WIND MITIGATION DISCOUNT PLAN

Louisiana Hurricane Loss Mitigation Survey Form Inspector Instructions

The purpose of these instructions is to provide guidance to certified inspectors on how to properly complete the Louisiana Hurricane Loss Mitigation Survey Form (Survey Form). The purpose of the Survey Form is to document the physical features and design information that may influence the wind-resistance of an insured structure. This information will be used to determine if an insurance discount is applicable. Determining the appropriate level of discount relies on the accuracy of this inspection!

The inspection shall be conducted on the dwelling only. Detached accessory buildings, such as detached garages, sheds, or barns do not qualify for this discount program.

The Louisiana Hurricane Loss Mitigation Survey Form and Supplemental Question 10a must both be fully completed (all questions answered) in order for the structure to be considered for an insurance discount.

The Survey Form requires an on-site inspection of the dwelling, a review of construction documents kept on file at a municipal or parish building department, documentation from contractors who have performed work on the structure, photographs, or some combination of these data collection methods.

⚠ VERIFICATION REQUIRED!

The answers to the questions must be verified through the processes noted in these instructions. Making a "best guess" on concealed items (e.g. roof deck attachment) or design items is NOT acceptable. If the building element/attribute cannot be confirmed, answer the question as "Unknown or Unidentified." This answer is available on all questions except for Question #7 (Roof Geometry).

For each question, the type of acceptable confirmation required from the inspector is identified. For some questions, SUBMISSION OF ADDITIONAL DOCUMENTATION is required.

NOTICE TO THE INSPECTOR:

Before starting the inspection, confirm that you meet the inspector qualifications of the State of Louisiana as indicated in Section III of the Louisiana Hurricane Mitigation Survey Form. By signing the Survey Form, you certify that you meet the inspector qualifications.

QUESTION 1 – BUILDING CODE

Coordination: The answer to Question #1 must be compatible with the answer to Question #13 (See the Coordination text box under Question #13 instructions for an explanation).

For dwellings completed in 2007 or earlier, answering Question #1 will require confirmation through records at the local code enforcement office.

The building code can be confirmed by reviewing the building permit application or indications on the design documents (house plans). A building permit application with a date of January 1, 2007, or later may be considered as being built to the Louisiana State Uniform Construction Code (LSUCC).

The building permit application date is not to be confused with the building permit issuance date. The building permit issuance date has no bearing on what building code was used for design.

If the structure was built to a prior code, but the dwelling was completely retrofitted to meet the wind load design requirements of the LSUCC, the dwelling is considered to be built to the LSUCC wind requirements. However, building permit application date for the wind design retrofit must be January 1, 2007, or later.

For dwellings completed in 2008 or later, since the effective date of the LSUCC is January 1, 2007, the inspector may assume the dwelling is built to the LSUCC.

The IBHS Fortified . . . for Safer Living® program is a "code plus" program developed by the Institute for Business and Home Safety for the purpose of building stronger homes. If the house is identified as an "IBHS Fortified" structure on the Survey Form, the inspector must attach a copy of the IBHS certification document.

The IBHS Fortified certification may be obtained from the Institute for Business and Home Safety by calling (813) 286-3400.

⚠ VERIFICATION REQUIREMENTS FOR QUESTION #2:

The inspector shall confirm the answer to Question #1 as follows:

- To indicate what building code was used, the inspector shall:

  1) **Review of Construction Documents**: For homes completed in 2007 or earlier, review the design documents (house plans) to confirm the building code used, or review the building permit application document and confirm the application date. A building permit application date of January 1, 2007, or later indicates "LSUCC." December 31, 2006, or earlier indicates "Built to another code."

  2) **Assumption Based on Year Built**: For homes completed in 2008 or later, the inspector may indicate "LSUCC" on this question, unless available information indicates otherwise.

- To indicate the dwelling is an IBHS . . . Fortified for Safer Living® structure, the inspector shall:

  1) SUBMIT a copy of the IBHS certificate attached to the Survey Form.

If none of this information is found or available, the inspector shall answer "**D - Unknown, unidentified, or no code.**"

QUESTION 2 – BASIC WIND SPEED

The basic wind speed is the wind speed to which the structure and cladding on the home has been designed.

The basic wind speed may be obtained from the design documents (house plans) on file at the local code enforcement office.

The basic wind speed is to be indicated on this form as a 3-second gust speed. If the basic wind speed is indicated on the design documents in fastest mile units, it is acceptable to convert to 3-second gust by multiplying the fastest mile basic wind speed by a factor of 1.2. For example, if the basic wind speed is 100-mph fastest mile, this would convert to 120-mph 3-second gust.

If the basic wind speed is not indicated on the design documents or the design documents are not available, the basic wind speed shall not be assumed based on location except as provided in item 2 of the Verification Requirements below.

⚠ VERIFICATION REQUIREMENTS FOR QUESTION #2:

Because it is design information not available on-site, the inspector shall determine the Basic Design Wind Speed using one of the following methods:

1) **Review of Construction Documents**: The inspector shall confirm the Basic Design Wind Speed from design documents on file at the local code enforcement office.

2) **Louisiana State Uniform Construction Code Council Web Site**: For dwellings built to the LSUCC, if the design documents do not exist, or the Basic Design Wind Speed is not indicated on the documents, the inspector may assume the Basic Design Wind Speed based on LSUCCC information using the geographic location of the dwelling. http://www.dps.louisiana.gov/lsuccc/windspeed.html

3) **Fortified . . . for Safer Living® Certificate**: For dwelling built to the Fortified standard, the inspector shall confirm the Basic Design Wind Speed with IBHS.

For dwellings not built to the LUSCC, if the Basic Design Wind Speed cannot be confirmed, the inspector shall answer this question "**I - Unknown, unidentified, or no Basic Wind Speed**."

QUESTION 3 – EXPOSURE CATEGORY

Exposure category indicates the type of surrounding terrain used in the structural design for wind loads. The exposure category may be obtained from the design documents on file at the local code enforcement office.

The exposure category used for the design of the dwelling shall be as defined by ASCE 7. It is not to be an assessment of the existing conditions at the site.

⚠ VERIFICATION REQUIREMENTS FOR QUESTION #3:

Because it is design information not available on-site, the inspector shall confirm the Exposure Category used for design using the following method:

Review of Construction Documents: The inspector shall confirm the Exposure Category from design documents on file at the local code enforcement office.

If the design documents do not exist, or the Exposure Category is not indicated on the documents, the inspector shall answer this question "**Unknown, unidentified, or no Exposure Category**."

It is not acceptable to assume the Exposure Category based on the geographic location of the dwelling or an assessment by the inspector of the existing conditions at the site.

QUESTION 4 – SECONDARY ROOF WATER INTRUSION SYSTEM

A Secondary Roof Water Intrusion System may reduce interior water damage during high wind storms. Its purpose is to prevent rainwater from entering the attic and living spaces if the roof covering is blown off.

