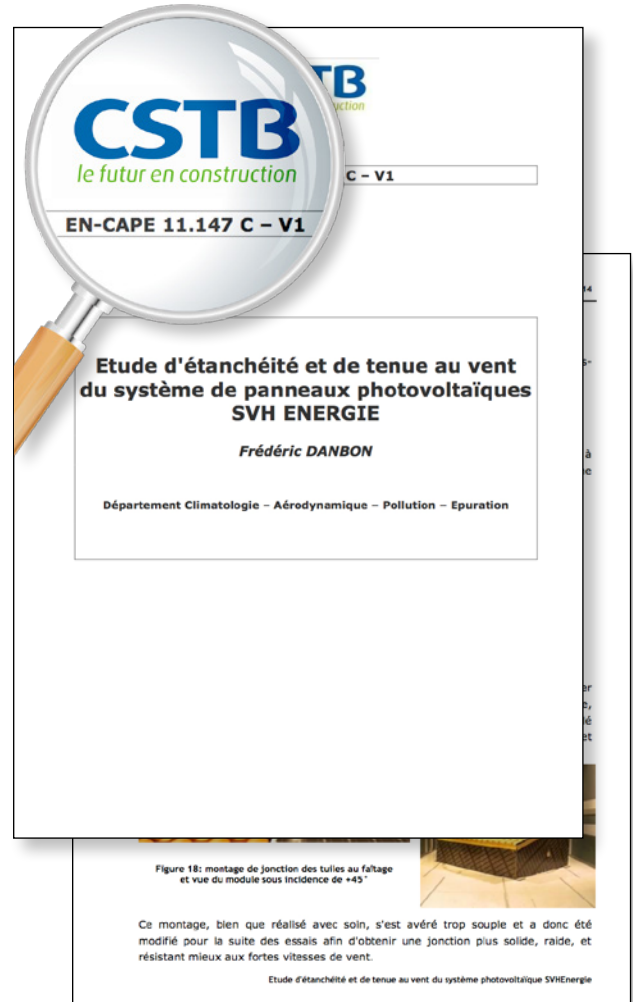
#### CONCLUSIONS

The SVH ENERGIE “GSE Integration” system, with photovoltaic panels, on a traditional GR13 tile roofing, was tested for waterproofing and for its resistance to strong winds.

The waterproofing tests, under a combination of wind and rain, confirmed that the integration system is effective. Waterproofing performance is summarised in the table below :

### OVERVIEW OF WATERPROOFING TEST RESULTS

Full scale tests, conducted in a climatic blower system, on 21st and 22nd July 2011, confirmed the effectiveness of the “GSE Integration” system under severe climatic conditions.



| Type of Roofing         | Slope length | Wind-rain intensity | Slope        | Angle of incidence in relation to wind | Observations during test      | Test result |
|-------------------------|--------------|---------------------|--------------|--|-------------------------------|-------------|
| GR13 Tile in baked clay | 8.2 m        | 14 m/s<br>130 mm/h  | 12°<br>(21%) | 0°,<br>+ 30°, + 60°,<br>- 30°, - 60°   | No leak if properly installed | Positive    |

# CSTB Ageing analysis report

## ACCELERATED AGEING OF PHOTOVOLTAIC MODULE MOUNTING PANELS

### 1/ ACCELERATED AGEING IN RELATION TO UV RADIATION

#### Method of exposure to UV radiation

The accelerated ageing tests were conducted in compliance with standards NF EN ISO 4892-1 and 2 : “Exposure to a Xenon arc lamp light source”, method A, cycle 1, under the following conditions :

- energy spectrum lighting: 0.51 W/m<sup>2</sup> at 340 nm, giving an overall energy spectrum lighting of 550 W/m<sup>2</sup> (wavelength: 290-800 nm),
- air temperature in chamber: 38°C ± 3°C,
- relative humidity (RH): 50% ± 10%,
- temperature on BST type black panel: 65°C ± 3°C,
- watering cycle :
  - watering: 18 mn ± 0.5 mn,
  - drying: 102 mn ± 0.5 mn,
- permanent lighting.

**Exposure duration: 2000 hours.**

### 2/ ACCELERATED AGEING IN STOVE

#### Method of climatic exposure

The climatic ageing tests were conducted under the following conditions :

- 10 cycles, as follows :
  - 8 h at 50°C and 95% relative humidity
  - Transition 1 h
  - 16 h at -20°C
  - Transition 1 h

### 3/ TENSILE STRENGTH CHARACTERISTICS

#### Test principle and conditions

Measurement of rupture force and extension of a rectangular test piece, drawn along its main axis at constant velocity.

Test conditions are defined by standard NF EN ISO 527-2 :

- Test piece geometry: type 1B (dumbbell).
- Test conditions: 23°C and RH 50%.
- Velocity for modulus computing: 2 mm/min

Test velocity is 30 mm/min.

