GENERAL®
MEMBRANE

GENERAL SOLAR PV®

INTEGRATED ROOFING SYSTEM FOR WATERPROOF AND ENERGY PRODUCTION

www.GeneralSolarPV.com

STOPPING THE WATER
CATCHING THE SUN

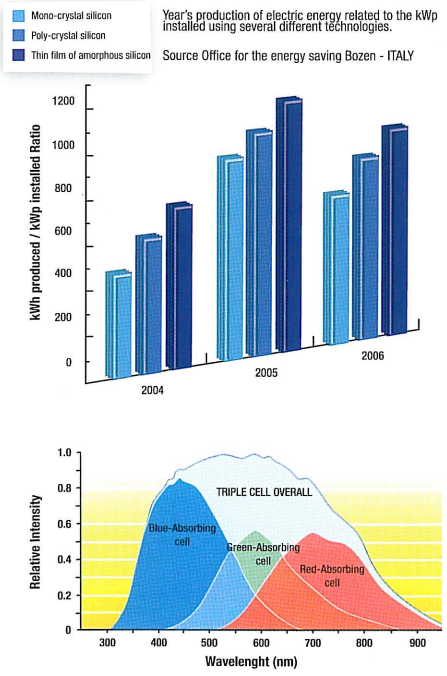
FERMIAMO L'ACQUA
CATTURIAMO IL SOLE

GENERAL SOLAR PV®

Nearly half of the **energy** of the world is generated from non-renewable fossil fuels and this is the main cause of CO2 emissions into the atmosphere. The **Kyoto agreement** established that at least the 20% of this energy must be made using **renewable sources by 2020**. The way to go is still long but **General SOLAR PV®** helps to achieve this ambitious environmental target, allowing for the exploitation of spaces, i.e. the roofs, un-used until now, in an easy and safe way for the production of **clean electrical energy**.

Commercial roof refurbishment with asbestos remediation, thermal insulation and double layer Phoenix SOLAR waterproofing system with twenty-years warranty. 19 kWp General SOLAR PV® building integrated photovoltaic system.

GENERAL SOLAR PV® IS THE NEW RANGE OF **BITUMINOUS PHOTOVOLTAIC WATERPROOFING FLEXIBLE MEMBRANES**, CAPABLE OF PRODUCING ELECTRIC ENERGY IN BOTH FLAT AND SLOPED ROOFS IN NEW OR REMEDIAL ROOFING. **WATERPROOFING** HAS UNTIL NOW BEEN THE MISSION PURSUED BY GENERAL MEMBRANE, WHEREAS TODAY THIS MISSION HAS BEEN ENLARGED: **TO UTILISE THE SUN**.



WATERPROOF

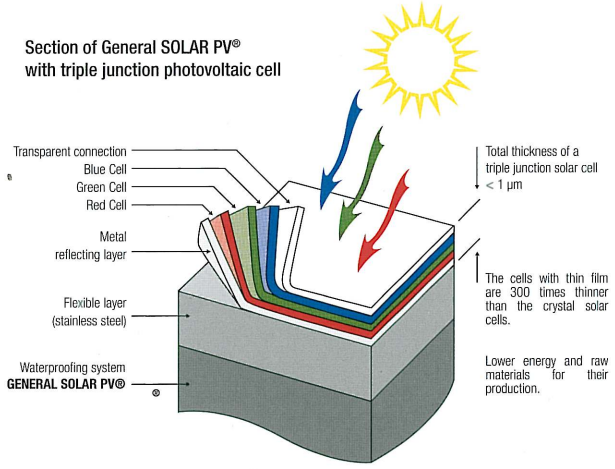
General SOLAR PV® is a high performance waterproofing system, exclusively utilising **PHOENIX SOLAR 20 years warranty** membranes. These membranes are made with special **APAO** polymeric modifiers of very high quality, giving excellent resistance to the ageing and exceptional resistance to heat absorption associated with solar gain. The system is **securely fixed** to the roof by conventional means but special attention is request for the dimensional stability of the system and its wind lift up resistance. The underlay will be PHOENIX SOLAR and the insulation, where required, can consist of PIR, rockwool or other materials having working temperature higher than 85°C. In the case of different materials (i.e. EPS) it will be protected with a recovery board of either CORK, PERLITE or FIBREBOARD to resist the extra heat gain the roof will be subjected to.