A secondary roof water intrusion system is intended to be used with wood roof decks. Secondary roof water intrusion systems are not compatible with other types of roof decks such as spaced batten boards with no continuous solid roof deck (sometimes used under wood shingles), metal roof decks, precast concrete roof decks, or reinforced concrete roof decks.

There are three types of secondary roof water intrusion systems.

a) On top of roof deck – Approximately 5" wide strips of self-adhering bitumen flashing installed over all joints in the plywood or OSB roof deck. This would not be compatible with dimensional lumber roof decks. **See Figure 4.1**.

b) On the underside of the roof deck – Sprayed-on foam insulation applied at all joints in the plywood or OSB roof deck, including at trusses or rafters. **See Figure 4.2**. This would not be compatible with dimensional lumber roof decks. The foam insulation shall be urethane-based closed cell spray-on adhesive.

c) On top of roof deck – Installing self-adhering bitumen sheets over the entire roof deck. This would be compatible with dimensional lumber, plywood, and OSB roof decks.

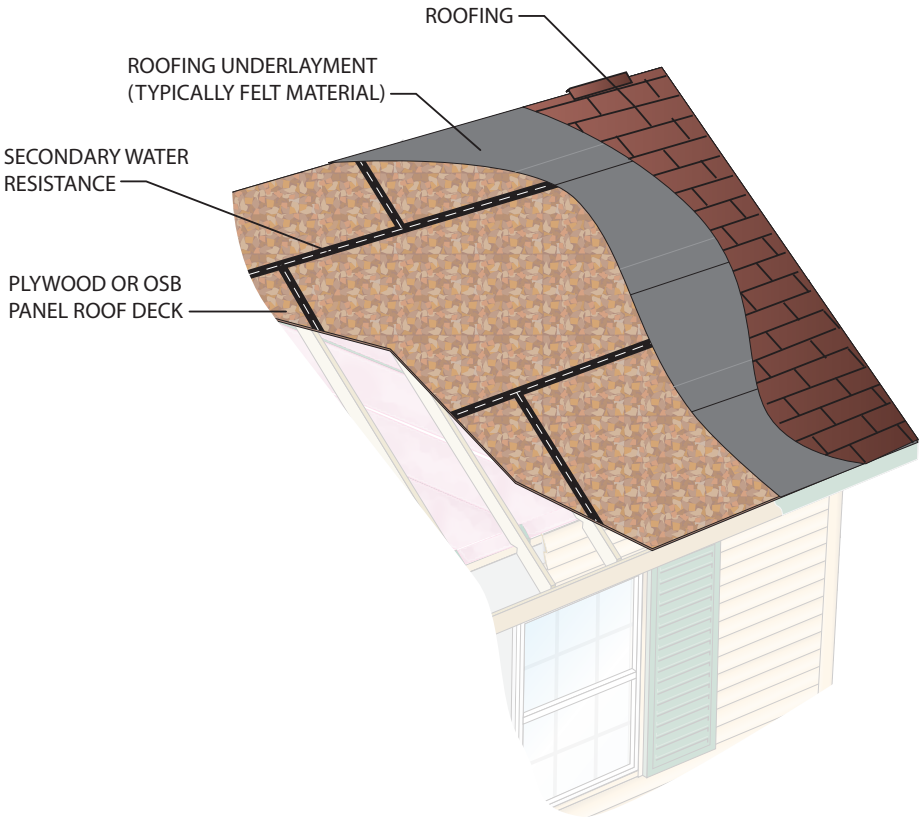


FIGURE 4.1 – SECONDARY WATER RESISTANCE SYSTEM
(Self-Adhering Bitumen Flashing Installed on Top of Roof Deck)

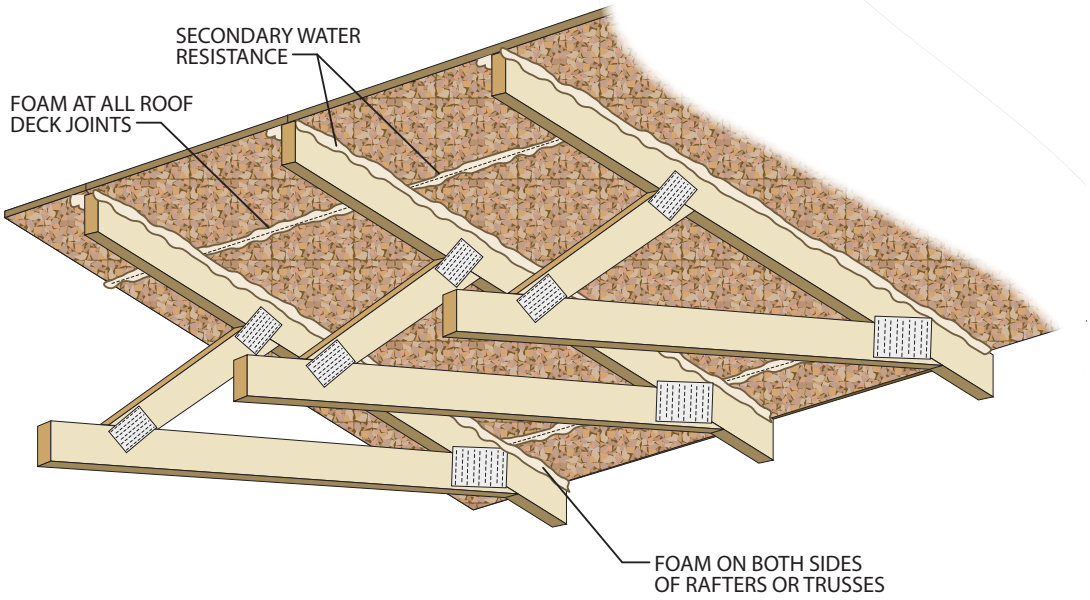


FIGURE 4.2 – SECONDARY WATER RESISTANCE SYSTEM
(Spray-On Foam Installed on Underside of Roof Deck)

The secondary roof water intrusion system must be applied to the entire roof deck. If the system is not applied to the entire roof deck, including unfinished spaces, answer "No" on the survey form.

Roofing underlayment, which is not self-adhered, is NOT considered a secondary roof water intrusion system because roofing underlayment can blow off during a windstorm.

The secondary roof water intrusion system must be installed by a licensed professional.

⚠ VERIFICATION REQUIREMENTS FOR QUESTION #4:

Because secondary water intrusion systems are either concealed after the roof covering system is installed or difficult to verify due to inaccessible attics, the inspector shall confirm the existence of a complete secondary water resistance system by one or more of the following methods:

1) **Confirmation by Installing Contractor**: Confirmation may be based on a letter from the installing contractor or an invoice from installing contractor which:

- Identifies the manufacturer and product used for the secondary water intrusion system
- Verifies that it is installed at every roof deck panel joint over all conditioned and unconditioned spaces

The product identified by the contractor must meet the requirements of the secondary water intrusion system as indicated in these instructions.

2) **Visual Inspection (During Installation)**: On-site visual inspection during installation while the secondary water resistance system is exposed to view.

Confirming the existence of secondary water intrusion systems by looking at photographs is NOT acceptable.

