

Green Built Texas – Verifier Guidelines Version 3.0 with 2015 Energy Code

CATEGORY	PROTOCOL ELEMENT	WHEN VERIFIED	RESPONSIBLE PARTY	HOW VERIFIED
WATER EFFICIENCY				
Water Efficiency	Obtain EPA WaterSense Certification	At Final Inspection.	Verifier	Verifier confirms presence by visual inspection.
OR Implement the following strategies:				
Water Efficiency	Irrigation systems shall be equipped with technology that inhibits or interrupts operation of the irrigation system during periods of rainfall, sufficient moisture, and freezing (e.g., rain sensors, soil moisture sensors) or a weather-forecast based (ET) irrigation controller. WS 4.2.6.	At Final Inspection.	Verifier	Verifier confirms presence by visual inspection.
Water Efficiency	Limit landscape & turf plantings to drought-tolerant varieties (must survive stage 3 drought restrictions).	At Final Inspection.	Builder, Verifier, and/or Landscaping Professional	Presence of compliant landscaping can be attested to by builder, verifier, or landscaping professional. Consult Texas A&M Horticulture list at https://aggieturf.tamu.edu/answers4you/publications/Turf%20Selection%20SCS-2009-05lr.pdf
Water Efficiency	Install 2" deep mulch in landscape beds.	At Final Inspection.	Verifier	Verifier confirms mulch of at least 2-inches in depth.
Water Efficiency	Select water efficient toilets (1.3 gpf) that work with first flush (min. 350 grams).	At Final Inspection.	Verifier or Plumber	Verifier confirms that toilet model(s) purchased meets performance requirement, using MaP testing protocol reference sheet, or plumber attests that the toilets provided meets program requirements.
Water Efficiency	<p>Reduce hot water usage by implementing one of the following: (NAHB 801.1.1)</p> <ul style="list-style-type: none"> • Hot water plumbing running to kitchen and all bathrooms is 30 feet or less in length from the water heater and is sized in accordance with the code for the specified application. • One of the following piping system designs is implemented: <ul style="list-style-type: none"> ○ Structured-type plumbing with demand-controlled hot water loops ○ Engineered parallel piping system (i.e. manifold system) in which the hot water line distance from the water heater to the parallel plumbing system is less than 15 feet. ○ Central core plumbing system with all plumbing fixture fittings (e.g. faucets and showerheads) is located such that the volume of water between the water heater and fixture fittings is a maximum of 6 cups. • Pipe runs exceeding 30 feet from the water heater to fixture locations are aided by one of the following: <ul style="list-style-type: none"> ○ Tankless hot water heater installed at point of use and served only by cold water ○ An on-demand hot water recirculation system is installed. 	At Pre-Drywall Inspection.	Verifier	Verifier confirms that piping is run at a distance of no more than 30 feet (Vertical plus Horizontal with Margin of error 5 feet) to fixtures OR presence of hot water on demand system.

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	<ul style="list-style-type: none"> ○ Pipes are insulated to minimum of R3. Circulating hot water piping is insulated to minimum R2. 			
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Water Efficiency	Install an ENERGY STAR dishwasher.	At Final Inspection.	Verifier or Builder	Verifier visually confirms that model carries ENERGY STAR label OR Builder with appliance provider confirms that dishwasher carries ENERGY STAR label.
Select any two (2) of the following water conservation strategies or install rainwater catchment system to provide for a minimum of 50% of landscape irrigation needs (presence of rainwater catchment system confirmed by verifier and performance attested to by builder and/or landscaping professional):				
Water Efficiency	<u>Strategy #1:</u> Select high performance fixtures. Choose any two (2) of the following: <ul style="list-style-type: none"> • All lavatory faucet flows rates equal to or less than 1.5 gpm. • All kitchen & utility faucet flow rates equal to or less than 2.2 gpm. • All showerhead flow rates equal to or less than 2.0 gpm • Lavatory faucets operated with infrared sensors 	At Final Inspection.	Verifier and Builder	Builder with plumber and/or fixture provider confirms flow rate with Verifier. Confirmation of fixture performance must be sent to Verifier at least twice annually.