PHOTOVOLTAIC

The photovoltaic waterproofing system **General SOLAR PV®** utilises the UNI-SOLAR technology of **thin film triple junction amorphous silicon solar cells**. The blue , green and red component of the solar light spectrum is absorbed in a refracted way by the three different layers. For this reason the **highest productivity of energy is obtained** compared to the traditional rigid systems in poly or single crystal silicon placed in the same position, especially in conditions with **low levels of natural light**, of **indirect light** or in conditions where light is obscured by cloud or mist etc. Furthermore the production of clean energy is improved by the effect of solar gain on the roof, which increases the working temperature of the whole waterproofing system, thereby giving a better performance when compared against traditional systems when viewed over a period of a year.

The photovoltaic cells of **General SOLAR PV®** are **very light** (3, 5 kg/sq.m.) **shatter proof** and **resistant to hail** (they are not coated with glass but with cellular anti-stick and self-cleaning Teflon), they are **flexible** and therefore perfectly suitable for the use on all kinds of roofs, **without** any particular requirement regarding **orientation**, **inclination**, shading, supports / plinths or ventilation. The **longevity** of the cells is **exceptional**, and the by-passing integrated diodes in **General SOLAR PV®** are connected to every single cell, allowing the modules to produce electricity even when they are dirty or heavily shaded.

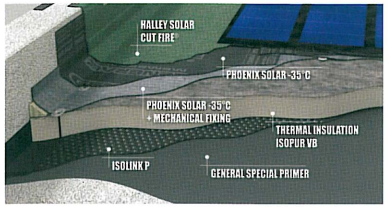
Section of General SOLAR PV® with triple junction photovoltaic cell



UNI-SOLAR®
United Solar Ovonic

THE **GENERAL SOLAR PV®** SYSTEM IS BETTER THAN TRADITIONAL PHOTOVOLTAIC ALTERNATIVES, WHICH DISREGARD THE WATERPROOFING OF THE ROOF ON WHICH THEY ARE INSTALLED. OUR AIM **TO WATERPROOF AND THERMALLY INSULATE** A ROOF, IS NOW **COMBINED** WITH AN ADVANTAGE OF **CLEAN ELECTRICAL ENERGY PRODUCTION**.

GEN
MEMB



A COMPLETE SYSTEM

General SOLAR PV® System is a **unique and integrated solution** for the essential needs of a roof: high quality waterproofing, thermal insulation meeting local standards and efficient production of clean electrical energy.

EASY TO APPLY

EXISTING ROOFS

Easy installation of **General SOLAR PV®** on **special membrane** as link to the existing roof

- **BiPV** - building integrated photovoltaic system
- simple and economic
- optimal solution for the waterpoofing, with no drills or heavy support structures required

BEFORE

EXISTING ROOF WITH BITUMINOUS WATERPROOFING MINERAL MEMBRANE

AFTER

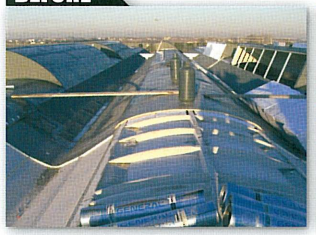
APPLICATION OF GENERAL SOLAR PV® ON THE EXISTING ROOF, WITHOUT DRILLING THE ROOF

COPERTURE NUOVE:

Phoenix SOLAR double layer waterproofing system with twenty-years guarantee. The system comes with a Declaration of Conformity by General Membrane

- **BiPV** - building integrated photovoltaic system
- top quality waterproofing solution, twenty-years guarantee
- both photovoltaic and waterproofing application is offered by the same company

BEFORE



NEW BEAM, COUPEL AND SHED PREFABRICATED ROOF: WATERPROOFING WITH THERMAL INSULATION

AFTER

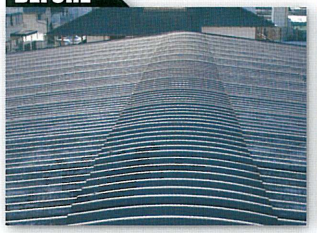
GENERAL SOLAR PV® BUILDING INTEGRATED PHOTOVOLTAIC SYSTEM LAYED ON COUPEL AND SHED

REMEDIAL ROOFING

Separation layer **ISOLINK**, **Phoenix SOLAR** double layer waterproofing system (twenty-years guarantee). The system comes with a Declaration of Conformity by General Membrane