QUESTION 5 – EXTENT OF WINDBORNE DEBRIS PROTECTION

Coordination: Answers to Questions #5 & #6 must agree with one another. Question #5 cannot be answered "A, B, C, D, or E" when Question #6 is answered "X." If this is the case, one of these two questions is answered incorrectly.

The purpose of this question is to determine to what extent windborne debris protection is provided on the home.

All "building envelope openings" must be considered when answering this question. Building envelope openings include glass block windows, windows, swinging doors (with and without glass), sliding glass doors, garage doors (with and without glass), skylights, and door sidelights. Do not consider vents and louvers as building envelope openings.

If there are attached screened porches or lanais, any windows or doors inside of the screened area are considered building envelope openings.

If opening protection is not permanently installed, it will be necessary to physically locate all devices used for the windborne debris protection system and match them to all protected openings by size and quantity.

Non-operating, decorative shutters are not acceptable windborne debris protection.

⚠ VERIFICATION REQUIREMENTS FOR QUESTION #5:

Visual Inspection (On-Site): The inspector shall physically verify the existence or absence of windborne debris (opening) protection at all openings.

- If the opening protection is permanently installed, the inspector shall verify its proper operation.
- If the opening protection is not permanently installed, the inspector shall match up the opening protection with the openings to confirm proper size and quantity.
- If the opening protection is in the form of impact-resistant doors or windows, the inspector shall physically locate product labels or product data that positively identifies the doors and/or windows to have passed windborne debris impact tests using 9-lb. missiles.

QUESTION 6 – TYPE OF WINDBORNE DEBRIS PROTECTION

Coordination: The answer to Question #6 must be compatible with the answer to Question #5 (See the Coordination text box under Question #5 instructions for an explanation).

There are all kinds of windborne debris protection. There are untested devices and tested devices. "Tested" means the product has undergone standardized testing, such as ASTM E1886 and E1996, or Miami-Dade Code Compliance Office TAS 201 and TAS 203.

ASTM E1996 and TAS 201 are missile impact tests. ASTM E1886 and TAS 203 are cyclic pressure loading tests.

Windborne debris protection can take the form of storm panels (which are not permanently installed), hurricane shutters (which are permanently installed), and impact-resistant window/skylight/door products.

The purpose of Question 6 is to indicate the weakest type of windborne debris protection used on the structure. The types of protection are listed on the Survey Form from strongest to weakest.

In order to answer Question 6 as "**A**," all windborne debris protection must have passed the impact testing with a minimum of a 9-lb. missile and be approved for use as windborne debris protection by least one building code product approval system. Currently, only two product approval systems exist with these types of products listed. These are the Florida Product Approval System and the Miami-Dade County Code Compliance Office Product Approval System.

There are different missile sizes and speeds used for ASTM E1996 and TAS 201. The missile sizes range from 9-lb. to 2 grams. For ASTM E1996, there are several different missile sizes and speeds between those indicated above. For the purposes of this inspection, tested products are considered "stronger" than untested products. For tested products, this program considers products passing lighter weight missile tests as "weaker" than products passing heavier weight missile tests.

If shutters are installed on the house, but are:

- Not labeled and cannot be identified as having passed impact testing, or,
- Not listed on a product approval system, and,
- The weakest form of protection,

then Question 6 should be answered "**B**."

Wood structural panels (plywood or oriented strand board) are commonly used windborne debris protection devices. However, they are not tested nor are they listed with any product approval system. If these products are used and are the weakest type of windborne debris protection, Question 6 should be answered "**C**."

Tested opening protection must be installed by a licensed contractor. In cases where the opening protection was not installed by a licensed contractor, the inspector shall answer "**B**."

⚠ VERIFICATION REQUIREMENTS FOR QUESTION #6:

For this question to be answered "**A**", the inspector must complete the following two steps:

a) **Visual Inspection (On-Site)**: The inspector must confirm the hurricane shutters, impact-resistant doors and windows, or storm panels have passed the proper windborne debris impacts tests either through reading permanently installed labels which identify the product or by matching the opening products with product data (shop drawings, manufacturer literature). The permanent labels or product data must clearly indicate the opening products have passed windborne debris tests as required. If the opening protection is permanently installed, the inspector shall confirm its proper operation.

b) **Product Listing Verification**: The inspector shall confirm the listing of all opening protection devices on the State of Florida Product Approval System or the Miami-Dade Code Compliance Office Product Approval System.

Because the wind borne debris tests have varying sizes of missiles, in order to answer "**A**" to this question, the inspector must confirm that the products have passed wind borne debris impact tests using 9-lb. missiles.

If either of these two steps cannot be completed, the inspector shall answer "**B – External protection devices that cannot be identified as meeting the requirements in Answer A**."

The inspector shall only answer this question "**U - Unknown or Unidentified**" if they did not attempt to confirm the answer to this question.

The inspector shall only answer this question "**X – Not applicable because there is no windborne debris protection**" if they confirm this condition and answered Question #5 appropriately.

QUESTION 7 – ROOF GEOMETRY (ROOF SHAPE)

Coordination: Answers to Questions #7 & #12 must agree with one another. When Question #7 is answered "A," Question #12 must be answered "X." If this is not the case, one of these two questions is answered incorrectly.

The purpose of this question is to categorize the roof geometry of the entire dwelling.

The construction industry has general terms for roof shapes created at the ends of roof ridges. For the purposes of this program, roof shapes shall be defined by **Figure 7.1** and the structure's roof shape categorized by following this three-step process.

1) Locate all exterior walls longer than 4 feet (horizontal) on the structure. All walls longer than 4 feet shall constitute a side.

2) Determine the roof shape on each side of the structure.

3) Determine the correct answer by considering the roof shapes on all sides.

Figure 7.1 groups the various roof shapes into three categories – Total Hip, Partial Hip, and Other (Roof Shapes).

"**Total Hip Roofs**" shall have no "**Partial Hip**" roof shapes, "**Other**" roof shapes, and shall have no dormers. If the roof is a hip roof and has small roof areas (less than 50% on any one side) or dormers, this qualifies as a "**Partial Hip Roof**." All other roof shapes and combinations of roof shapes shall be categorized as "**Other**."

Attached lightweight structures are not considered when categorizing roof shape. Attached lightweight structures are those elements that do not have structural members that are also an integral part of the main building's structures. Examples of lightweight structures are lanais, pool cages, and metal carports that are connected to the main structure's fascia board or exterior siding.

Submit photos of all sides of the home so all parts of the roof are visible.

