# WINDSTORM CONSTRUCTION STANDARD, ASCE702/IRC 2012

## (For construction in hurricane-prone regions for a basic design wind speed of 130 mph or less)

Anchor Bolts:
- 5/8 X " – minimum 7" embedment with min. 2 X 2 X 1/8" or 2" diameter washer.
- Anchor bolt spacing .J" o.c. for all exterior walls.
- 5/8" dia anchor bolts shall be spaced 4" o.c. for interior shearwalls.
- Retrofit anchor bolts shall provide a min. pull out capacity of 1,300 lbs.

Hold Down Anchors:
- Holddown connectors shall be installed at all corners, garage door openings, and interior shearwalls or as required by Windstorm Design Plan.
- Holddown connector uplift load path shall be continuous from 2nd floor to foundation. See Detail 10 for HD1. See Detail 9 of Windstorm Details for offset condition.
- Required holddown connector capacity and acceptable connectors shall be as per Table 1 and Details 3, 4 and 5.
- Anchor bolts for holddown connectors shall have pull out capacity equal to the connector's capacity. See Details 4 and 5.

Framing:
- Framing fastener size shall be per the Windstorm Fastener Summary Table for all connections.
- Double studs shall be provided where holddown connectors are required (DOUBLE STUDS SHALL NOT BE NOTCHED, OR CUT)
- Double studs shall be fastened together with 2 rows of framing fasteners spaced 6" o.c. along studs. See Detail 6.
- Load bearing studs with height greater than 12' shall be minimum 2x6 spaced 16" o.c. or doubled.
- Wall studs exposed to wind loads shall be continuous from horizontal support to horizontal support (foundation to ceiling/roof/floor, or floor to roof/ceiling) i.e. balloon framing cathedral ceilings. No pony walls in exterior walls.
- Minimum 1" thick band/rim joist shall be provided between 1st story and 2nd story plates (min. 2x member for offset conditions).
- Offset floors (brick pocket) shall have a min. 2x band joist and be blocked along the 1st floor plate line.
- Floor joist shall be blocked above interior shearwall.
- Rafters minimum 2x6 SYP No. 3. Allowable Rafter Span for wind shall be per Table 2, or per the Wood Frame Construction Manual.
- Wall studs spaced maximum of 16" o.c.
- Rafters spaced maximum of 19.2" o.c.
- Maximum overhang support post spacing of 12'.
- Load bearing overhang support beams minimum 2–2x12s SYP No. 2 lumber.
- Overhang support posts shall be min. 4x4 SYP No. 2 lumber (NO CEDAR).
- Maximum 24" overhang at unsupported gable end.
- Lookout shall be spaced max. 36" o.c.
- Box out windows shall be fully sheathed and anchored to the header stud per detail 27.

Gable End Wall Bracing and Overhang Anchorage:
- Gable endwalls and overhangs shall be framed per detail 14, 15 and 24.
- Strong backs shall be provided at gable end walls spaced 4' o.c.
- Strong backs shall consist of 2–2x4 members 8' long and shear nailed to gable studs. See Detail 11.
- Strong backs shall be nailed to each ceiling joist with 2 framing nails per joist.

Straps and Clips:
- Required connection capacity and acceptable framing anchors shall be as per Table 3, or as specified by the windstorm design plans.
- Fasteners for straps and clips shall be as specified by the manufacturer to obtain the listed load resistance. See Windstorm Fastener Summary Table for most common fasteners for clips and straps.
- All straps and clips should form a continuous line of anchorage from rafters down to first floor toe plate.
- Clip every rafter across both top plates.
- On two–story house, strap across floors every 16" o.c. from stud to stud with a minimum of 5 nails per stud.
- Strap king studs floor to floor.
- Clip every stud top and bottom.
- Strap header to header studs and header studs to sole plate.
- Provide and anchor 2 header studs for openings 6' wide or larger.
- Strap cripple studs above header or top plate directly to header with strap spaced 16" o.c.
- Clip or strap every gable stud to rafter and top plates. See Detail 10.
- Overhang ceiling joists shall be anchored to the top of the double top plate.
- Overhang support beams shall be strapped to support posts with 4 straps (2 inside/2 outside).
- Overhand support beams shall be anchored to the structure with 2 straps. See Detail 19.
- Laps in top plates on unsheathed exterior wall segments (partial plywood applications) shall be strapped horizontally to resist 970 lbs.
- Ridge straps shall be provided over ridges and hips with 5 nails per side, See Table 3 for anchorage. Opposing rafters may be anchored to the hip rafter.