#### SUMMARY OF TENSILE STRENGTH AFTER AGEING TEST RESULTS

Results were computed in accordance with standard NF EN ISO 527-1. The tests confirmed that elasticity  $E_t$  (MPa), maximum acceptable loading  $\delta_M$  (MPa), rupture load  $\delta_B$  (MPa) and distortion capacity before rupture  $\epsilon_B$  (%) remained unchanged after the various treatment cycles defined above.

**CSTB**  
le futur en construction

**RAPPORT d'ESSAIS**  
N°EMI 13-26044709

**RAPPORT d'ESSAIS N°EMI 13-26044709**  
**VIEILLISSEMENT ACCELERE DE PANNEAUX**  
**SUPPORTS DE MODULES PHOTOVOLTAÏQUES**

Ce rapport d'essais atteste uniquement des caractéristiques de l'objet soumis aux essais et ne préjuge pas des caractéristiques de produits similaires. Il ne constitue pas une certification de produits au sens des articles L. 115-27 à L. 115-33 et R115-1 à R115-3 du code de la consommation.

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Il comprend 6 pages.

**A LA DEMANDE DE :** **SVH ENERGIE**  
95 Avenue Achille Peretti  
92200 NEUILLY SUR SEINE

|                   |       |             |             |             |            |
|-------------------|-------|-------------|-------------|-------------|------------|
| 3                 | 49.96 | 1284        | 21.5        | 19.9        | 8.2        |
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| 5                 | 50.00 | 1501        | 20.4        | 19.6        | 7          |
| <b>Moyenne</b>    | -     | <b>1520</b> | <b>20.9</b> | <b>19.6</b> | <b>7.0</b> |
| <b>Ecart type</b> | --    | <b>154</b>  | <b>0.5</b>  | <b>0.6</b>  | <b>1.3</b> |

**Tableau 1 : Caractéristiques en traction des échantillons témoins**

## WIND LOAD RESISTANCE COMPLIANT TO NF EN 12179 (OCTOBRE 2000) STANDARDS

The tests were performed according to standard NF EN 12179 (October 2000): wind load resistance - Test method.

### PRESSURE/DEPRESSION VALUES VALIDATED

| Theoretical wind pressure | Theoretical wind depression |
|---------------------------|-----------------------------|
| 1 300 Pa                  | - 1 300 Pa                  |

### MEASUREMENT OF DISTORTION TO PRESSURE/DEPRESSION THEORY

| Objects | Way        | Pressure/depression maximum | Arrows calculated | Measurement results (in mm) |
|---------|------------|-----------------------------|-------------------|-----------------------------|
| A       | Pressure   | 1 300                       | 1 - 2 - 3         | 0,2                         |
| A       | Pressure   | 1 300                       | 3 - 4 - 5         | 6                           |
| A       | Depression | - 1 300                     | 1 - 2 - 3         | - 0,1                       |
| A       | Depression | - 1 300                     | 3 - 4 - 6         | - 8,3                       |

**NO SIGNIFICANT DEFORMATION WAS OBSERVED.**

### RESISTANCE TO WIND LOAD IN INCREASED

The model is subject to pressure and depression, increased wind load equal to 150% of the theoretical wind load.

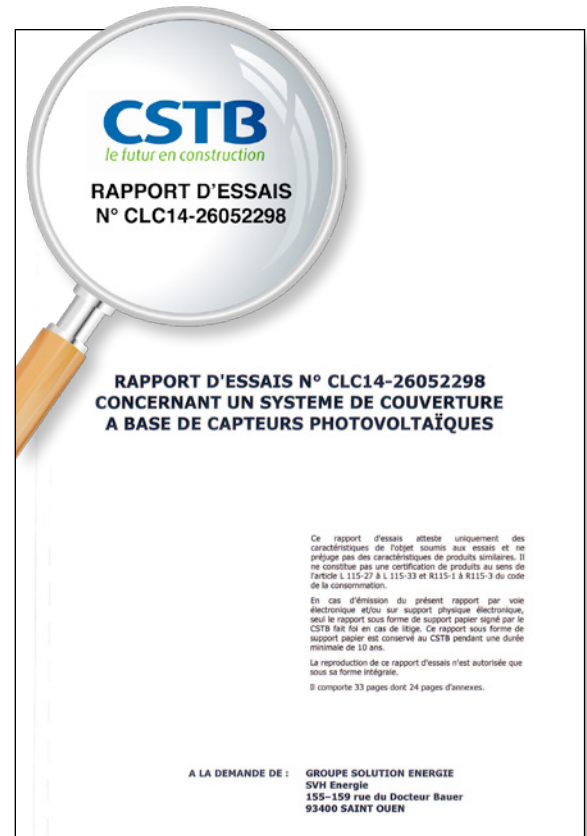
| Objects | Pressure (Pa) | Depression (Pa) | Criteria   | Results    |
|---------|---------------|-----------------|--|------------|
| A       | 1 969         | - 2 025         | No permanent damage should occur over framing members, the filling elements, openings, fasteners or anchors. The elements, decorative beading and covers must remain securely attached and the linings of the joints shall not be moved. | Satisfying |

### TEST OF RESISTANCE TO DESTRUCTION

To validate the theoretical load values due to the wind, the model was subjected to an extreme depression load to be greater than 350% of the design load.