Water Efficiency	<u>Strategy #2:</u> Zone irrigation system separately for turf and slab/bedding areas.	At Final Inspection.	Verifier, Builder, and/or Landscaping Professional	Builder or landscaping professional must clearly denote separate zoning on irrigation control box. Verifier confirms separate zoning indicated on control box.
Water Efficiency	<u>Strategy #3:</u> Install a low-volume, non-spray irrigation system. Choose any one (1) of the following: <ul style="list-style-type: none"> • Drip irrigation • Bubblers • Drip emitters • Soaker hose • Subsurface irrigation • Use no irrigation system 	At Final Inspection.	Verifier, Builder, and/or Landscaping Professional	Presence of system used can be attested to by builder, verifier, or landscaping professional. Installed system must not have spray zones.
INDOOR AIR QUALITY				
Indoor Air Quality	Obtain EPA Indoor Air Plus Certification	At Final Inspection.	Verifier	Can be attested to by builder providing copy of certification to verifier.
OR Implement the following strategies:				
Indoor Air Quality	Comply with ENERGY STAR Version 3.0 HVAC Quality Installation requirements OR Implement all of the following (a-d):	At Final Inspection.	Verifier	HVAC Quality Installation Checklist is to be completed per EPA guidelines OR

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Indoor Air Quality	<p>a. Heating and cooling design loads shall be determined for each room according to ACCA Man J, ASHRAE Handbooks, or equivalent software. Heating and cooling equipment shall be properly sized and selected to meet the design loads. This requirement shall be met by an ENERGY STAR HVAC QI Certificate (where available) OR verification of all the following:</p> <ul style="list-style-type: none"> • Documentation of design load calculations (i.e., load calculation worksheet or software report), AND • System design documentation (i.e., sizing calculations and equipment performance information), AND • Verification that outdoor and indoor coils match in accordance with the AHRI Directory of Certified Product Performance. For more information, see www.ahridirectory.org 	When completed by HVAC contractor.	Verifier and HVAC Contractor per EPA Guidelines	Load calculations can be conducted by contractor with proper credentials (Engineer, Texas A/C license, or under the supervision of a license holder). HVAC contractor attests to the sizing/commissioning being completed and will be required to maintain documentation throughout the warranty term. Upon request of verifier, homeowner, or builder the HVAC contractor must submit the <i>Manual J sizing calculation according to equipment manufacturer's specifications and airflow design according to calculations performed; within five (5) business days of request.</i>
Indoor Air Quality	<p>b. Sealed Duct system(s) shall be designed according to ACCA Man D, ASHRAE Handbooks, or equivalent software AND installed to be substantially airtight, properly balanced, and protected from construction debris. This requirement shall be met by an ENERGY STAR HVAC QI Certificate (where available) OR verification of all the following prescriptive requirements, OR the Performance Test Alternative below:</p> <ul style="list-style-type: none"> • Design verified by appropriate documentation (i.e., duct-sizing worksheet or annotated layout), AND • Duct system verified to meet the following additional requirements: <ul style="list-style-type: none"> ○ Seams in the HVAC cabinet, plenum, and adjacent ductwork shall be sealed with mastic systems, tape that meets the applicable requirements of UL 181A or UL 181B, or gasket systems. ○ Building cavities shall not be used as part of the forced air supply or return systems. ○ Duct openings shall either be covered during construction or vacuumed out thoroughly prior to installing registers, grilles, and diffusers <p>Performance Test Alternative:</p> <ul style="list-style-type: none"> • Room-by-room airflows balanced and measured by the HVAC contractor within +/-20% of calculated room airflows to meet design loads, except for baths, closets, and pantries, AND • Duct system TOTAL leakage test no greater than 6 cfm per 100 s.f. of floor area (or 9% design fan flow), measured at 25 Pa, with duct boots and air handler in place, according to ASTM E1554, ASHRAE 152, or other RESNET-approved method. 	