- **BiPV** - building integrated photovoltaic system
- top quality waterproofing solution, twenty-years guarantee
- both photovoltaic and waterproofing application is offered by the same company
- asbestos remediation

BEFORE



EXISTING ASBESTOS ROOF WITHOUT THERMAL INSULATION

AFTER

ROOF REMAKE (WATERPROOFING, THERMAL INSULATION AND ASBESTOS REMEDIATION) WITH GENERAL SOLAR PV® SYSTEM

PERFECT ARCHITECTURAL INTEGRATION AND HIGHEST GOVERNEMENT INCENTIVES

The perfect integration of **General SOLAR PV®** on the roof achieves the **highest economical advantages** in terms of tax incentives and grants that may be available locally. The system is suitable for use in the **Public** and **Private** sectors.

EXAMPLE OF YIELD

Proposed on the installation of **General SOLAR PV®** of 200 kWp on roof of 4500 sq.m, simulation for three climatic areas.

	LONDON	ROME	CAIRO
Power installed – A	200 kWp	200 kWp	200 kWp
Yield per climatic zone – B	799 kWh	1260 kWh	1578 kWh
Year production – AxB	159.800 kWh	252.000 kWh	315.600 kWh

THE CERTIFICATION MARK FOR ONSITE SUSTAINABLE ENERGY TECHNOLOGIES

APPROVED PRODUCT

MCS

BRE GLOBAL LISTED

Certificate Number MCS PV0045
Photovoltaic Modules

NOLA - 25 MWp **THE WORLD'S LARGEST PHOTOVOLTAIC INTEGRATED ROOFING SYSTEM**

Stopping the Water and Catching the Sun in Nola (Naples) with the world's largest integrated roofing system for waterproofing and energy production. 25 MWp installed that will produce 33 million kW/h (equivalent to 13.000 households).

RANE

ADVANTAGES OF General SOLAR PV®

- Flexibility
- More Kwh Higher RoI
- High Temp Performance
- Shadow Tollerant
- Lightweight
- Walkable for Maintenance
- BIPV Roof Integrated
- Without Glass
- Hail Resistante
- Waterproofing
- No Holes on the Roof
- Ecological
- Selfcleaning
- No Support Structures

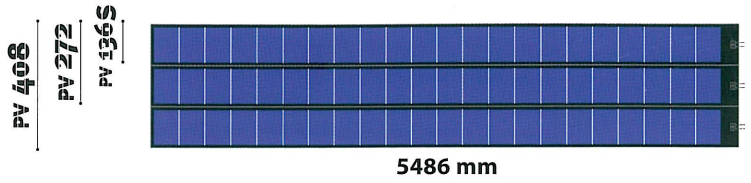
GENERAL SOLAR PV®- TECNICAL DATA SHEET

GENERAL SOLAR PV® LONG STRIPES

408 Wp per module - 3 long stripes
measures: **5486 x 1200 x 7 mm** - area: **6,58 mq**

136 Wp per module - 1 long stripes
measures: **5486 x 400 x 7 mm** - area: **2,19 mq**

272 Wp per module - 2 long stripes
measures: **5486 x 800 x 7 mm** - area: **4,39 mq**



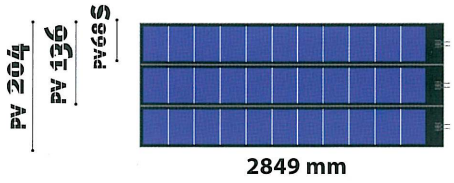
5486 mm

GENERAL SOLAR PV® SHORT STRIPES

204 Wp per module - 3 short stripes
measures: **2849 x 1200 x 7 mm** - area: **3,42 mq**

136 Wp per module - 2 short stripes
measures: **2849 x 800 x 7 mm** - area: **2,28 mq**

68 Wp per module - 1 short stripes
measures: **2849 x 400 x 7 mm** - area: **1,14 mq**



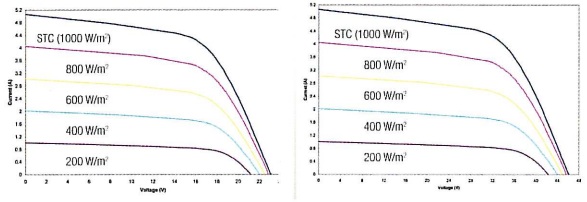
2849 mm

NEW MODULES AVAIBLE: GENERAL SOLAR PV® 432, 288 e 144 S

(from June 2011 new PowerBOND version with 7,2% higer efficiency will be available)