| Objects | Depression destruction / maximum | Observations                     |
|---------|----------------------------------|----------------------------------|
| A       | - 5 535 Pa                       | <b>NO RECORDED DETERIORATION</b> |

**Conclusion: The model has undergone depression loads of 5,535 Pa (425% of the theoretical value) without proven deterioration. This test validates easily the permissible load value of 1 300 Pa.**



## MECHANICAL AND CLIMATIC VALIDATION OF THE GSE INTEGRATION SYSTEM

### MECHANICAL LOADING TESTS

|                      |  |
|----------------------|--|
| Sample(s)            | 20120903-M008 + GSE Integration structure 20120903-M00 |
| Date tests conducted | 10/12/2012   |
| Test equipment       | Electrical safety tester                               |
| <b>Conclusion</b>    | <b>COMPLIANT</b>                                       |

### PRE-CONDITIONING FOR UV RADIATION TESTS

|                      |                               |
|----------------------|-------------------------------|
| Sample(s)            | 20120903-M006 / 20120903-M007 |
| Date tests conducted | from 10/18/2012 to 11/06/2012 |
| Test equipment       | E-201012023                   |
| <b>Conclusion</b>    | <b>COMPLIANT</b>              |

### THERMAL CYCLING TESTS (200 CYCLES)

|                      |   |
|----------------------|---|
| Sample(s)            | 20120903-M005 (STRUCTURE) + M008 (MODULE) |
| Date tests conducted | from 10/18/2012 to 11/28/2012             |
| Test equipment       | Climatic chamber                          |
| <b>Result</b>        | <b>NO DEFECT OBSERVED</b>                 |

### HUMID HEAT TESTING (1000 HOURS)

|                      |   |
|----------------------|---|
| Sample(s)            | 20120903-M002 (STRUCTURE) + M009 (MODULE) |
| Date tests conducted | from 10/19/2012 AU 11/30/2012             |
| Test equipment       | Climatic chamber                          |
| <b>Result</b>        | <b>NO DEFECT OBSERVED</b>                 |

### CONCLUSIONS

The **ZN SHINE ZW 190(37) MS module**, used with the “GSE Integration” system, assembled by **3 clamps** (heavy duty type) responded favourably to the 2400 Pa mechanical load test.

The module **remained in its structure throughout the duration of the test and met the requirements of paragraph 10.16 of standard NF EN 61215.**

The “GSE Integration” mounting systems subjected to the UV radiation pre-conditioning test **exhibited no visual defect after 15 kWh.m2 of exposure to UV radiation.**

The modules installed with “GSE Integration” mounting systems that have been subjected to climatic testing (Cycling and Humid heat) **remained in their structure throughout the duration of the tests. No defect observed.**

**certisolis**  
TEST - CERTIFICATION PHOTOVOLTAÏQUE  
**RAPPORT D'ESSAI**  
201210903-003-SVH ENERGIE - Page 1 sur 23

**cofrac**  
ESSAIS

Client : SVH ENERGIE  
95 Avenue Achille Peretti  
92200 Neuilly sur Seine  
FRANCE

Référence et date de la commande : Bon pour accord sur devis n°20120903 et n°20121013 du 25/10/2012  
Objet : Validation mécanique et climatique du système GSE Intégration  
Documents de référence : NF-EN 61215 : 2005  
NF-EN 61730 : 2007

Échantillons : 7 Modules ZN SHINE ZW 190(37) MS  
9 systèmes de fixation GSE système  
Dates d'essais : 03/10/2012 au 30/11/2012

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Il comporte 23 pages.

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Siège social : Savoie Technolac - BP 364 - 39 allée du Lac de Côme - 73372 LE BOURGET-DU-LAC Cédex  
Filiale du groupe CSTB et du LNE

|            |               |      |      |       |       |    |     |     |          |
|------------|---------------|------|------|-------|-------|----|-----|-----|----------|
| 15/10/2012 | 20120903-M008 | 0,00 | 0,80 | 25600 | 32602 | 40 | Non | Non | Conforme |
|------------|---------------|------|------|-------|-------|----|-----|-----|----------|

Conditions d'essai :

- Tension max du système : 1000 V<sub>DC</sub>
- Tension diélectrique : 6000 V<sub>DC</sub>
- Tension d'isolement : 1000 V<sub>DC</sub> Classe A

§ 10.3 DIELECTRIQUE ET RESISTANCE D'ISOLEMENT

| Date       | Identifiant Certisolis | Diélectrique          |                       | Isolement |                                       | Observations | Résultat                      |
|------------|------------------------|-----------------------|-----------------------|-----------|---------------------------------------|--------------|-------------------------------|
|            |                        | I <sub>max</sub> [mA] | I <sub>lim</sub> [mA] | R [MΩ]    | R <sub>max</sub> [MΩ.m <sup>2</sup> ] |              |                               |
| 15/10/2012 | 20120903-m008          | 0,00                  | 0,80                  | 29100     | 37059                                 | 40           | Rupture<br>Claquage<br>C / NC |