ROOF GEOMETRY

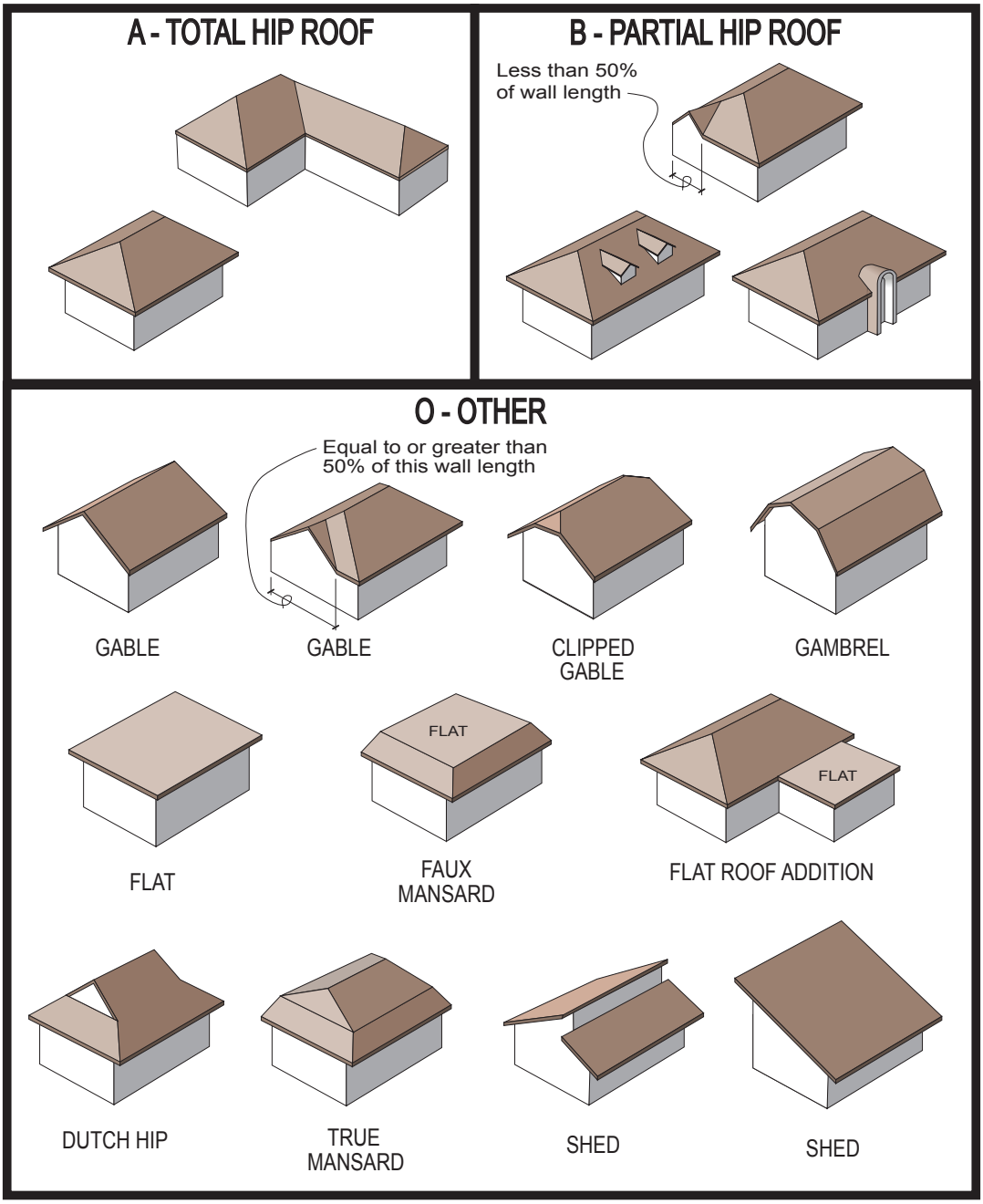
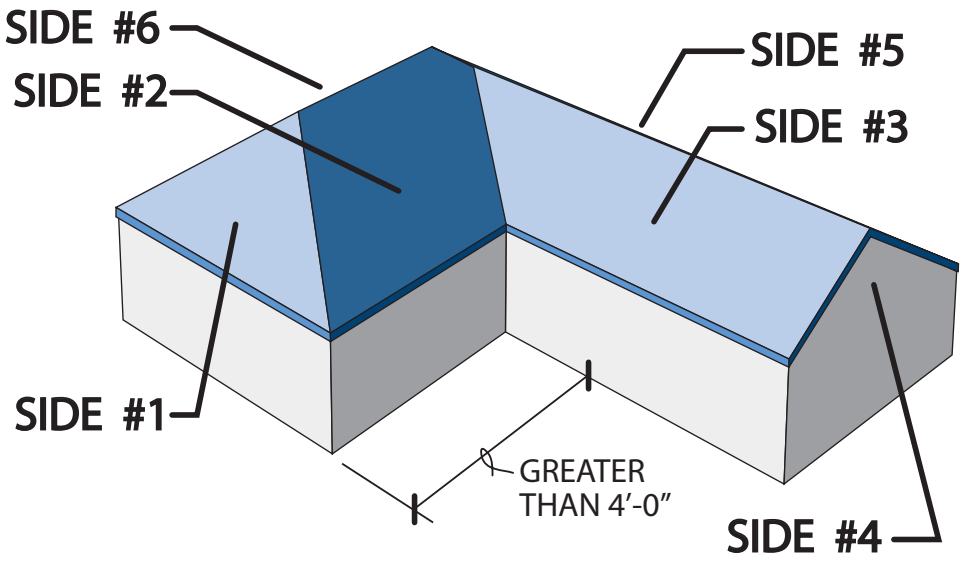


FIGURE 7.1 – BASIC ROOF SHAPES

Note that a side of a building can have a combination of hip roof and other roof shape and still be considered a partial hip roof if the other roof shape extends less than fifty-percent of the total wall length.

Because many structures will have multiple roof shapes, parameters are set as to what will qualify as a hip roof. The following is an example of determining how to answer Question #7.



EXAMPLE:
This house has six sides. SIDE #1 is a hip roof. SIDE #2, SIDE #3, SIDE #5, & SIDE #6 are considered hip roofs because the roof slopes down to the top of the exterior wall. However, SIDE #4 is a gable roof.

Taking into account the roof shapes on all sides, the answer to Question #4 is "Other" because SIDE #4 is a gable end, making the roof geometry a combination roof shape.

FIGURE 7.2 – ROOF SHAPE EXAMPLE

⚠ VERIFICATION REQUIREMENTS FOR QUESTION #7:

Visual Inspection (On-Site): The inspector shall inspect all sides of the dwelling to document the roof shape on each side, and categorize the roof shape of the dwelling (as a whole) using the process outlined in these instructions.

SUBMIT: Attach a photograph of each side of the dwelling that exceeds 4 horizontal feet.

QUESTION 8 – ROOF COVERING SYSTEM

The purpose of this question is to determine if the predominant roof covering material on the dwelling has enhanced wind-resistance.

In order to be the predominant roof covering material, the roof covering material must cover more than fifty-percent of the total roof surface.

Many asphalt (composition) shingles are tested for wind-resistance using the test method, ASTM D3161. A more recent wind-resistance test method for asphalt (composition) shingles is ASTM D7158.