<p>At Pre-Insulation.</p> <p>At Final Inspection.</p> <p>At Final Inspection.</p> <p>At Pre-drywall Inspection</p>	<p>Verifier</p> <p>Verifier</p> <p>HVAC Contractor</p> <p>HERS Rater</p>	<p>Verifier confirms duct design according to ACCA Man D, ASHRAE Handbooks, or equivalent software.</p> <p>Verifier confirms presence by visual inspection.</p> <p>HVAC Contractor confirms room-by-room balance airflows according to ACCA 5 QI-2015 standard.</p> <p>HERS Rater confirms duct system TOTAL leakage requirements through duct testing outline in ASTM E1554, ASHRAE 152, or other RESNET-approved method.</p>
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	<p>c. Provide mechanical whole-house ventilation meeting all ASHRAE 62.2 requirements. The following requirements shall be visually verified:</p> <ul style="list-style-type: none"> • Whole house mechanical ventilation system & controls shall be installed to deliver the prescribed outdoor air ventilation rate (ASHRAE 62.2 section 4), including ventilation restrictions in ASHRAE 62.2 section 4.5 (e.g., not greater than 6.0 cfm/100 s.f. in “Warm-Humid” climates as defined by IECC Figure 301.1); AND • Transfer air (i.e., air from adjacent dwelling units or other spaces such as garages, crawlspaces, or attics) shall not be used to meet ventilation requirements (ASHRAE 62.2 section 6.1); AND • Outdoor air inlets shall be located a minimum of 10 ft. from contaminant sources (ASHRAE 62.2 section 6.8); AND • Airflow shall be tested to meet rated fan airflow (at 0.25 in. w.c.) OR verify duct(s) sized according to the requirements of ASHRAE 62.2 Table 7.1 and the manufacturer’s design criteria (ASHRAE 62.2 section 7.3) 	<p>At Pre-drywall Inspection</p> <p>At Pre-drywall Inspection</p> <p>At Pre-drywall Inspection</p> <p>At Final Inspection</p>	<p>Verifier</p>	<p>Verifier confirms presence by visual inspection.</p>
	<p>d. Room pressure differentials shall be minimized by installing transfer grilles or jump ducts for any closed room that does not have a dedicated return, except for baths, kitchens, closets, pantries, and laundry rooms. The opening size shall be 1 square in. capacity (grille area) per cfm of supply (including free area undercut below door as part of the area).</p> <p>Performance Test Alternative: Measured pressure differential no greater than 3 Pa (0.012 in. w.c.) between closed rooms and adjacent spaces that have a return. Pressure difference of 5 Pa shall be acceptable for rooms with designed airflow of greater than or equal to 150 cfm.</p> <p>Note: Outdoor air ducts connected to the return side of an air handler shall be permitted as supply ventilation only if the manufacturers’ requirements for return air temperature are met (e.g., most manufacturers recommend a minimum of 60 degrees F air flow across furnace heat exchangers)</p>	<p>At Pre-drywall Inspection.</p>	<p>Verifier</p>	<p>Verifier confirms presence by visual inspection.</p>
<p>Indoor Air Quality</p>	<p>If gas furnaces and/or water heaters are located within conditioned space they must be sealed combustion or vented to the outside</p>	<p>At Pre-Drywall Inspection.</p>	<p>Verifier</p>	<p>Verifier confirms that gas furnaces and/or water heaters located within thermal envelope are sealed combustion or vented to outside.</p>

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Indoor Air Quality	<p>No air-handling equipment or ductwork shall be located in garages.</p> <p>Note: Ducts and equipment may be located in framing spaces or building cavities adjacent to garage walls or ceilings if they are separated from the garage space with a continuous air barrier (see ENERGY STAR Thermal Enclosure Rater Checklist).</p>	At Pre-Drywall Inspection.	Verifier	Verifier confirms that NO air-handling equipment or ductwork is located in garages by visual inspection.