## ■ TEST RELATED TO THE EXPANSION OF THE GSE INTEGRATION SYSTEM

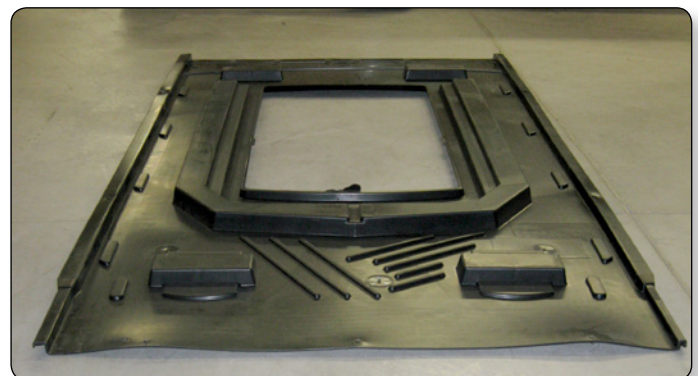
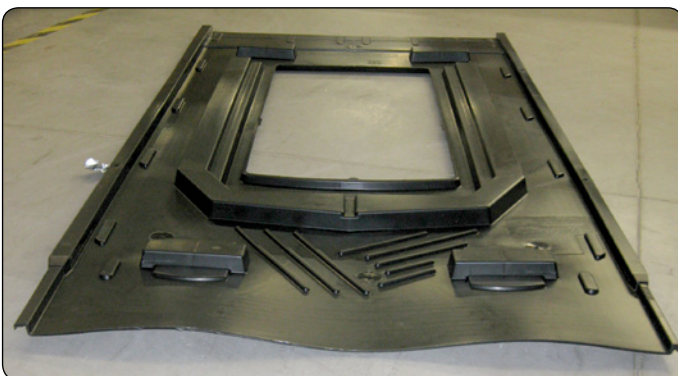


### ■ THERMAL CYCLING TEST (200 CYCLES)

|                     |  |
|---------------------|--|
| Sample(s)           | 20120903-M005 (STRUCTURE) + M008 (MODULE)  |
| Date test conducted | from 10/18/2012 to 11/28/2012  |
| Test conditions     | 20120903-M008 installed with a GSE Integration structure.<br>20120903-M005 mounted on a wooden structure for assembly onto an alloy chassis.<br>Climatic chamber<br>200 cycles from -40°C to +85°C |
| Test equipment      | Climatic chamber   |
| <b>Result</b>       | <b>NO DEFECT OBSERVED</b>  |

### ■ HUMID HEAT TEST (1000 HOURS)

|                     |   |
|---------------------|---|
| Sample(s)           | 20120903-M002 (STRUCTURE) + M009 (MODULE)   |
| Date test conducted | from 10/19/2012 to 11/30/2012   |
| Test conditions     | 20120903-M009 installed with a GSE Integration structure.<br>20120903-M002 mounted on a wooden structure for assembly onto an alloy chassis.<br>Climatic chamber<br>1000 h at +85°C, RH 85% |
| Test equipment      | Climatic chamber  |
| <b>Result</b>       | <b>NO DEFECT OBSERVED</b>   |



### ■ CONCLUSIONS

Modules installed with GSE mounting systems were subjected to climatic testing [thermal cycling (200 cycles from -40°C to +85°C) and humid heat]. **The modules remained in place in their structure throughout the entire test period and were not damaged in any way.**