For Question #8 to be answered "**Y - Yes**," the predominant roof covering material must be asphalt (composition) shingles and have one of the following classifications:

ASTM D3161:
Class F = 110-mph

ASTM D7158:
Class G = 120-mph
Class H = 150-mph

For Question #8 to be answered "**N - No**", the predominant roof covering material must be asphalt (composition) shingles and tested to ASTM D3161 or ASTM D7158 and have one of the following classifications:

ASTM D3161:
Class A = 60-mph
Class D = 90-mph

ASTM D7158:
Class D = 90-mph

Question #8 shall be answered "**N - No**" if it is confirmed that the asphalt shingle roof covering has not been tested at any wind speed. It should be noted that most asphalt composition shingles have been tested to ASTM D3161 at 60-mph.

Question #8 shall be answered "**N – No**" if a tested asphalt shingle (any classification) is installed as an overlay over existing asphalt shingles, wood shingles, or wood shakes. Overlays (asphalt shingles installed over existing shingles or shakes) are allowed by building code, but the asphalt shingles are not tested as an overlay.

For Question #8 to be answered "**U - Unknown or unidentified**," the predominant roof covering material must be asphalt (composition) shingles, but the type of wind-resistance testing cannot be confirmed.

If the predominant roof covering material is not asphalt (composition) shingles (e.g. concrete tile, slate, rolled roofing, etc.), then Question #8 shall be answered, "**X - Not applicable because predominant roof covering is not asphalt shingles.**"

⚠ VERIFICATION REQUIREMENTS FOR QUESTION #8 & #9:

It will not be possible to visually verify whether the roof covering material meets the requirements of these ASTM tests. Roofing materials are not currently labeled with this information.

Confirmation by Installing Contractor: Confirmation may be based on a letter from the installing contractor or an invoice from installing contractor.

The written confirmation or invoice must:

- Be on the installing contractor's letterhead,
- Identify the manufacturer and product line of roofing installed,
- Indicate the ASTM test and classifications of the product (optional, if the inspector can confirm the ASTM tests based on manufacturer and product data).

The inspector shall confirm the product indicated by the installing contractor does meet the ASTM tests identified on the inspection form.

QUESTION 9 – AGE OF ROOF COVERING

Indicate the year that the predominant roof covering installation was completed. If the date of installation cannot be confirmed, answer this question as "**Unknown**."

QUESTION 10 – PREDOMINANT ROOF DECK MATERIAL & ATTACHMENT

The purpose of this question is to identify the type of roof deck and determine the strength of roof deck attachment to the dwelling structure.

Additional Information: In a windstorm, negative pressures are usually produced on top of the roof, creating forces that act to lift the roof deck off its supports. The roof deck is held in place by the friction created between the fasteners and the structural members (usually rafters or trusses) on which the deck sits.

Larger fasteners and closer spacing (more fasteners) both increase the amount of friction and result in greater wind-resistance.

First, the inspector must identify the predominant roof deck material. To qualify as predominant, the roof deck material must cover over fifty-percent of the total roof deck area on the dwelling.

Once the predominant roof deck material has been identified, the size and spacing of the fasteners must be confirmed.

Most roof decks on single-family homes will be oriented strand board (OSB) or plywood. **Figure 10.1** shows the most common nailing patterns (as listed in Question #10).

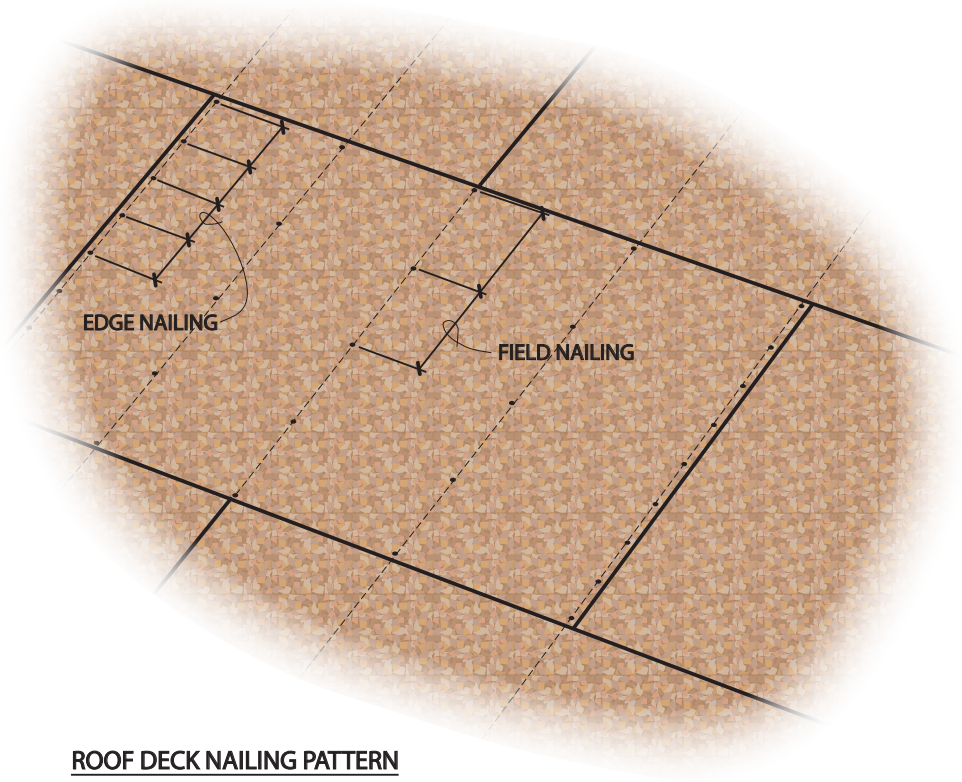


FIGURE 10.1 – ROOF DECK NAILING PATTERN FOR OSB OR PLYWOOD PANEL ROOF DECKS

In the case of plywood and OSB roof decks, both nail spacing and nail size must be inspected in order to properly answer Question #10. **For Question #10, there are two parts to complete for a State Farm policyholder: the Louisiana Hurricane Loss Mitigation Survey Form and Supplemental Question #10a**.

Louisiana Hurricane Loss Mitigation Survey Form
Complete the "free form" information of Type of Roof Deck, Size and Type of Fastener, and Spacing of Fasteners.

The inspector must provide the following:

1) For Type of Roof Deck, indicate the type and thickness of the predominant roof deck. As examples, the answer may be 1 x 6 (3/4" actual thickness) Tongue & Groove Dimensional Lumber or 9/16" Thick Oriented Strand Board. Only one roof deck type should be indicated.

2) For Size and Type of Fastener, be very specific about the nail size. For example, differentiate between 8d common nails, 8d box nails, or 8d sinker nails. Indicate the smallest fastener used.

3) For Spacing of Fasteners, indicate the weakest spacing condition.

SUPPLEMENTAL STATE FARM QUESTION #10A

In addition to completing the required information on the Louisiana Hurricane Loss Mitigation Survey Form, supplemental Question #10a (on the last page of these instructions) must be completed in order to properly process the discounts related to this program.

The supplemental Question #10a is in the form of "multiple choice" responses.

Nail Spacing Issues: Nail spacing for plywood and OSB roof decks should be handled in the following manner. The edge nailing and field nailing must both be within the parameters of the applicable answer. If one or both are spaced farther apart than what is indicated, another answer should be selected.

