

**Minimum Design Standards  
For the Rehabilitation of  
Single Family & Multifamily Housing Units**



**Community Programs Division  
502 Deaderick Street, 2<sup>nd</sup> Floor  
Nashville, Tennessee 37243  
615-815-2030**

**January 2017**

## Table of Contents

<b>Page</b>	
Division 1: General Requirements.....	<b>3</b>
Division 2: Existing Conditions .....	<b>7</b>
Division 3: Concrete .....	<b>7</b>
Division 4: Masonry .....	<b>8</b>
Division 5: Metals .....	<b>8</b>
Division 6: Wood, Plastics, and Composites .....	<b>8</b>
Division 7: Thermal and Moisture Protection .....	<b>9</b>
Division 8: Openings .....	<b>10</b>
Division 9: Finishes .....	<b>11</b>
Division 10: Specialties .....	<b>13</b>
Division 11: Equipment.....	<b>14</b>
Division 12: Furnishings .....	<b>15</b>
Division 13: Special Construction .....	<b>16</b>
<b>Division 14 – 20: Reserved for Future Use</b>	
Division 21: Fire Suppression.....	<b>16</b>
Division 22: Plumbing.....	<b>16</b>
Division 23: Heating, Ventilating, and Air Conditioning .....	<b>18</b>
<b>Division 24 – 25: Reserved for Future Use</b>	
Division 26: Luminaires .....	<b>20</b>
Division 27: Communications .....	<b>20</b>
Division 28: Electronic Safety and Security .....	<b>21</b>
<b>Division 29 – 30: Reserved for Future Use</b>	
Division 31: Earthwork.....	<b>21</b>
Division 32: Exterior Improvements.....	<b>21</b>
Division 33: Utilities .....	<b>23</b>

## Introduction

The following minimum design standards are for rehabilitated single family and multifamily attached units. These same standards also apply to accessibility improvements. Refer to ADA Accessibility Guidelines for technical requirements and standards when applicable.



## **Division I: General Requirements**

### **1 Minimum Design Standards:**

These Minimum Design Standards shall apply when applicable THDA funding is used for rehabilitation of single family and multifamily housing financed through THDA's Community Programs Division.

THDA's Minimum Design Standards are to be used as a guideline to meet and/ or exceed all applicable federal, state, county, and local codes. These standards also serve as a vehicle to promote and enforce modern construction and design practices for builders, contractors, and design professionals who wish to use funding from the Tennessee Housing Development Agency's Community Programs Division. Other methods of construction and design may be acceptable on a case by case basis.

THDA must review and approve all plans, specifications, work write-ups and written cost estimates and determine cost reasonableness for rehabilitation activities prior to putting the project out to bid.

### **2 Quality Assurance:**

General Contractors and/or subcontractors shall furnish a written material and labor warranty on all units, materials, and construction for a period not less than one full year after the date of issuance of a certificate of occupancy or owner's final inspection acceptance.

### **3 Units for Elderly Residents:**

All newly rehabilitated multi-family constructed units for elderly residents, age 62 or older, shall be located at the grade level or on an elevator accessible floor in compliance with ICC A117.1-2009 1005 Type C Visitable Units

### **4 Universal Design:**

Projects that receive funding from THDA for the purpose of rehabilitating single family or multi-family housing are encouraged to use Universal Design principles to ensure the unit's viability for a range of future users. Information regarding Universal Design principles can be found at:

<http://www.huduser.org/Publications/PDF/remodel.pdf>  
and at <https://www.ncsu.edu/ncsu/design/cud/>

## 5 **Codes:**

All construction shall comply with applicable federal, state, county, and local codes, planning and zoning requirements, local authorities' rules and regulations. In the absence of local codes, the following Tennessee State adopted codes shall apply as applicable:

- 2012 International Building Code
- 2012 International Existing Building Code
- 2012 International Fire Code
- 2012 International Fuel Gas Code
- 2012 International Plumbing Code
- 2012 International Mechanical Code
- 2008 National Electrical Code
- 2012 International Property Maintenance Code
- 2012 International Energy Conservation Code

The International Code books are available from:

Eastern Regional Office:  
(BIR) 900 Montclair Road  
Birmingham, AL 35213  
[P] 888-ICC-SAFE (888-422-7233) and press 0  
[F] (205) 599-9871  
Open 8 a.m. to 4 p.m., Central, Monday-Friday