## ANALYSIS OF BUILDING INTEGRATION ASSESSMENT COMMITTEE

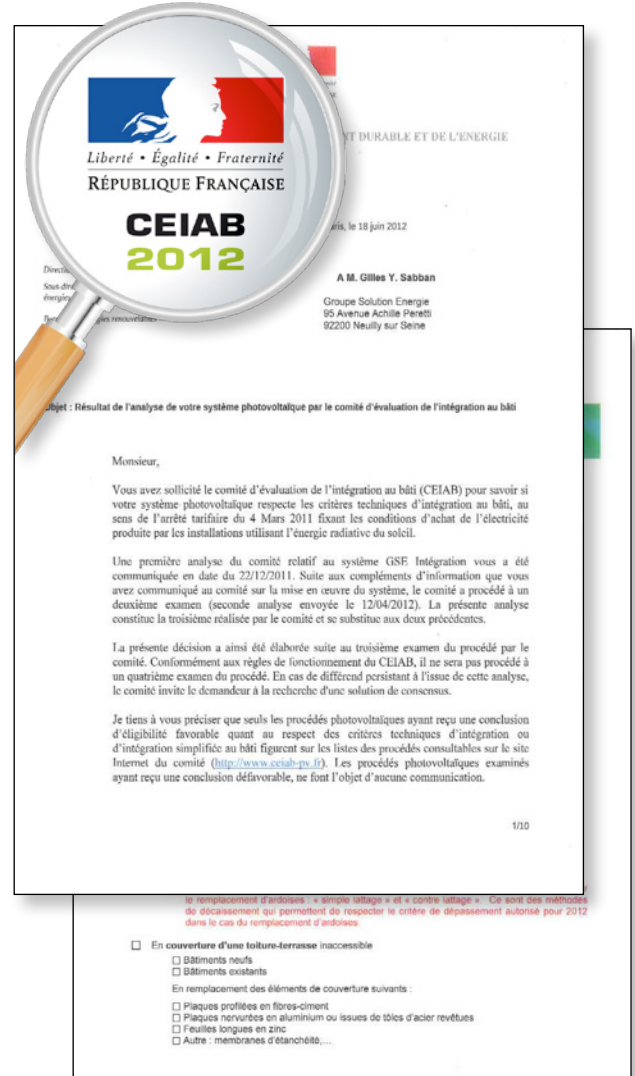
### CONCLUSIONS

The committee reached the following conclusions :

- The system meets building integration technical requirements (IAB 2012) for installation in partial coverage of one roof face comprising :

- **From the year 2012 :** Slates, flat tiles in baked clay or concrete, flat exposed tiles, interlocking or slide-in, in baked clay or concrete. Profile tiles, interlocking or slide-in, in baked clay or concrete, baked clay channel tiles, formed plates in cement fibre.

- The system meets the simplified building integration technical requirements (ISB 2012) for installation in partial coverage of one roof face.



THE GSE INTEGRATION SYSTEM  
MEETS THE REQUIREMENTS OF **CEIAB 2012**  
STANDARDS FOR ALL ROOFS,  
FOR CONVENTIONAL PHOTOVOLTAIC PANELS.

# SVH 2014 Clamps report

## TEST REPORT ON MOUNTING CLAMPS OF SVH ENERGIE

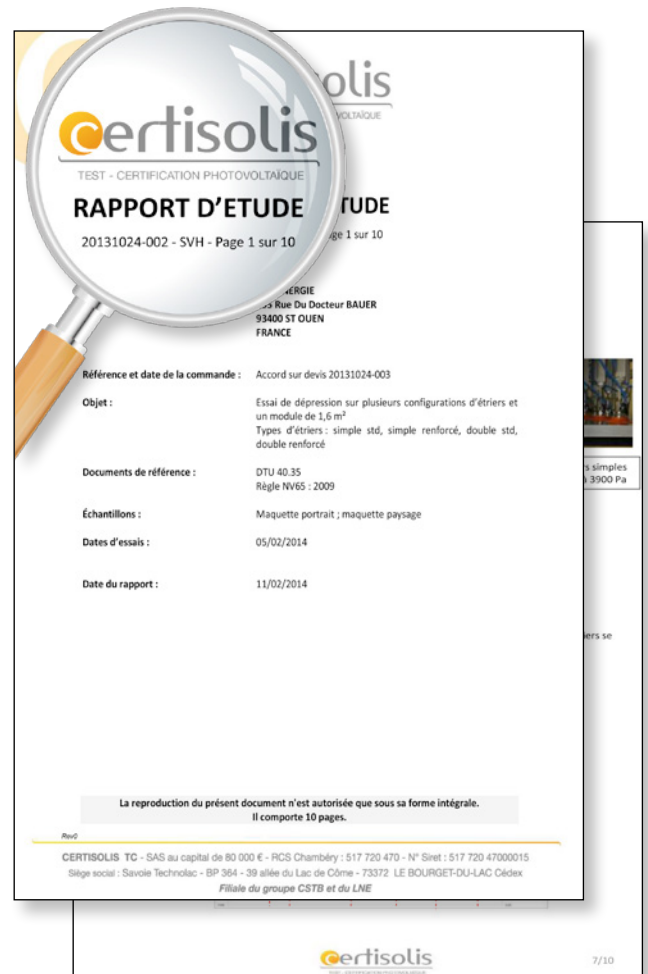
### 2014 CLAMPS RECOMMANDATION

Depending on the case, one can draw the following prescription table for mounting the panels with the clamps (taking a coef security 1.5.): For a higher security coef, it is recommended a more comprehensive study.

Roof zones - rule V65



When using the new reinforced 2014 clamps, the available area to install a GSE integration roof system in wind zone 3, at 15 m in height is equal to the entire available roof area.



### TESTED WIND ZONES

**Depression calculation N / m2 (Pa) calculated in the case of slopes plans (V65 with following rules amending No. 2)**

**Table 1.1 - Slopes Plans - Rolled ribbed steel wood and derived products - New Construction - Buildings closed**

| Wind Zone     | Wind Speed (in m/s) | Wind Speed in Km/h | Number of clamps per panel |
|---------------|---------------------|--------------------|----------------------------|
| Wind Zone I   | < 21 m/s            | < 75.6 km/h        | 4                          |
| Wind Zone II  | 21 to 23 m/s        | 75.6 to 82.8 km/h  | 4                          |
| Wind Zone III | 23 to 25 m/s        | 82.8 to 90 km/h    | 4                          |
| Wind Zone VI  | 25 to 27 m/s        | 90 to 97.2 km/h    | 4                          |
| Wind Zone V   | >27 m/s             | > 97.2 km/h        | 4                          |