For example, if a plywood roof deck is nailed with 8d common nails spaced with 3/13 nailing pattern, the appropriate answer to Question #10a is "**C**" because the field nailing of 13 inches is greater than 12 inches. This is even though the 3-inch edge nailing is much closer than 6 inches.

Nail Size Issues: Careful examination of the nails is required to determine the nail size. The nail sizes in the survey answers are considered to be common nail sizes. Most gun driven nails are smaller in diameter and length than the common nails with the same size designation. Therefore, do not indicate the gun nail manufacturer's nail size when answering this question. Always translate gun-driven nail shaft surface area to the nearest common nail size.

For example, if an OSB roof deck is attached with 8d gun-driven nails spaced with a 6/6 nailing pattern, but the 8d gun-driven nails are equivalent to a 7d common nail size, Question #10a shall be answered "**D**."

Thicker Roof Decks: Plywood and OSB roof decks are usually ½-inch or 5/8-inch thick. Using a thicker roof deck actually decreases the uplift resistance of the deck.

If the predominant roof deck is plywood or OSB and is ¾-inch or thicker, Question #10a shall be answered "**D**" even if 8d common nails with a 6/12 nail pattern are installed. This is because the nails are not penetrating the roof structure members (top chord of truss or rafter) to an equivalent depth as with a thinner deck.

If the plywood or OSB roof deck has been nailed on top of batten boards (which are attached to the roof structure), Question #10a shall be answered "**O**" because the connection of the batten boards is the important factor in determining uplift resistant and this is an unusual condition which essentially constitutes an "other" type of roof deck.

If the roof deck consists of batten boards with space between the boards, Question #10a shall be answered "**N**" because this is a discontinuous roof deck.

⚠ VERIFICATION REQUIREMENTS FOR QUESTION #10A:

The size and spacing of roof deck attachment is concealed by the roof covering once the roof covering is installed. Therefore, there are a limited number of ways to confirm this information. The attachment of the roof deck may be confirmed by one of the following methods:

1) **Construction Documents:** Review of construction documents on file at the local building department.

2) **Visual Inspection (During Installation):** On-site physical inspection of installed conditions, including measuring fastener spacing and confirming nail diameter and length, before underlayment and roof covering is installed.

3) **Confirmation by Installing Contractor:** Written confirmation by the installing contractor.
The written confirmation shall:
- Be on the installing contractor's letterhead,
- Indicate the type and thickness of the predominant roof deck material,
- Indicate the weakest type of attachment (nail type, nail size, and nail spacing),
- Indicate manufacturer and product line of nail used (including nail diameter and length)

Estimating roof deck nail spacing with a metal detector is not acceptable. Estimating roof deck nail size by measuring exposed nails is not acceptable.

QUESTION 11 – ROOF-TO-WALL CONNECTION TYPE

This question documents the weakest type of connectors used to tie the roof structure (trusses, rafters, or concrete decks) to the supporting exterior walls.

Because many structures have multiple types of roof-to-wall connectors, select the weakest form of roof-to-wall connectors used on the building. The answers are listed on the Survey Form in order of strongest to weakest.

There are three types of sheet metal roof-to-wall connections from which to choose: clips, single wraps, and double wraps.

Toenailing is a connection method consisting of nails (typically two 16d nails) driven at an angle through the rafter or truss into the top of the wall.

Clips are single metal connectors that do not extend over the top of the rafter or truss top chord. The clip runs up along the side of the rafter or truss and is nailed into the side of the rafter or truss.

Single and double wraps are sheet metal connectors that extend over the top of the rafter or truss top chord. Single wrap is one metal strap per truss or rafter and double wrap is two metal straps per truss or rafter.

See **Figure 11.1** for a graphic of the various sheet metal connectors.

Poured-in-place or precast concrete roof decks typically have reinforcing rods or anchor bolts connecting the concrete decks to the top of walls. Metal roof decks are not typically connected directly to the exterior walls. These decks are typically welded or screwed to steel or wood supporting members. For concrete and metal roof decks, answer "**X**" on Question #11.

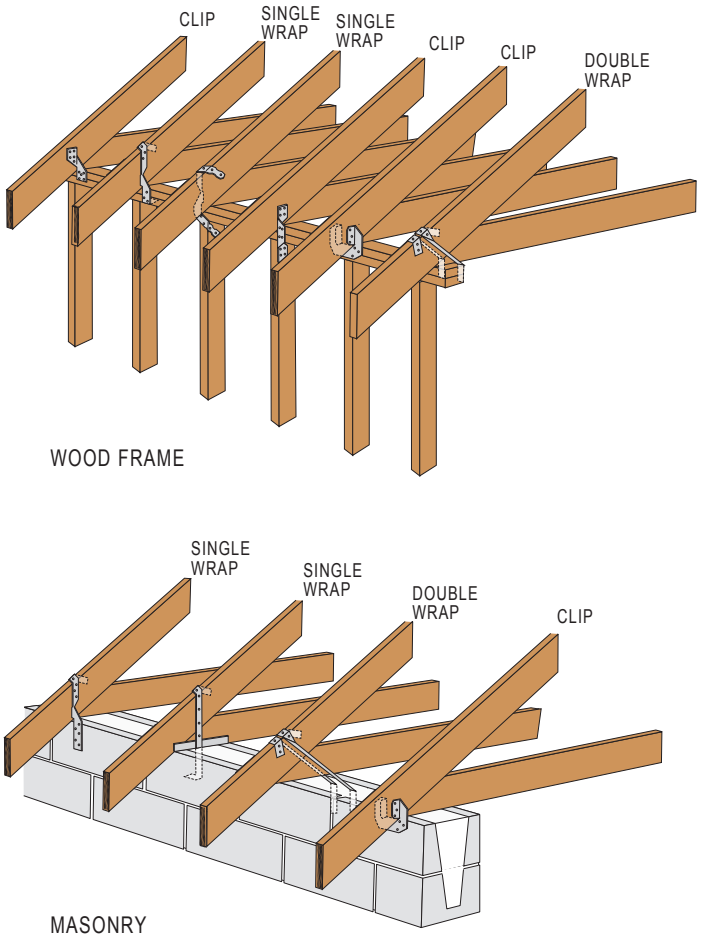


FIGURE 11.1 – ROOF-TO-WALL SHEET METAL CONNECTOR TYPES

The roof-to-wall connection type may be verified by on-site inspection. However, the inspection must occur during the construction of the dwelling or during the retrofit construction that exposes all roof-to-wall connectors.

Trying to verify the weakest roof-to-wall connector in a completed house is not possible. Typically, only a small percentage (maybe a handful out of 50 to 100 connectors in a typical house) is exposed to view. Most are either in an inaccessible part of an attic or covered with insulation and cannot be reasonably uncovered for inspection.

Additional Information: The magnitude of uplift force is affected by house design. The geographic location, shape of the house, truss span, organization of how framing members tie together, and location of the connector within the house all have an effect on the estimated uplift force at any one connector.