Shear Walls:
- Exterior walls shall be fully sheathed first floor, second floor and gable endwalls unless otherwise indicated by the windstorm design plan.
- Sheathing shall be minimum thickness 7/16" plywood or OSB (3/8" plywood is acceptable where wall framing is 16" o.c.).
- Shearwalls shall be continuous from the toe plate to the double top plate.
- Sheathing fastener spacing shall be 4" o.c. panel edges, 12" o.c. field, unless otherwise indicated by the windstorm design plan.
- Block all shearwall panel edges along entire structure and nail 4" on center.
- Rear wall of all attached garages shall be fully sheathed unless otherwise indicated by the windstorm template.
- Sheathing fasteners shall be minimum 8d common nails (0.131 x 2.5") or as specified in the Windstorm Fastener Summary Table.
- Interior shearwalls per Windstorm Design Plan. Nail 4" o.c. @ perimeter & 12" o.c. in field or as specified in the windstorm template.
- Shear shall be transferred from the 2nd floor to the first floor at exterior walls and to interior shearwalls per Windstorm Details Sheet Details 11, 16 or 17.
- Interior shearwalls shall be fastened to a strut (ceiling joist, floor joist or blocking) with a Simpson LTP4 or equivalent every 12" o.c.
- Special return details shall be min. 18" wide and be constructed per Detail 1, 2, 7 and 8.
- 16" returns are acceptable as a minimum when constructed according to Detail 12 and 13.

Rafter Bracing – Purling Braces:
- Rafter bracing/Purlin bracing must be provided on every third rafter where rafters are over span, and at laps or splices. See Detail 22.
- Rafter shall be braced to interior walls or a min. 2–2x12 beam anchored at each end to resist 200 lbs per brace supported.
- Purling braces shall be clipped or nailed in shear to rafters with 5 framing fasteners, and must be clipped or strapped to both top plates, wall studs and toe plates.
- Laps shall be min. 4' long fastened with 21 nails (3 rows of 7 fasteners). See Detail 22.

Collar Ties:
- Without ridge straps, collar ties shall be provided for every other set of rafters located in upper third fastened with 4 nails at each end. See Detail 23.

Roof Deck Sheathing:
- Must be nailed 4" o.c. edges and 6" o.c. in field (for gable ends, the gable rafter and fly barg shall be considered an edge).
- Fasteners shall be minimum 8d common (0.131 x 2.5"). See Windstorm Fastener Summary.

Roof Coverings:
- Slopes > 4:12 shall have one layer of felt fastened with corrosion resistant fasteners spaced a maximum of 36" o.c.
- Slopes > 2:12 and < 4:12 must have half–lapped felt fasteners with corrosion resistant fasteners spaced a maximum of 36" o.c.

Roofing Shingles:
- Composition shingle roof covering shall meet the ASTM D 3161 high wind standard installed per manufacturer's installation instructions.
- Fastened per the manufacturer's installation instructions on the nail line.
- Fasteners shall not be overdriven or crooked.

Brick Ties:
- Fastened 16" o.c. along each stud with 1– 8d corrosion resistant nails.
- Brick ties shall be spaced 6" o.c. around window and door openings where windborne debris protection is to be anchored to brick veneer.

Mechanical Unit:
- Secured by bolting or shooting to slab. 3 shots round unit; 4 shots square unit. All units must be on minimum 90–pound concrete pods.