## PRODUCT 10-YEAR GUARANTEE INSURANCE COVER

The **SMABTP** hereby certifies that SVH Énergie is the holder of an **ALPHA-BAT** Manufacturers insurance policy N° 880016 K 1004000 with effect from 01/01/2013, covering the following activity :  
**MANUFACTURE OF THE GSE INTEGRATION PHOTOVOLTAIC INTEGRATION SYSTEM :**  
**GSE INTÉGRATION**

### THIRD PARTY LIABILITY

This policy covers financial liability in respect of any injury or material or immaterial damage suffered by a third party and caused by the policy holder :

- In the conducting of the policy holder's professional activity, irrespective of the legal basis claimed,
- Caused by the products defined above, following the delivery of the said products and/or components, when vendor liability is claimed.



| NATURE OF GUARANTEES   | SUMS GUARANTEED  |
|--|--|
| 1 - Injury, other than those specified in 3 and 4, below.  | 1 525 000 € per claim and per year   |
| 2 - Material and immaterial damage, other than those specified in 3 and 4, below.  | Per claim: €500,000, including €100,000 in respect of immaterial damage.<br>Per year of policy : €1,000,000, including €200,000 in respect of immaterial damage. |
| 3 - All damage (injury, material, immaterial) directly or indirectly due to or related to asbestos or to any material containing asbestos. | 1.000.000 € per claim and per year   |
| 4 - Damage relating to pollution of the environment, including any form of injury or material or immaterial damage.                        | 305.000 € per claim and per year   |

### PROFESSIONAL LIABILITY

The policy covers financial liability in respect of material damage to the construction :

- Resulting from a hidden defect in the product or from a fault by GSE INTEGRATION or by any persons or companies for which GSE INTEGRATION is liable,
- When the liability of the policy holder is claimed under the terms of article 1792-4 of Civil Code, in respect of components or products incorporated in building works, when the building site was opened between 01/01/2013 and 31/03/2013, or in respect of civil engineering.

| NATURE OF GUARANTEES  | SUMS GUARANTEED PER CLAIM AND PER YEAR  |
|---|---|
| Material damage resulting from a hidden defect in the product, or incurring the liability of the policy holder under the terms of article 1792-4 of Civil Code for building works.<br>Material damage incurring the liability of the policy holder under the terms of article 1792-4 of Civil Code for civil engineering works. | €600,000 per claim and per year<br>Including €100,000 per claim and per year in respect of material damage affecting civil engineering works. |



# RSA Liability Insurance

## LIABILITY INSURANCE TRADING AND PRODUCT

**Royal & Sun Alliance Insurance (RSA)** certifies that **SVH Energy Company** benefits from the contract **No. 400051**, against the financial consequences of the liability it may incur due to the damage caused to third parties, as long as after the performance of work and / or delivery of products, because of the safeguards activities under this contract.

This warranty is valid for the policy period **from June 1st 2015 to December 31th 2015**.



**RSA**

**ASSURANCE  
RC PRODUIT  
ET EXPLOITATION**

STATION D'ASSURANCE

Nous soussignés, Royal & Sun Alliance Insurance Plc 153 rue Saint Honoré 75001 PARIS, certifions que la Société:

**SVH Energie**  
5-9 rue Morand - 93400 Saint-Ouen

bénéficie du contrat n° 400 051, garantissant les conséquences pécuniaires de la Responsabilité Civile pouvant lui incomber en raison des dommages causés aux tiers, tant pendant que après l'exécution des travaux et/ou la livraison des produits, du fait des activités garanties au titre de ce contrat.

Cette attestation est valable pour la période d'assurance du 1<sup>er</sup> juin 2015 au 31 décembre 2015 sous réserve du paiement des primes et des possibilités de suspension de la police, dans les cas prévus par le Code des Assurances ou par le contrat.

CETTE ATTESTATION EST DELIVREE POUR SERVIR ET VALOIR CE QUE DE DROIT, ET NE PEUT EN AUCUN CAS ENGAGER LA COMPAGNIE AU DELA DES CLAUSES ET CONDITIONS DU CONTRAT AUQUEL ELLE SE REFERE.

La présente attestation ne peut engager l'Assureur au-delà des termes et limites du contrat d'assurance auquel elle se réfère. Sa validité cesse pour les risques situés à l'étranger dès lors que l'assurance de ces derniers ne peut être souscrite conformément à la Législation locale qu'auprès d'Assureurs agréés dans la nation considérée.

Fait à Paris le 19 juin 2015

**Royal & Sun Alliance Insurance Plc.**  
153 Rue Saint Honoré  
75001 PARIS  
Téléphone : +33 1 58 71 40 35  
Fax : +33 1 58 71 41 35

## ■ GSE INTEGRATION

**GSE**  
Intégration

Votre distributeur :

## ■ TECHNICAL DEPARTMENT / ASSISTANCE SERVICE

**TECHNICAL ASSISTANCE IS AVAILABLE FROM MONDAY TO FRIDAY,  
FROM 8 AM TO 6 PM.**

**GSE**  
Intégration

16 QUAI GUSTAVE FLAUBERT 76380 CANTELEU

Tél. 02 32 10 77 60

Mail: [technique@gseintegration.com](mailto:technique@gseintegration.com)

## Article 1 - Purpose

The purpose of these General conditions of sale is to govern the contractual relationship between the Supplier and its customers in the context of sales of the product "GSE INTEGRATION" offered for sale by the Supplier.