Therefore, the type (or size) of a connector is not an accurate measure of its wind resistance capability in an installed situation.

This question is designed, not to determine the adequacy of the connectors used, but for ease of use. This is done with the understanding that generally double wraps are stronger than single wraps, which are generally stronger than clips, which are stronger than toe-nails, which are stronger than no connection at all.

In some cases, all or some of the roof structure may be resting on top of the bearing walls with no connection. Only gravity is holding the roof structure in place. In these instances, Question #11 shall be answered "**E – None**."

In cases where the design documents were not available or did not indicate the type of connection, physical inspection during construction was not possible, or the type of connection was not able to be confirmed through the installing contractor, Question #11 shall be answered "**U – Unknown or unidentified**."

⚠ VERIFICATION REQUIREMENTS FOR QUESTION #11:

The following methods may be used by the inspector to categorize the weakest type of roof-to-wall connector:

1) **Construction Documents:** Assessment of the design documents (house plans) or truss shop drawings, if the type of connectors are clearly indicated.

2) **Visual Inspection (During Installation):** On-site verification of the type of connector during the construction of the dwelling while all connectors are exposed to view.

3) **Confirmation by Installing Contractor:** Letter from the contractor, who installed the connectors. Written confirmation must:
   - Be on installing contractor's letterhead,
   - Include the manufacturers and product numbers of all roof-to-wall connectors used

QUESTION 12 – GABLE END BRACING

Coordination: The answer to Question #12 must be compatible with the answer to Question #7 (See the Coordination text box under Question #7 instructions for an explanation).

Confirming that gable end bracing is installed in accordance with the Louisiana State Uniform Construction Code (LSUCC) will be difficult. There are no prescriptive requirements in the LSUCC. Proper gable end bracing, if it exists, will vary based on roof slope, spans, number of bearing points, and calculated wind load.

Adding to the complexity, there are many times different types of bracing specified for an attic space. These include temporary truss erection bracing, permanent truss member bracing, and permanent whole house bracing.

Gable end bracing is considered permanent whole house bracing of gable end walls. Gable end bracing is necessary because many times the wall is not continuous from the floor to the roof deck. Often the end wall is built to the height of the ceiling and a special truss is set on top of the end wall. This creates a weak point which can fail during high wind events.

This weak point can be eliminated if the end wall is built without this "break" in construction. The end walls can be built using full height (balloon frame) stud walls or full height masonry. If the gable end wall extends from the floor below to the roof deck, gable end bracing is not always required.

Gable end bracing can be in several different forms.

1) The gable end may be braced with several boards running perpendicular to the gable end wall and running along the top of the ceiling joists.

2) In some geographic locations, the building code may consider the gypsum board ceiling as adequate gable end bracing. In these cases, the ceiling must be located at the junction of the gable end truss/framing and the top of the wall.

3) The gable end may be braced with diagonal bracing running from the bottom of the gable end truss up to the roof deck. This can also be in the form of X-bracing running from the bottom and top of the gable end truss.

If the end wall is not framed continuously (balloon frame) or is not continuous masonry to the underside of the roof deck structure, the gable end likely requires bracing members and these will be indicated on the design documents.

⚠ VERIFICATION REQUIREMENTS FOR QUESTION #12:

The following two steps must be completed by the inspector.

a) **Review of Construction Documents:** The inspector shall obtain and review the design documents (house plans) and the truss shop drawings.

b) **Visual Inspection (On-Site):** The inspector shall visually confirm the installation of all gable end bracing specified in the construction documents listed above.

If either of these two steps cannot be completed, the inspector shall answer "**U – Unknown or Unidentified**."

QUESTION 13 – FOUNDATION RESTRAINT

Coordination: The answer to Question #13 must be compatible with the answer to Question #1. If Question #1 is answered "**A – Louisiana State Uniform Construction Code,**" then Question #13 cannot be answered "**N – No.**" The only compatible answers to Question #13 in these cases are "**Y – Yes**" or "**U – Unknown or unidentified.**"

Foundation restraint pertains to the foundation-to-wall connection at the exterior walls. There are different types of foundation restraints and they also vary depending on the type of floor construction.

For most homes with slab-on-grade foundations, which are common in coastal areas, the foundation restraint will be concealed within the wall and impossible to verify after construction is complete. Some homes will have stem foundation walls with crawl spaces. Access to verify foundation restraint will be difficult in crawl spaces.

Homes with basements with finished ceilings will also be difficult to inspect due to concealed conditions.

The Louisiana State Uniform Construction Code (LSUCC) has the following minimum requirements:

- Maximum spacing of anchor bolts of 6-feet on center
- Minimum size of anchor bolt of ½" diameter

Those minimum requirements are for the foundation-to-wall connection for a wall sole plate to a slab-on-grade or a sill plate of a floor system to a stem or basement foundation wall in geographic areas with a code-required basic wind speed of less than 110-mph.

The LSUCC also allows for alternative foundation-to-wall connectors if the alternative connectors provide the equivalent foundation anchorage as ½" anchor bolts at 6-feet on center.

In geographic areas with a code-required basic wind speed equal to or greater than 110-mph, prescriptive or engineered design is required, so it is less likely the code-minimum requirement of ½" anchor bolts at 6-feet on center will be adequate.

The inaccessibility of this connection and the variability of design, especially in the higher wind areas, make it difficult to confirm this is constructed according to the LSUCC.

Question #13 should be answered "**U - Unknown or unidentified**" if any part of the foundation anchorage system is concealed, preventing complete inspection or if design documents do not indicate the foundation anchorage.

Only when there is a verifiable deficiency in the foundation anchorage system should this question be answered "**N - No.**"

⚠ VERIFICATION REQUIREMENTS FOR QUESTION #13:

The inspector shall categorize the foundation restraint with one of the following methods:

1) **Visual Inspection (During Installation)**: Obtain a copy of the code enforcement office approved design documents and confirm the installation during construction while anchorage system is exposed.

2) **Visual Inspection (On-Site)**: Obtain a copy of the code enforcement office approved design documents and confirm the installation if all foundation-to-wall connection conditions are exposed to view.

3) **Visual Inspection (On-Site)**: In geographic areas where the basic wind speed is less than 110-mph, confirm the installation of ½"diameter or larger anchor bolts spaced at a maximum of 6-feet on center, if all foundation-to-wall connection conditions are exposed to view or the inspection is done during construction while the anchorage system is exposed.

If none of these methods are possible, the inspector shall answer "**U – Unknown or Unidentified**."

DEFINITIONS

ASCE 7 – A design standard created and maintained by the American Society of Civil Engineers. ASCE 7 is the *Minimum Design Loads for Buildings and Other Structures*. This standard is generally accepted as the best source for determining loading from forces such as wind, earthquakes, wave action, snow loads, and more.

ASCE 7 is referenced and adopted by the International Residential Code for use in determining the loads from hurricanes. However, other design standards may be used instead of ASCE 7 if allowed by the residential building code.