Sheetrock:
- Minimum exterior walls 1/2" fastened with 5d cooler nails spaced a maximum of 7 inches at edges with panel edges blocked.

Chimneys and Dormers:
- The entire chimney shall be sheathed with wood structural panels.
- Chimney studs shall be anchored to rafters and/or wall studs below to resist 600 lbs. uplift, see Detail 20.
- Dormers studs shall be anchored top double rafters. See Detail 21.

Doors and Windows:
- Window and door products shall have a minimum design pressure of 35 psf (32 psf for garage door products) or as specified in Table 301.2(2) of the 2012 international Residential Code.
- An evaluation report or testing information shall be available upon request.
- Windows and glass door products shall meet the requirements of Section 613 of the 2012 International Residential Code.
- Contact window manufacture and door supplier for proper rated material and installation specifications.
- In lieu of the installation required by a product evaluation,
  - Aluminum windows may be installed with 10d common box nails (0.131 x 3"), spaced 6" o.c. around perimeter and placed in predrilled holes where provided.
  - Vinyl framed windows shall be installed with 1–1/2" roofing nails (11 gauge shank diameter, 7/16" head diameter) spaced 3" o.c.
- Build out material for window installation shall be installed to wall framing with same fastener size and spacing as windows.
- In lieu of the installation required by a product evaluation, entry doors may be installed with either
  - No. 8 x 3" wood screws, spaced a minimum of 4" from the corners and 10" o.c. thereafter, or
  - No. 10 x 2–1/2" wood screws spaced 6" from the corners and 23" o.c. thereafter

Windborne Debris Protection:
- Structures located in the inland I zone have glazed exterior openings protected from windborne debris by an approved protection method as specified itn the 2012 International Residential Code.
- Protection method shall meet the impact and cyclic wind pressure testing requirements of ASTM E1886 and 1996, or be an approved wood structural panel application specified in the 2012 International Residential Code.
- Evidence of protection method shall be provided prior to certification and the protection materials and fasteners shall be at the site at the time of the final inspection.

Doors and garage door openings with glazing shall be protected from windborne debris. Door and garage door openings without glazing do not require protection against windborne debris.

Fasteners:
- Fastener size shall be as specified in the Windstorm Fastener Summary. Fastener shall not be overdriven.
- All fasteners shall be corrosion resistant per TDI Amendment.

Windstorm Details:
- Referenced details shall be per Windstorm Detail Sheets 1–2 and 2–2.
- Construction in accordance with the 2012 Wood Frame Construction Manual or SSTD 10 is also acceptable.

## GENERAL CONSTRUCTION AND DESIGN REQUIREMENTS

OTHER CONSTRUCTION DOCUMENTS:

SEE CONSTRUCTION STANDARD SHEET CS 1–1, AND WINDSTORM DETAIL SHEETS WS 1–2 AND WS 2–2 FOR OTHER WINDSTORM CONSTRUCTION REQUIREMENTS AND DETAILS. THIS DESIGN IS FOR WIND ONLY.

OTHER OR NON SPECIFIED CONSTRUCTION DETAILS, MATERIAL REQUIREMENTS AND LOADS SHALL BE PER THE 2003 INTERNATIONAL RESIDENTIAL CODE.

DESIGN CRITERIA:

DESIGN STANDARD:
2012 WOOD FRAME CONSTRUCTION MANUAL, CHAPTER 2
AND ASCE 7–02

BASIC WIND SPEED 130 MPH (3–SECOND GUST)
EXPOSURE CATEGORY: B

ACCEPTABLE WINDSTORM ZONES:

| | |
|---|---|
| INLAND I | YES |
| INLAND II | YES |
| SEAWARD | NO |

## WALL BRACING REQUIREMENTS

SHEARWALL REQUIREMENTS:

WALL SHEATHING SHALL BE MINIMUM 7/16" OSB (3/8" PLYWOOD IS ACCEPTABLE WHERE WALL FRAMING IS 16" O.C.) WHERE SPECIFIED IN THIS DESIGN PLAN. SHEARWALLS SHALL BE FULL HEIGHT FROM THE SOLE PLATE TO THE UPPER MEMBER OF THE DOUBLE TOP PLATE. SHEARWALLS SHALL BE FASTENED 12" O.C. IN THE FIELD AND AS SPECIFIED PER THIS PLAN AT THE PERIMETER.

