




BROWARD COUNTY

Board of Rules & Appeals

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<http://www.broward.org/codeappeals.htm>

TO: All Building Officials
FROM: 
James DiPietro, Administrative Director
DATE: May 15, 2009
SUBJECT: Solar Thermal and Solar Electric Installations

Please find enclosed three (3) Solar Thermal and Solar Electric Installations related documents effective May 15, 2009.

- A. Board Policy 09-02 Broward County Board of Rules and Appeals Administrative Guidelines for Processing Solar Thermal/Electric Permits.
- B. Broward County Board of Rules and Appeals' staff recommendation: Guideline for Expedited Permit Process for Small-Scale, Single Phase Electrical PV Systems.
- C. Formal Interpretation, #21, Rooftop Clearance Requirements Section 1522.3, 1522.3.1 and the FRC Section 4402.11.3 and 4402.11.3.1

Should additional technical information be desired, please contact:

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JDP/ck

Subject: Administrative Guidelines for Processing Solar Thermal/Electric Sub-Committee

- A.) Adopt the Solar Thermal and Solar Electric Matrix as a "BCBRA Approved Guideline" establishing minimum code requirements regarding permit application submittals, thereby creating and instituting countywide uniformity.
- B.) Building Departments shall establish an individual master permit for both Solar Thermal and Solar Electric installations to which applicable subsidiary categories are to be tied. Adding additional categories to the master permit may not require an additional permit obtained by a separate contractor, but will require a separate trade review in every instance.
- C.) It is established that Certified Solar Contractors may obtain the master permit in either the Solar Thermal or Solar Electric categories. Certified or Registered Plumbing Contractors may obtain the master permit in the Solar Thermal category. Certified or Registered Electrical Contractors may obtain the master permit in the Solar Electric category. Registered Solar Contractors may obtain the master permit in the solar thermal category, restricted to residential installations only. Each of these contractors may perform all work identified in their individual scopes of work including the installation of appurtenances, apparatus, or equipment. However, such contractor shall subcontract all other work which is specified as being the work in the trade of another contractor.
- D.) Building Departments shall provide inspections of solar thermal and solar electric systems. More than one inspection may be performed during any inspection visit.

Solar Thermal

Building/Structural/Roofing – Time of Installation and Final

Plumbing – Final

Solar Electric

Building/Structural/Roofing – Time of Installation and Final

Electrical – Rough and Final

Hybrid Systems (Complete PV Panel System combined with integral solar water panels)

Building/Structural/Roofing – Time of Installation and Final

Electrical – Rough and Final

Plumbing – Final

**Effective Date
May 15, 2009**

- E.) The Board recommends Building Departments establish an inspection procedure to ensure all required inspections are completed within a specified two hour timeframe.**
- F.) Recommend that Building Departments include an Owner notification on all solar thermal or solar electric permit applications, for existing structures, using substantially the language provided below:**

"Installation of roof mounted photovoltaic or solar support systems typically require roof system penetrations to allow attachment to the structure which may create additional long-term roof system maintenance requirements and/or jeopardize roof system manufacturer's warranties. Roof mounted solar systems generally require removal and reinstallation of solar panels/arrays in order to perform routine roof system maintenance, repair or replacement."

- G.) The Board recommends building departments maintain accurate records regarding the type, number and the location of solar energy installations.**
- H.) Recommend and encourage Building Departments to expand access of renewable energy technology to the community, by not imposing needless or excessive oversight measures and through a program of streamlined permitting and inspections.**
- I.) Recommend and encourage Manufacturers to pursue optional product approval as a means of accelerating the permit approval process by ensuring a less complicated and less expensive process for consumers.**
- J.) BCCO to continue the ongoing awareness program designed to ensure all certified personnel understand the process of permitting and inspecting Solar Thermal and Solar Electric installations.**
- K.) BCCO will provide guidance and assistance to the Solar Energy industry, provide mediation, and assist with the BORA appeal process as necessary.**