Basic Design Wind Speed – This is the wind speed to which a building code requires a structure to be built. In the US, Basic Wind Speed is in miles per hour. Newer codes have Basic Design Wind Speeds in 3-second gust units. Older codes have Basic Design Wind Speeds in one-minute sustained units. It should be noted that 3-sec gust wind speeds are different than one-minute sustained wind speeds. For example, a 100-mph 3-sec gust speed is not equal to a 100-mph one-minute sustained speed. In ASCE 7 and most building codes, the Basic Design Wind Speed is at 33-feet above the ground and is adjusted based on a number of factors.

Building Envelope – Normally considered the exterior skin (walls and roof deck) of the structure which keeps the wind from blowing into or passing through the building.

Building Envelope Opening Products – Products (such as windows, swinging doors, sidelights, garage doors, sliding glass doors, skylights, glass block, and door sidelights) which fill openings in the building envelope. Building Envelope Opening Products can be more vulnerable to failure from impacts from windborne debris than the Building Envelope. If these products fail and an opening is created in the Building Envelope, wind can enter the opening and create outward acting pressures *(called internal pressurization)* on the inside of the building.

Clip – A type of sheet metal roof-to-wall connector used in rafter or truss roof structures. A clip connects to the top of the wall, and connects to the rafter or truss, but it does not extend over the top of the roof rafter or truss top chord.

Common Nails – These are mechanical fasteners made of steel usually used in locations that are concealed from view. Like all nails, they have a head and a shaft. They typically come in what are referred to as "penny" sizes. Six penny is written as 6d, eight penny as 8d, and so on.

Common nails have specific shaft lengths, diameters, and total shaft surface areas.

	Shaft Length	Shaft Diameter	Shaft Surface Area
6d	2"	0.113"	0.710 sq. inches
8d	2 ½"	0.131"	1.028 sq. inches
10d	3"	0.148"	1.394 sq. inches

Gun driven nails typically have the same "penny" designation, but will typically have a shorter length and smaller diameter nail than its counterpart common nail. In other words, an 8d gun driven nail is almost always smaller than an 8d common nail. In the case of roof deck nails, the shaft length and diameter directly correlate to the nail's ability to resist wind uplift forces.

Double Wrap – A roof-to-wall connection where two sheet metal straps connect the roof structure (trusses or rafters) to the top of the supporting wall and where the metal straps wrap over the top of the truss or rafter.

Dwelling – For inspections on single family homes, all data collected on the survey form shall pertain to the dwelling. The dwelling is the structure on the residence premises that contains the living spaces. The dwelling does not include detached structures such as sheds or detached garages. If there is more than one dwelling structure on the property, contact the State Farm agent to determine which dwelling structure is being insured under the policy for which the discount is being applied.

Exposure Category – ASCE 7 defines this as the roughness characteristics of the upwind terrain. Open exposures have less effect of reducing wind speeds as compared with suburban and forested areas. In ASCE 7 and most building codes, the effect of the upwind terrain is taken into account to estimate the wind pressures at the height of the structure.

Internal Pressurization – A condition in which wind enters a building and cannot escape. The result is higher wind loads due to outward acting wind pressures on the inside of the building envelope.

Opening Protection – See Windborne Debris Protection.

Roof Covering – Part of the roof covering system whose primary function is to shed rainwater and to protect the roof deck and dwelling interior from water damage. Common examples of roof coverings are asphalt shingles, concrete tile, standing seam metal roof panels, and asphalt roll roofing.

Roof Covering System – The roof covering and roofing underlayment.

Roofing Underlayment – Part of the roof covering system that is located between a discontinuous roof covering and the roof deck. In the case of asphalt shingles, it is typically an asphalt-impregnated felt paper. The roofing underlayment is intended to shed water that may get under the roof covering.

Single Wrap – A roof-to-wall connection where one sheet metal strap connects the roof structure (trusses or rafters) to the top of the supporting wall and where the metal strap wraps over the top of the truss or rafter.

Toe Nailing – Toe nailing is a roof-to-wall connection that uses nails driven on an angle to connect the roof structure (trusses or rafters) to the top of the supporting walls.

Windborne Debris – These are objects that are picked up by high winds. Common objects that become windborne debris are tree limbs, house siding, concrete roof tiles, and roof aggregate (small gravel).

Windborne Debris Protection – This can either be in the form of an external protection device like a hurricane shutter or storm panel; or be impact-resistant window, door, skylight, etc. This is also known as Opening Protection.

Windborne Debris Region – An area defined by ASCE 7 to be coastal areas prone to hurricanes that have design wind speeds of 120-mph or greater or design wind speeds of 110-mph and within one mile of the coastline.

FOR INSPECTOR QUESTIONS, CONTACT STATE FARM'S HELP DESK – 866-279-1306

Complete name and address as it is indicated in Section I of the Louisiana Hurricane Loss Mitigation Survey Form:

Applicant's/Insured's Name: _____

Location Address: _____

_____

_____

*Sections I, II, & III are on the Louisiana Hurricane Loss Mitigation Form.

Section IV – Attach photos as required for Question #7 (Verification Requirements).

Section V – Answer the following Supplemental Question related to Question #10 of the Louisiana Hurricane Loss Mitigation Survey Form.

SUPPLEMENTAL QUESTION REQUIRED BY STATE FARM INSURANCE

10a) What category best describes the predominant roof deck and type of deck attachment to the structure below?

A) 1x dimensional lumber roof deck attached with at least two 8d common nails (or larger) at every supporting member

B) 1x dimensional lumber roof deck attached with fewer than (or smaller than) (2) 8d common nails at every supporting member

C) Plywood or OSB wood structural panel roof deck attached with any size of staples with any spacing

D) Plywood or OSB wood structural panel roof deck attached with smaller than 8d common nails; or with an 8d common nail spaced wider than 6/12 spacing; or both conditions coexisting

E) Plywood or OSB wood structural panel roof deck attached with 8d common nails (or larger) with a nail spacing of 6/12 or closer spacing, but wider spacing than 6/6

F) Plywood or OSB wood structural panel roof deck attached with 8d common nails (or larger) with a nail spacing of 6/6 or closer spacing

G) Reinforced concrete or precast concrete roof deck

N) No roof deck or no continuous (solid) roof deck

O) Other type of roof deck not listed above

U) Unknown or unidentified

I certify that I am a Building Code Enforcement Officer, registered architect, registered engineer, or registered Third-Party Provider, as defined by Louisiana Revised Statute or applicable Administrative Rule. I am registered with the Louisiana State Uniform Construction Code Council and authorized, by that registry, to perform residential building inspections for compliance with the Louisiana State Uniform Construction Code or to perform wind mitigation surveys. I have conducted an inspection of the structure, and reviewed all construction documents and building products specifications necessary to accurately answer the questions in this inspection survey, and certify that, to the best of my knowledge, all questions are answered truthfully and correctly.

Name (please print): _____

Firm Name: _____

Title: _____

State of Louisiana License Number: _____

Inspector Signature: _____ Date: _____

Insureds' Signatures: _____ Date: _____

_____ Date: _____