REQUIRED HOLDDOWN CONNECTOR CAPACITY:

▲ 4,800 LBS. HD1 ▲ 5,500 LBS. HD2 ▲ 8,300 LBS. HD3

ALTERNATE SHEATHING REQUIREMENTS:

–FOR THE WALLS INDICATED, IT SHALL BE ACCEPTABLE AS AN OPTION TO THE PLYWOOD PANELS SHOWN TO USE THE ALTERNATE SHEATHING METHOD DESCRIBED BELOW.

–ALTERNATE SHEATHING METHODS SHALL HAVE A PUBLISHED SHEAR RESISTANCE OF 160 PLF THAT HAS BEEN VERIFIED THROUGH TESTING. THE PRODUCT SHALL BE INSTALLED AS SPECIFIED BY THE MANUFACTURER TO ACHIEVE THE REQUIRED SHEAR RESISTANCE.

–WHERE ALTERNATE SHEATHING METHODS ARE USED, IT SHALL BE THE RESPONSIBILITY OF THE BUILDER TO PROVIDE THE MANUFACTURER'S INFORMATION, INCLUDING INSTALLATION INSTRUCTIONS, TO THE INSPECTOR PRIOR TO USING THE PRODUCT.

## UPLIFT REQUIREMENTS

UPLIFT LOAD PATH MUST BE CONTINUOUS FROM THE ROOF TO THE FOUNDATION.

-RAFTER AND STUD ANCHORAGE (PER MEMBER)-

| | ANCHORAGE |
|---|---|
| RAFTER TO TOP PLATE: | 600 LBS |
| TOP PLATE TO STUD: | 600 LBS |
| STUD TO SOLE PLATE: | 420 LBS |

-HEADER ANCHORAGE-

| | OPENING SIZE | ANCHORAGE |
|---|---|---|
| HEADER STUDS TO HEADER | 3' | 600 LBS |
| AND SOLE PLATE: | 6' | 1125 LBS |

-OVERHANG ANCHORAGE-

| | ANCHORAGE |
|---|---|
| RAFTER TO BEAM: | 600 LBS |
| POST TO BEAM/POST TO SLAB: | 4,000 LBS |

## PLYWOOD USED FOR SHEAR AND UPLIFT REQUIREMENTS

–WHERE SPECIFIED IN THIS DESIGN PLAN, PLYWOOD/OSB MAY BE USED TO REPLACE STUD–TO–PLATE AND PLATE–TO–HEADER STRAPPING WHEN INSTALLED ACCORDING TO DETAIL 28, SHEET WS 2–2.

–EACH RAFTER SHALL BE ANCHORED TO THE DOUBLE TOP PLATE ACCORDING TO THE UPLIFT REQUIREMENTS ABOVE.

–STRAPPING SHALL BE PROVIDED ACCORDING TO THE UPLIFT REQUIREMENTS ABOVE FOR ALL WINDOW AND DOOR HEADER STUDS.

–PLYWOOD/OSB USED TO RESIST SHEAR AND UPLIFT SHALL BE FASTENED 3" O.C. @ PANEL EDGES AND 3" O.C. ALONG HEADERS AND THE LOWER MEMBER OF THE DOUBLE TOP PLATE. SEE DETAIL 28, SHEET WS 2–2.

–PLYWOOD/OSB PANELS USED TO RESIST SHEAR AND UPLIFT SHALL BE CONTINUOUS FROM THE SOLE PLATE TO THE UPPER MEMBER OF THE DOUBLE TOP PLATE.

