



**Green Built™
TEXAS**



Protocol Version 3.0

**In order to be recognized by the program, each home must be verified, under the process established by the program. See the GBT Verifier Resources Guide for more information.*

**Applicable building codes, as they are written or interpreted by the jurisdiction in which the home is constructed, take precedence over any provision contained herein.*

Highlighted Items are Town Amended Requirements

Water Efficiency

Obtain EPA WaterSense Certification or implement the following strategies:

1. 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.
2. Limit new turf plantings to drought-tolerant varieties (must survive stage 3 drought restrictions).
3. Install 2" deep mulch in landscape beds.
4. Select water efficient toilets (1.3 gpf) that work with first flush (min.350 grams). (performance for WS toilet)
5. Install Energy Star dishwasher (now mandatory)
6. Reduce hot water usage by implementing one of the following: (NAHB 801.1.1)
 - 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:
 - 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:
 - Tankless hot water heater installed at point of use and served only by cold water
 - An on-demand hot water recirculation system is installed.
 - Pipes are insulated to minimum of R3. Circulating hot water piping is insulated to minimum R2.

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:

Strategy #1: Select high performance fixtures. Choose any **two (2)** of the following:

- All lavatory faucet flow rates are equal to or less than 1.5 gpm.
- All kitchen & utility faucet flow rates are equal to or less than 2.2 gpm.
- All showerhead flow rates are equal to or less than 2.0 gpm.
- Lavatory faucets are operated with infrared sensors

Strategy #2: Zone irrigation system separately for turf and slab/bedding areas.

Strategy #3: Install a low-volume, non-spray irrigation system. Choose any one (1) of the following:

- Drip irrigation
- Bubblers
- Drip emitters
- Soaker hose
- Subsurface irrigation
- ~~Use no irrigation system~~

Indoor Air Quality

Obtain EPA Indoor Air Plus Certification or implement the following strategies:

1. **Comply with Energy Star Version 3.0 HVAC Quality Installation requirements or implement all of the following:**

- 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:
 - 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
- Seal 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:
 - Design verified by appropriate documentation (i.e., duct-sizing worksheet or annotated layout), AND
 - Duct system verified to meet the following additional requirements:
 - 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

Performance Test Alternative:

- Room-by-room airflows balanced and verified 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.
- c. **Provide mechanical whole-house ventilation meeting all ASHRAE 62.2 requirements.** The following requirements shall be visually verified:
- 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 7.5 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).
- d. **Install 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).

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.

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).

- e. **Install ENERGY STAR programmable thermostats with humidity control.**

2. If gas furnaces and/or water heaters are located within conditioned space they must be sealed combustion or vented to the outside.

3. **No air-handling equipment or ductwork shall be located in garages.**

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 Bypass Checklist Guide).

4. Provide local mechanical exhaust ventilation to the outdoors in each bathroom and kitchen, meeting ASHRAE 62.2 section 5 requirements

5. 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.

6. Install equipment to maintain Relative Humidity at or below 60% using one of the following:

- a. Additional dehumidification system(s)
- b. Central HVAC system equipped with additional controls to operate in dehumidification mode

7. Provide combustion air for wood-burning fireplaces from outside and install glass door or install sealed combustion fireplace.

8. Use water-based mastic to seal ducts.

9. Use minimum MERV 8 filters for AC return. There should be no visible bypass between the filter and the filter rack.
10. **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.

Select any one (1) of the following strategies to enhance indoor air quality:

Strategy #1: Select carpets, padding, 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.

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:**

- 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

Strategy #3: Install central vacuum (canister unit) outside conditioned space.

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.

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.

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).

Strategy #7: 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.

Energy Efficiency (choose one of the following strategies)

1. Achieve HERS Index of 75 or below and comply with ENERGY STAR Version 3.0 Thermal Enclosure System Checklist.
2. Obtain ENERGY STAR Version 3.0 certification.

Durability and Moisture Management

Comply with Energy Star Version 3.0 Water Management System Checklist

Materials

1. Install gutters and Provide gutter downspout extensions or concrete splashguards and positive drainage away from house.

2. Use minimum Class 3 roofing materials with a minimum 30-year warranty.

Homeowner Education

1. Provide homeowner with operations and maintenance kit and perform walk-through.
2. Provide homeowner with information on local recycling programs, green energy service providers, and Green Built Texas registration process.