Every order accepted in accordance with Article 3 constitutes our special conditions which modify or supplement these general conditions.

## Article 2 - Scope

Sale of the product "GSE INTEGRATION" by the company SVH ENERGIE is made exclusively subject to these general terms and conditions (T&Cs), which are addressed to each Customer on a routine basis. The particulars shown in catalogues, brochures, prospectuses and price lists, as well as statements made by the Supplier's sales staff and technicians, are of indicative value only.

Any firm order accepted by our company implies the Customer's unreserved acceptance of these general conditions of sale.

These General conditions of sale come into force on the date of confirmation of order, as defined at Article 3.

## Article 3 - Formation / modification of the contract

Any sale, even negotiated by the agents or representatives of SVH ENERGIE, is treated as accepted by SVH ENERGIE only after it has been confirmed in writing or has been carried out. This accepted order will constitute the special conditions.

Any modification of the order requested by the customer will be taken into account only if it reaches us in writing before we have incurred any expenditure in relation to the initial order. Any modification of the order must be accepted by SVH ENERGIE in writing.

## Article 4 - Price

The prices of the goods sold are those in force on the day the order is taken.

Prices are understood to exclude VAT and other taxes that apply, the Customer being in addition responsible for the costs of packing and shipping the products. The prices contained in our price offers, catalogues/price lists are not contractual. They are liable to change in accordance with the variations which manufacturers impose on us.

## Article 5 - Period - Payment terms

5.1 Settlement of orders is effected:

- 1- either by cheque;
- 2- or by bank transfer.

5.2 When the order is registered, the Customer must make a down-payment of 30% of the amount of the invoice, including all taxes, the balance having to be paid on the date the goods are delivered.

Unless stated to the contrary, any payment by the Customer is applied against the oldest invoice.

## Article 6 - Late payment

Any sum not paid by due date shall give rise to payment by the Customer of penalty charges fixed at one and a half times the legal interest rate, without prejudice to any claim for compensation of loss or harm connected to the said delay.

The legal interest rate used is that in force on the date the goods were delivered.

These penalty charges are calculated on the amount, all taxes included, of the sum remaining due.

They are due and payable as a matter of law with effect from the due date of invoice and will be automatically carried to the debit side of the Customer's account. They will remain in application until payment in full of the whole of the sums due to the Supplier.

Any invoice recovered through the courts will be subject to a fixed charge of 15% of the amount of the invoice due as a penalty clause.

In the case of payment by paper instrument, the failure to return the said paper shall be considered a refusal of acceptance and treated as default of payment. Similarly, where payment is by instalment, the non-payment of a single instalment shall entail the whole of the debt being immediately due and payable, without prior formal notice.

The Customer must reimburse all costs incurred by recovery of the sums due through the courts.

## Article 7 - Reservation of title

Ownership of the goods delivered to the Customer transfers only after payment of the price agreed in full, in principal and incidentals, even in the case where payment terms are granted. In case of remittance of a bill of exchange or of any instrument to cover this price creating an obligation to pay, the transfer of ownership will occur only after actual collection.

Thus, if the customer is the subject of judicial liquidation or corporate recovery plan, SVH ENERGIE reserves the right to claim the goods sold but not paid for within the framework of the collective liquidation proceedings.

With effect from delivery, the customer becomes the depository and keeper of the said goods.

In the case of non-payment and except where SVH ENERGIE chooses to enforce the sale in full, SVH ENERGIE retains the right to consider the sale rescinded for fault, after formal notice has remained without effect for 15 days, and to claim the goods delivered, the return costs being at the purchaser's charge and the payments made being accrued to SVH ENERGIE in terms of a penalty clause.

## Article 8 - Shipping - Delivery - Compliance

8.1 Release or shipment of the products ordered.

The products ordered are, at the Customer's request, either released for his disposal in the Supplier's warehouses or shipped to the address stated on the order. Packing and, as the case may be, shipment of the products, are carried out at the Customer's cost.

8.2 Delivery lead-times

The delivery lead-time stated on registering the order is given only for indicative purposes and is in no way guaranteed.

Accordingly, any delay in releasing the products shall not give rise to the following in the customer's favour:

- the award of damages and compensation;
- application of penalty charges;
- cancellation of the order.

8.3 Compliance

It falls to the customer to verify the goods delivered as soon as they are delivered.

In case of goods missing, damaged or apparently non-compliant, the customer must express the necessary reserves on the delivery slip on receipt of the said goods. In addition, these reserves must be confirmed in writing within five working days of delivery, by registered post with advice of receipt. Failing which, the

customer is deemed to have accepted the goods without reservations.