–PLYWOOD/OSB PANELS USED FOR UPLIFT RESISTANCE SHALL HAVE THE FOLLOWING LENGTHS:

| WALL HEIGHT | PANEL LENGTH |
|---|---|
| 8' | 97 1/8" |
| 9' | 109 1/8" |
| 10' | 121 1/8" |

–STANDARD LENGTH PLYWOOD/OSB SHALL NOT BE USED TO RESIST UPLIFT LOADS.

–PLYWOOD SHALL BE USED TO RESIST SHEAR AND UPLIFT ONLY WHERE SPECIFIED. WHERE NOT SPECIFIED, CLIPS AND STRAPS SHALL BE USED PER THE UPLIFT REQUIREMENTS.

## WINDSTORM LEGEND

- HD1 ▶ HOLDDOWN LOCATION AND TYPE (SEE DETAIL 3, 4 OR 5 SHEET CS 1–1)
- FULL HEIGHT TEARFUL LOCATION
- HEADER STRUT LOCATION (SEE DETAIL 1, 7 OR 12)
- HD-P ▶ PORCH POST ANCHORAGE DETAIL
- ALTERNATE SHEATHING METHOD (SEE ALTERNATE SHEATHING REQUIREMENTS FOR SPECIFICATIONS)
- PLYWOOD USED FOR SHEAR AND UPLIFT RESISTANCE (SEE PLYWOOD USED FOR SHEAR AND UPLIFT RESISTANCE REQUIREMENTS)

## Table 1: Holddown Connectors

| Required Holddown Capacity | | Simpson | USP | Tamlyn |
|---|---|---|---|---|
| 1st FLOOR TO FOUNDATION | | | | |
| HD1 | 4,800 lbs | STHD14, HTT22 | STHD14, HTT22 | STHD14, HTT22 |
| HD2 | 5,500 lbs | PHD6, HTT22 | STAD14, HTT22, PHD5 | ADSJ–8 |
| HD3 | 8,300 lbs | HDQ8 | PHD8, UPHD8 | ADQ8 |
| 2nd FLOOR TO FOUNDATION | | | | |
| HD1 | 4,500 lbs | MSTC40 | MSTC40, KST248 | MTS172 |

## Table 2: Allowable Rafter Spans for Wind Loads

| Roof Slope | Horizontal Rafter Span | | | |
|---|---|---|---|---|
| | 2X6, SYP No. 3 | | 2X6, SYP No. 2 | |
| | 16" o.c. | 19.2" o.c. | 16" o.c. | 19.2" o.c. |
| 5 | 9'–8" | 8'–10" | 12'–6" | 11'–5" |
| 6 | 9'–1" | 8'–4" | 11'–9" | 10'–9" |
| 7 | 11'–5" | 10'–5" | 14'–10" | 13'–6" |
| 8 | 10'–9" | 9'–10" | 13'–10" | 12'–8" |
| 9 | 10'–2" | 9'–3" | 13'–2" | 11'–11" |
| 10 | 9'–5" | 8'–8" | 12'–3" | 11'–2" |
| 11 | 8'–10" | 8'–1" | 11'–6" | 10'–5" |
| 12 | 8'–3" | 7'–7" | 10'–1" | 9'–9" |

## Table 3: Uplift Connections

| Connection | Required Capacity | Simpson | USP | Tamlyn |
|---|---|---|---|---|
| Rafter to Double Top Plate (each rafter) | 600 lbs | H–8 | RT7A | HT8 |
| Overhang Ceiling Joists to Double Top Plate (each joist) | 600 lbs | H–8 | RT7A | HT8 |
| Double Top Plate to Studs (each stud) | 600 lbs | H–8 | RT7A | HT8 |
| 2nd floor studs to band joist or 1st floor studs (each stud) | 600 lbs | LSTA36 | LSTA40 | LSTA40 |
| Stud to Bottom Plate (each stud) | 420 lbs | SSP | RSPT4 | SPTR |
| Header end to King/Trimmer stud | 600 lbs | LSTA12 | MP4F | FAL |
| Trimmer/King stud to Sole/Bottom plate | 420 lbs | SSP | RSPT4 | SPTR |
| Top Plate to Header (16" o.c. along header) | 450 lbs | LSTA(4 Nails per side) | RSPT4(4 Nails per side) | |
| Ridge Strap (each header) | 970 lbs | LSTA12 | LSTA–12 | SS–12 |
| Overhang beam to post | 4,000 lbs | (4)LSTA12 | (4)MP4F | (4)FAL |
| Overhang beam to structure | 2,000 lbs | (2)LSTA12 | (2)MP4F | (2)FAL |
| Support post to foundation | 4,000 lbs | HTT16, HTT22 | STAD14, HTT22 | SSAD14, HAH22 |