UNIFORM PERMIT SUBMITTAL MATRIX
for
SOLAR THERMAL AND SOLAR ELECTRIC INSTALLATIONS
in
THE HIGH VELOCITY HURRICANE ZONE

General Requirement	Submittal Requirements	F.S./Code Section
1. Permit Application		
		FBCB 105.3 BCAP 105.3
2. Building/Equipment Layout Plan		
		FBCB 106 BCAP 106
3. Structural Design		
<ul style="list-style-type: none"> Photovoltaic Roof Mounted Panel & Solar Thermal Equipment 	Submit signed and sealed drawings & design calculations by licensed Professional Engineer or Registered Architect showing: <ul style="list-style-type: none"> Documentation/verification exposed solar panel equipment meet wind loads. Documentation/verification support framing meets both uplift and lateral forces. Design of connections for the wind loads. Documentation/verification structural supports will accommodate additional dead loads. 	FBCR4402.11.2 FBCEB 404 FBCR4403.1.2 FBCEB 707 FBCR4403.7.8 FBCR4403.9.1 FBCR4403.9.2 FBCR4403.9.3 FBCR4403.10 Note: Dead load compliance with the Exception contained in FBCE Section 707.4.1 may be demonstrated by providing Dead Load criteria from the original plans.
4. Roof Design		(FEBC 611 References Sec. 1512-1525 FBC)
<ul style="list-style-type: none"> Building Integrated Photovoltaic (BIPV) 	Submit a Uniform HVHZ Permit Application.	FBCR4402.1.3 FBCB 1512.3 FBCR4402.1.2.1 FBCB 1512.2.1 FBCR4402.5.2 FBCB 1516.2
<ul style="list-style-type: none"> Photovoltaic Roof Mounted Panel 	Submit a detail of the roof penetration flashing Submit clearance requirements.	FBCR4402.3 FBCB 1514 FBCR4402.11.3.1 FBCB 1522.3.1
<ul style="list-style-type: none"> Solar Thermal 	Submit a detail of the roof penetration flashing. Submit clearance requirements.	FBCR4402.3 FBCB 1514 FBCR4402.11.3.1 FBCB 1522.3.1

5. System Components		
<ul style="list-style-type: none"> Solar Water Heater 	Submit FSEC Approval/Listing and System Reference Drawing.	FBCB 101 FBCR N1112 BCAP 101
<ul style="list-style-type: none"> Solar Water Heater using a PV powered pump 	Submit listing for PV panel and pump.	NEC Article 690
<ul style="list-style-type: none"> Solar Swimming Pool Water Heater 	Manufacturers selected system installation manual/detail and system specifications.	FBCB 106 BCAP 106
<ul style="list-style-type: none"> Solar Swimming Pool Water Heater 	Submit FSEC Approval/Listing and System Reference Drawing.	FBCB 101 F.S. 377.705 BCAP 101
<ul style="list-style-type: none"> Photovoltaic System Electrical Engineer Requirements 	Plans must be signed and sealed by a Professional Engineer if: a.) The system has a value of more than \$50,000, or; b.) The systems has an aggregate service capacity of 600 amperes (240 volts) or more for a residential electrical system, or; c.) The system has an aggregate service capacity of 800 amperes (240 volts) or more for a commercial or industrial electrical system.	F.S. 471.003(h)
<ul style="list-style-type: none"> Statutory Requirement 	FSEC will generate a System Certification Approval Form.	F.S. 377.705
<ul style="list-style-type: none"> Electrical Diagram 	Submit electrical diagram designed in accordance to the National Electrical Code Article 690 Solar Photovoltaic Systems, in its entirety.	NEC Article 690
<ul style="list-style-type: none"> Component Documentation 	FSEC Certification.	F.S. 377.705 NEC 110.3(B)
Abbreviations	BCAP - Broward County Administrative Provisions FBCB - Florida Building Code, Building Volume FBCEB - Florida Building Code, Existing Building Volume FBCR - Florida Building Code, Residential Volume F.S - Florida Statute FSEC - Florida Solar Energy Center NEC - National Electric Code	

**Broward County Board of Rules and Appeals
Staff Recommendation
Guideline for Expedited Permit Process for Small-Scale, Single Phase
Electrical PV Systems**

The information in this guideline is intended to help local jurisdictions and contractors identify when Electrical PV system installations are simple, needing only a basic review, and when an installation is more complex. It is likely that 50%-75% of all residential systems will comply with these simple criteria. For projects that fall to meet the simple criteria, refer to Uniform Permit Matrix for Solar Thermal and Solar Electrical Installations in the High Velocity Hurricane Zone.

Required Information for Permit:

1. Electrical diagram showing PV array configuration, wiring system, overcurrent protection, inverter, disconnects, required signs, and ac connection to building (see supplied standard electrical diagram).
2. Specification sheets and installation manuals (if available) for all manufactured components including, but not limited to, PV modules, inverter(s), combiner box, disconnects, and mounting system.

Step 1: Electrical Review of PV System (Calculations for Electrical Diagram)

In order for a PV system to be considered for an expedited permit process, the following shall apply:

1. PV modules, utility-interactive inverters, and combiner boxes are identified for use in PV systems.
2. The PV array is composed of 4 series strings or less, and 15 kW_{STC} or less.
3. The inverter has a continuous power output 13,440 Watts or less
4. The ac interconnection point is on the load side of service disconnecting means (690.64(B)).
5. The electrical diagram (E1.1) can be used to accurately represent the PV system.

Fill out the standard electrical diagram completely. A guide to the electrical diagram is provided to help the applicant understand each blank to fill in. If the electrical system is more complex than the standard electrical diagram can effectively communicate, provide an alternative diagram with appropriate detail.