The customer must supply evidence as to the reality of the defects found; SVH ENERGIE reserving the right to conduct any findings and checks on site, directly or indirectly. The return of non-compliant goods is subject to prior acceptance by SVH ENERGIE. Failing which, the customer is deemed to have accepted the goods without reservations.

In case of non-payment of the whole of an invoice by due date, after notice to pay has remained without effect for 48 hours, SVH ENERGIE reserves the option of suspending all deliveries in progress and/or to come.

In the case where a customer places an order on SVH ENERGIE without having made payment of previous order(s), SVH ENERGIE will be able to refuse to meet the order and deliver the goods in question, without the customer being able to claim any compensation for any reason whatsoever.

## Article 9 - Transfer of risks

9.1 Unless the parties particularly agree otherwise, the transfer to the customer of the risks of theft, loss, deterioration or destruction takes place on delivery or, in the case of remittance to a carrier, when the goods are delivered to the first carrier.

9.2 At the Customer's request and expense, the Supplier may take out insurance against losses and damage caused by transport.

## Article 10 - Force majeure

The liability of SVH ENERGIE can only be incurred if the non-performance or delay in performance of any of its obligations described in these general conditions of sale arises from a case of force majeure.

We understand force majeure to mean any alien cause, foreseeable or not, of an irresistible nature or whose effects would substantially alter the economic balance of the sale for SVH ENERGIE.

Events such as strike, lock-out, fire, flood, riot, war, scarcity of fuel, energy, transports, materials, products necessary for SVH ENERGIE's productions etc., are deemed to be a case of force majeure, even if they are only partial and regardless of the cause thereof.

## Article 11 - Warranties and liability

11.1 Warranties

11.1.2 Public liability insurance SVH ENERGIE carries public liability insurance.

11.1.2 Hidden defects warranty

To the extent that the Customer is considered a professional in the same speciality, action by the latter to enforce a hidden defects warranty against the Supplier pursuant to Articles 1641 et seq of the Civil Code, is limited to defects which appear within a period of six (6) months from the date on which the product risks transferred to the Customer, provided the Customer informed the Supplier thereof by letter in recorded delivery with acknowledgement of receipt within seven (7) days of the defect being discovered. It falls to the Customer to bring proof of the date on which the defect was discovered.

In case of these conditions not being met, the Customer may not rely on the hidden defects warranty against the Supplier.

In case of hidden defects affecting the products, the Supplier is bound only to replace or repair the products.

After the Supplier's prior written agreement allocating a return number, the products

must be returned to the Supplier in its premises and at its cost, with the corresponding invoice and a description of the defects found. Products thus returned will be tested by the Supplier to satisfy itself that the alleged defects are inherent in the products and that the defects are not connected to a cause outside the warranty. In the event the Supplier does not find any hidden defects or finds that the defects are connected to a cause excluded from the warranty, the Supplier will return the products to the Customer postage due and reserves the right to invoice it for the costs of the tests and other costs and expenses borne. If the Supplier confirms that there are hidden defects, it undertakes, at its discretion, to replace or repair the products within, respectively, three (3) and six (6) months. These time periods are supplied as an indication only and must be confirmed by the Supplier in writing.

In case it is impossible for the Supplier to replace or repair the defective products within a reasonable time-frame, beyond the time periods stated, the Supplier will inform the Customer who will be entitled to ask for the Contract to be cancelled.

11.2 Liability

Except in the event of gross or wilful negligence on the part of the Supplier, the Supplier excludes all liability towards the Customer connected with the sale of the products.

The Supplier excludes all warranty and liability in case of defect, damage, loss or deterioration of the products arising from (i) poor installation or use of the products, (ii) any conversion, removal, incorporation to other products or other modification made to the products by any person other than the Supplier itself, (iii) the failure to comply with the Supplier's instructions, (iv) abnormal storage conditions and/or conservation conditions of the products with effect from their delivery, and (v) shipment of the products.

The Supplier excludes all liability in respect of collateral damage to property.

## Article 12 - Allocation of jurisdiction and competence

Any dispute relating to the application of these general conditions of sale, to their interpretation, performance and to the contracts of sale entered into by our company, or to the payment of the price, will be of the exclusive competence of the courts in whose jurisdiction is situated the registered office of SVH ENERGIE, whatever the place of order, delivery, payment, the method of payment and even in case of action to enforce a guarantee or multiple defendants.

In case of court action or any other action to recover receivables by our company, the costs of writs and summons, of the courts, fees of lawyers and bailiffs as well as all related costs will be at the customer's charge.

## Article 13 - Waiver and Governing law

13.1 The fact of our company not relying at any given time on any of the clauses herein shall not be tantamount to waiver to rely on these same clauses subsequently.

13.2 Any question relating to these general conditions of sale as well as to the sales they govern that has not been covered by these contractual provisions shall be governed by French law, to the exclusion of all and any other law.



GSE INTEGRATION is a development program patented by  
the GROUPE SOLUTION ENERGIE

[www.segroup.fr](http://www.segroup.fr)

GROUPE **SOLUTION ENERGIE**

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