This Inspection Outline, if followed, would assure appropriate construction methods were used. This Inspection Outline should be minimum guidelines for normal wind conditions. No one can guarantee what the potential of tornadic or hurricane force winds may be.

## WINDSTORM FASTENER SUMMARY

| Application: | | Corrosion Resistant | Minimum Fastener Dimensions | Fastener Spacing: |
|---|---|---|---|---|
| General Wall Framing | | No | – 3" x 0.128" (10d box)<br>– 3" x 0.131"<br>– 3.25" x 0.131" | Per practice and framing details |
| Sheathing Fastening | | No | – 2.5" x 0.131" diameter (8d common)<br>– 2.5" x 0.131" diameter deformed shank<br>– 2.5" x 0.120" diameter deformed shank<br>– 3" x 0.120" diameter deformed shank<br>– 3" x 0.128" diameter (10d box)<br>– 3" x 0.131" diameter<br>– 3.25" x 0.131 diameter | Wall Sheathing<br>– 4" o.c. @ perimeter<br>– 12" o.c. @ field<br>Roof Sheathing<br>– 4" o.c. @ perimeter<br>– 6" o.c. @ field |
| Composition Shingle Roof Coverings | | Yes | – 12 gauge shank diameter, 3/8" head diameter, 1" length | 4 nails per shingle on nail line unless otherwise specified by manufacturer. |
| Windows | | No | Per product evaluation/test report, or<br>– 2.5" x 0.131" diameter (8d common)<br>– 2.5" x 0.131" diameter deformed shank<br>– 2.5" x 0.120" diameter deformed shank<br>– 3" x 0.120" diameter deformed shank<br>– 3" x 0.128" diameter (10d box)<br>– 3" x 0.131" diameter<br>– 3.25" x 0.131 diameter | Per product evaluation/test report, or<br>– Spaced 6" o.c. around perimeter<br>– Place fastener in pre–drilled holes were provided<br>> Fastener must penetrate 1.5" into wall framing |
| Entry Doors | | No | Per product evaluation/test report, or<br>– No. 8 x 3" wood screws<br>– No. 10 x 2–1/2" wood screws | Per product evaluation/test report, or<br>– 4" from corners and 10" o.c. thereafter<br>– 6" from corners and 23" o.c. thereafter<br>> Fastener must penetrate 1.5" into wall framing |
| Garage Door | | No | – Per product evaluation/test report | Per product evaluation/test report |
| Hurricane Clip nails (typical) | Holddowns | No | – 2.5" x 0.162 dia. (or per catalogue for type) | Per connector type and manufacturer specifications |
| | Clips (H8) | No | – 1.5" x 0.148 dia. (or per catalogue for type) | Per connector type and manufacturer specifications |
| | Strap | No | – 2.5" x 0.148 dia. (or per catalogue for type) | Per connector type and manufacturer specifications |

| Date: | Remarks: | App'd: |
|---|---|---|
| | | |

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*A RESIDENTIAL PLAN FOR*
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| | | | |
|---|---|---|---|
| Date: 1/June/21 | | Designed: | D1 |
| Scale: N.T.S. | | Drawn: RJH | Sheet No.: 1 of 4 |
| Job No.: | | Checked: | |
| Drawing File: shane.DWG | | | |