Indoor Air Quality	Provide local mechanical exhaust ventilation to the outdoors in each bathroom and kitchen, meeting ASHRAE 62.2 section 5 requirements	At Final Inspection	Verifier	Verifier confirms presence of mechanical exhaust ventilation to the outdoors in each bathroom and kitchen compliant to ASHRAE 62.2 section 5 requirements.
Indoor Air Quality	Avoid attached garage or isolate garage from the living space by providing a tightly sealed, gasketed door between the garage and conditioned space and provide a continuous air barrier between walls and ceilings separating the garage from the conditioned living space.	Initially at Pre-Drywall and confirmed at Final Inspection	Verifier	Verifier checks for poly seal at base plate during Pre-Drywall Inspection and confirms sheetrock, tape, bed, and other sealing techniques at Final Inspection.
Indoor Air Quality	<p>Install equipment to maintain Relative Humidity at or below 60% using one of the following:</p> <p>a. Additional dehumidification system(s)</p> <p>b. Central HVAC system equipped with additional controls to operate in dehumidification mode</p>	At Pre-Drywall Inspection.	Verifier or HVAC Contractor	Verifier or HVAC contractor must attest to installation of equipment designed to meet this performance guideline in writing.
Indoor Air Quality	<p>Fireplaces. New wood –burning fireplaces shall have tight-fitting flue dampers or doors, and outdoor combustion air. Where using tight-fitting doors on factory-built fireplaces listed and labeled in accordance with UL 127, the doors shall be tested and listed for the fireplace. Where using tight-fitting doors on masonry fireplaces, the doors shall be listed and labeled in accordance with UL 907.</p>	Initially at Pre-Drywall and confirmed at Final Inspection	Verifier	Verifier confirms that combustion air for wood-burning fireplace will come from the outside. Verifier confirms presence of glass door on fireplace.
Indoor Air Quality	Use water-based mastic to seal ducts.	At Pre-Drywall Inspection.	Verifier	Verifier confirms presence by visual inspection.
Indoor Air Quality	Use minimum MERV 8 filters for AC return. There should be no visible bypass between the filter and the filter rack.	At Final Inspection.	Verifier	Verifier confirms filter rating of at least MERV 8.
Indoor Air Quality	<p>All homes equipped with combustion appliance(s) or an attached garage shall have a carbon monoxide (CO) alarm installed in a central location in the immediate vicinity of each separate sleeping zone (e.g., in a hallway adjacent to bedrooms.) The alarm(s) shall be hard-wired with a battery back-up function and placed according to NFPA 720. The alarms shall be certified by either CSA 6.19-01 or UL 2034.</p>	At Final Inspection.	Verifier or HVAC Contractor	Verifier confirms presence of CO detector and compliance with NFPA 5.2.3 is confirmed by manufacturer statement/specifications/label.

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<i>Select any two (2) of the following strategies to enhance indoor air quality:</i>				
Indoor Air Quality	Strategy #1: Select carpets, paddings, and adhesives that are compliant with emission levels in accordance with the Carpet and Rug Institute's (CRI) Green Label or Green Label Plus indoor air quality program.	At Final Inspection.	Builder or Verifier	Presence can be attested to by providing verifier copy of manufacturer statement/specifications and purchase order OR Verifier confirms that at least 80% of all carpet, pad, and floor covering adhesives are Green Label.
Indoor Air Quality	Strategy #2: Interior paints and finishes, including 90% or more of such products applied to interior surfaces of homes, shall be certified low-VOC or no-VOC by one of the following: <ul style="list-style-type: none"> • Green Seal Standard GS-11, OR • Greenguard Certification for Paints and Coatings, OR • Scientific Certification Systems (SCS) Standard EC-10.2-2007, Indoor Advantage Gold, OR • Master Painters Institute (MPI) Green Performance Standards GPS-1 or GPS-2, OR • A third-party low-emitting product list based on CA Section 01350, e.g., the CHPS List at www.chps.net/dev/Drupal/node/381 	At Final Inspection	Builder	Presence can be attested to by providing verifier copy of manufacturer statement/specifications and purchase order.
Indoor Air Quality	Strategy #3: Install central vacuum (canister unit) outside conditioned space.	At Final Inspection.	Verifier	Confirmed via visual inspection by verifier.