Design Temperatures For Various U.S. Cities

The following table indicates the 2% design temperature (averaged for June-August) for various cities; and the lowest expect ambient temperature [690.7] for each location (Min Mean Extreme Annual DB). The first column is elevation of the station for comparing climates with locations not listed. Column two represents the ASHRAE 2% design temperature(1). The third through sixth column is the resultant ambient temperature inside the conduit-unloaded(2). It is the temperature the wire is subjected to. The last column is the lowest expect ambient temperature for that city, based on 30 years of weather data. This is the temperature to be used for maximum voltage calculations in NEC 690.7. All temperatures in Celsius.

State	Station	Elev (M)	High	Temp. in Conduit in Sunlight (°C)				Extreme Annual DB	
			2%	Distance above roof.				Mean	
			DB	0"-0.5"	0.5"-3.5"	3.5"-12"	12"-36"	Max	Min
FL	FORT LAUDERDALE HOLLYWOOD	3	34	67	56	51	48	36	4

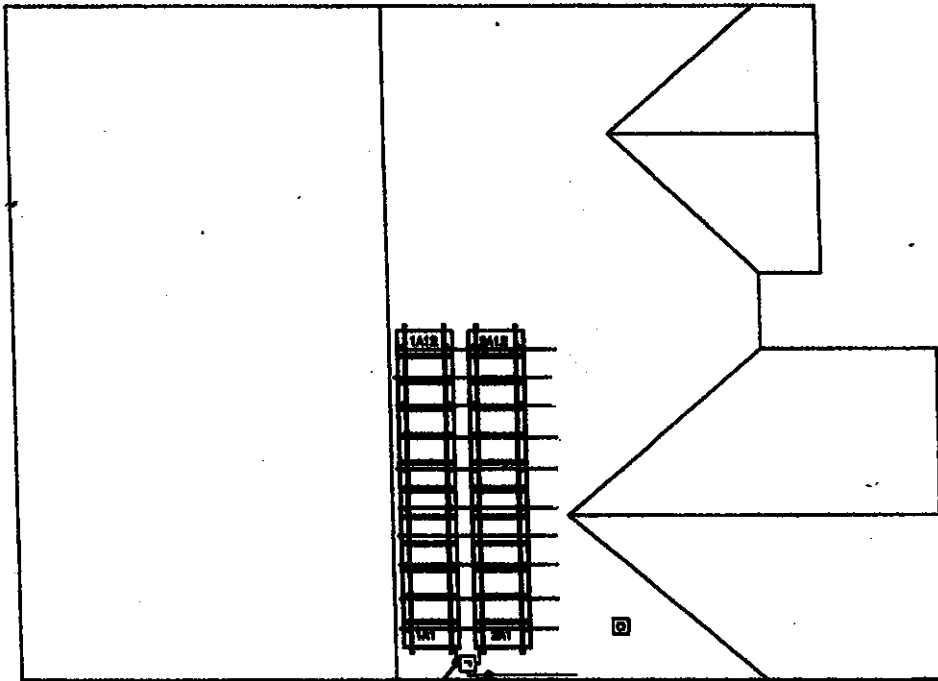
PV ARRAY LAYOUT & WIRING PLAN

ARRAY CONDUIT & WIRING ARRANGEMENT

1. FREE-AIR / 1/2 inch Conduit Sleeve**
(2) #12 AWG; R, W
2. To DC Disconnect
1/2 inch Conduit
(4) #12 AWG: (2)R, (2)W
(1) #8 GND

** Sleeve provides protection from physical Damage per NEC 300.13 & 300.18

All installations shall comply with Manufacturer's Installation Instructions.



CUSTOMER NAME

ADDRESS

DESIGNED BY	?	CHECKED BY	?
SCALE	1/8" = 1'	DATE DRAWN	?


COMPANY LOGO	COMPANY NAME
	ADDRESS



BROWARD COUNTY BOARD OF RULES AND APPEALS

FORMAL INTERPRETATION

TO: All Building Officials

FROM: 
James DiPietro, Administrative Director

DATE: May 14th, 2009

SUBJECT: Rooftop Clearance Requirements- Section 1522.3, 1522.3.1 and
the FRC Section 4402.11.3 and 4402.11.3.1

At its meeting of May 14, 2009, the Board approved an interpretation of the 2007 FBC Sections 1522.3, 1522.3.1 and the FRC Sections 4402.11.3 and 4402.11.3.1

The ROOFTOP CLEARANCE REQUIREMENTS FOR PERMANENTLY MOUNTED EQUIPMENT as specified in FBC Section 1522.3, 1522.3.1 and the FRC Section 4402.11.3, 4402.11.3.1 are not intended to be applied to rooftop mounted solar thermal or solar electric installations.

EFFECTIVE DATE: MAY 15, 2009

*******PLEASE POST AT YOUR PERMIT COUNTER*******

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