Scheda Tecnica Celle Solari UNI-SOLAR® a tripla giunzione film sottile silicio amorfo	1 stringa lunga 5486 mm - 22 celle		1 stringa corta 2849 mm - 11 celle	
	Specifiche STC	**Specifiche NOTC**	**Specifiche STC**	**Specifiche NOTC**
Potenza massima stringa (P_{max}):	136 Wp	105 Wp	68 Wp	53 Wp
Tolleranza di produzione:	± 5%	± 5%	± 5%	± 5%
Tensione con P_{max} (V_{mp}):	33,0 v	30,8 v	16,5 v	15,4 v
Corrente con P_{max} (I_{mp}):	4,1 A	3,42 A	4,1 A	3,42 A
Corrente di corto circuito (I_{sc}):	5,1 A	4,1 A	5,1 A	4,1 A
Tensione a circuito aperto (V_{oc}):	46,2 V	42,2 V	23,1 V	21,1 V
Corrente consentita tramite fusibile:	8 A	-	8 A	-
NOTC:	-	46°C	-	46°C
Coefficienti di Temperatura Con AM1.5, potenza di irraggiamento 1000 W/mq				
Coefficiente di temperatura I_{sc}:	5,1 mA/K (0,10%/°C)		5,1 mA/K (0,10%/°C)	
Coefficiente di temperatura V_{oc}:	-176 mV/K (-0,38%/°C)		-88 mV/K (-0,38%/°C)	
Coefficiente di temperatura P_{max}:	-286 mW/K (-0,21%/°C)		-143 mW/K (-0,21%/°C)	
Coefficiente di temperatura I_{mp}:	4,1 mA/K (0,10%/°C)		4,1 mA/K (0,10%/°C)	
Coefficiente di temperatura V_{mp}:	-102 mV/K (-0,31%/°C)		-51 mV/K (-0,31%/°C)	

Curve caratteristiche V-I con diversi livelli di irraggiamento (con AM1.5 e temperatura celle 25°C)



Specifiche Tecniche STC: Condizioni di verifica standard - 1000 W/mq, AM1.5, temperatura celle 25 °C
Specifiche Tecniche NOTC: Nominal Operating Cell Temperature 800 W/mq, AM1.5, 1m/sec. vento

- General SOLAR PV meets IEC 61646 and IEC 61730 Requirements
- 25 year warranty on Power output at 80%
- Solar cells thin film triple junction amorphous silicon serially connected with bypass diodes for shadow tolerance and working even in case of damage of the single cell
- Elevated production of energy even with high working temperature and low radiation (diffused light)
- Light weight of the module: 7 kg/sq.m. Light weight of the solar cell: 3,5 kg/sq.m.
- Output cables 560mm with rapid connections Multi-Contact®
- UL Listed to 600 VDC

Contact us at export@generalmembrane.it for any information

AXTER
Axter Ltd, West Road, Ransomes Europark, Ipswich IP3 9SX
Tel 01473 724056, Fax 01473 723263
Email info@axterltd.co.uk
www.axter.co.uk

Notes:
1. During the first 8-10 weeks of operation, electrical output exceeds specified ratings. Power output may be higher by 15%, operating voltage may be higher by 11% and operating current may be higher by 4%.
2. Electric specifications (±5%) are based to measurement made in conditions of standard test (radiation power 1000 W/sq.m, AM1.5 temperature cells 25°C) after stabilization.
3. Actual performance may vary up to 10% from rated power due to low temperature operation, spectral and other related effects. Maximum system open-circuit voltage not to exceed 600 VDC per UL.
4. Specifications subject to change without notice.

GENERAL SOLAR PV®

INTEGRATED ROOFING SYSTEM FOR WATERPROOF AND ENERGY PRODUCTION

www.generalsolarpv.com

pv@generalmembrane.it

GENERAL® MEMBRANE

General Membrane Spa - www.generalmembrane.it
Via Venezia 28 - 30022 Ceggia (VE) ITALY - T. +39. 0421.322000

concept: Area Marketing General Membrane - MB