Indoor Air Quality	Strategy #4: Structural plywood and OSB shall be certified compliant with PS1 or PS2, as appropriate, and shall be made with moisture-resistant adhesives as indicated by "Exposure 1" or "Exterior" on the American Plywood Association (APA) trademark. Hardwood plywood shall be certified compliant with the formaldehyde emissions requirements of ANSI/HPVA HP-1-2004 and U.S. HUD Title 24, Part 3280, OR certified compliant with CA Title 17.	At Final Inspection	Builder	Presence can be attested to by providing verifier copy of manufacturer statement/specifications and purchase order.
Indoor Air Quality	Strategy #5: Particleboard and MDF shall be certified compliant with the formaldehyde emissions requirements of ANSI A208.1 and A208.2, respectively, and U.S. HUD Title 24, Part 3280, OR certified compliant with EPPS CPA 3-08 by the CPA Grademark certification program, OR certified compliant with CA Title 17.	At Final Inspection	Builder	Presence can be attested to by providing verifier copy of manufacturer statement/specifications and purchase order.
Indoor Air Quality	Strategy #6: Cabinetry contains no added urea formaldehyde and is made with component materials that are certified to comply with all the appropriate standards listed in Strategies 5 or 6 OR shall be registered brands or produced in registered plants certified under KCMA's Environmental Stewardship Certification Program (ESP 01-06).	A Final Inspection.	Builder or Verifier	Presence can be attested to by providing verifier copy of manufacturer statement/specifications and purchase order.

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Indoor Air Quality	<u>Strategy #7:</u> Upgrade AC return filtration to minimum 4-inch pleated or MERV 9 or greater (in lieu of item #9). There should be no visible bypass between the filter and the filter rack. Ensure that filter is compatible with and accounted for in HVAC design calculations.	At Final Inspection.	Verifier	Verifier confirms filter is 4-inch pleated and/or carries a rating of at least MERV 9.
ENERGY EFFICIENCY (CHOOSE ONE OF THE FOLLOWING STRATEGIES)				
Energy Efficiency	<u>Strategy #1:</u> Achieve HERS Index of 65 or below and comply with ENERGY STAR Version 3.0 Thermal Enclosure System Checklist.	Per EPA Guidelines and RemRate software	HERS Rater	HERS Rater (can be the same entity as verifier) attests that home meets required HERS Index. (as proven by RemRate software). New state energy code requires ERI (HERS) 65.
Energy Efficiency	<u>Strategy #2:</u> Obtain ENERGY STAR Version 3.0 certification.	Per EPA Guidelines.	HERS Rater	HERS Rater (can be the same entity as verifier) attests that home meets performance guidelines set forth by ENERGY STAR after following EPA guidelines as they stand or may be amended.
Energy Efficiency	<u>Strategy #3:</u> Meet or exceed Texas Building Energy Performance Standards. NCTCOG approved Air Change Per Hour Tradeoffs are acceptable per guidance document issued to code officials, raters and builders.	Per code requirements or NCTCOG-issued guidance document	HERS Rater	HERS Rater (can be the same entity as verifier) attests that home meets performance guidelines and issues compliance certificate per code requirements or follows NCTCOG approved tradeoffs .
DURABILITY AND MOISTURE MANAGEMENT				
Durability and Moisture Management	Comply with Energy Star Version 3.0 Water Management System Checklist	At Final Inspection.	Builder or Verifier	Builder or Verifier confirms presence by visual inspection.
HOMEOWNER EDUCATION				
Homeowner Education	Provide homeowner with operations and maintenance kit and perform walk-through.	Builder Conducts Walk-Through.	Builder	Builder must provide a walkthrough of the home to familiarize the homeowner with the operation and maintenance of mechanical systems.
Homeowner Education	Provide homeowner with information on local recycling programs, green energy service providers, and Green Built Texas registration process.	Builder Presents Registered Home Certificate.	Builder	Builder presents homeowner with Green Built Texas certificate.