Central Regional Office:  
(CH) 4051 Flossmoor Road  
Country Club Hills, IL 60478  
[P] 888-ICC-SAFE (888-422-7233) and press 0  
[F] (708) 799-4981 or 1-800-214-7167  
Open 8 a.m. to 4 p.m., Central, Monday-Friday

Western Regional Office:  
(LA) 5360 Workman Mill Road  
Whittier, CA 90601  
[P] 888-ICC-SAFE (888-422-7233) and press 0  
[F] (562) 908-5524  
Open 8 a.m. to 4 p.m., Pacific, Monday-Friday

Website: [www.iccsafe.org](http://www.iccsafe.org)

## 6 **Accessibility:**

Federal regulations such as the Fair Housing Amendment Act of 1988, Section 504 of the Rehabilitation Act of 1973 and Americans with Disabilities Act of 2010, as

amended, shall apply as required by each regulation based on the specific project activity funded.

## **7 Uniform Physical Condition Standards:**

The Uniform Physical Condition Standards shall apply shall apply. A comprehensive list can be found on the THDA website ([www.THDA.org](http://www.THDA.org)) for the applicable THDA program.

## **8 Energy Efficiency:**

All rehabilitated residential building envelope designs shall strive to meet or exceed minimum energy efficiency requirements as currently adopted by the State of Tennessee.

## **9 Disaster Mitigation Control Methods:**

All rehabilitation construction should be constructed in a method that would attempt to protect the construction from possible disaster due to either a man-made issue, or an act of God that may cause physical or structural damage to the home. The methods should include any items that may be recommended, or required by either local, state, or federal agencies dealing with disasters. Additional information can be found in Chapter 34 of the 2012 International Building Code as adopted by the State of Tennessee.

## **10 Major Systems:**

Major systems include Structural Support (foundations/footings, walls/floors/ceilings, and roof support); Roofing (covering, eaves, penetrations, gutters/downspouts); Exterior (siding, windows, fascia, doors); Plumbing (water supply, sanitary sewer, fixtures, water heater); Mechanical (HVAC, ventilation), and Electrical (panel/fuse/breaker box, receptacles, switches, wiring methods).

Upon project completion of all projects, an estimate of the remaining useful life of each major system, based on age and condition, must be provided.

For multifamily housing with 26 or more units, the useful life must be determined through a capital needs assessment that is completed and provided to THDA for review prior to starting construction. The capital needs assessment must be used to determine the work to be performed under the construction contract and to identify the long-term physical needs of the project.

For all projects, if the remaining useful life of 1 or more major system is less than 30 years, a replacement reserve must be established with adequate monthly payments to repair or replace the system(s) as needed.

## **11 Health and Safety:**

If any item on any of these lists is in a condition that could possibly cause damage to the structure or the health and safety of a person, or persons in or around the structure, the issue must be recorded on this UPCS checklist as an Emergency Repair (ER) item and reported to the resident, if applicable, and, if a rental property, to the property owner. Rental property owners must correct the issue and protect the health and safety of the occupants within 24 hours as provided in the applicable program manual.

## **12 Inspection Protocols**

The following protocols will govern the inspection of newly constructed units:

- a. A Work Write-Up (WWU) is performed by a State of Tennessee Certified Building Inspector. His/her inspection and WWU starts the process to set the Scope of Work for the Project. Included in this WWU is the THDA Minimum Design Standards for the Rehabilitation of Single Family and Multi-family Units as well as the THDA Uniform Physical Condition Standards (UPCS) Checklist.
- b. The WWU is sent to THDA to be approved.
- c. THDA returns the Approved WWU to the Grantee and THDA's third party Quality Control Inspector (QCI).
- d. The Grantee forwards the WWU and schedules an Initial Quality Control inspection with the QCI.
- e. The QCI performs an Initial Quality Control Inspection and returns the report to THDA.
- f. THDA returns the Initial Quality Control to the Grantee with comments to be addressed, or approved. If comments are to be addressed, the Grantee returns the report to THDA for approval.
- g. The Project is bid and awarded to the selected contractor by the Grantee.
- h. At approximately 60% of the construction project being completed, the Grantee requests that the QCI performs a Progress Quality Control Inspection.
- i. The QCI forwards the Progress Quality Control Inspection to THDA with comments to be addressed, or approved. If comments are to be addressed, the Grantee returns the report to THDA for approval.
- j. At the conclusion of the project being completed, the Grantee requests that the Quality Control Inspector perform a Final QC Inspection.

- k. The QCIU forwards the Final Quality Control to THDA with comments to be addressed, or approved. If comments are to be addressed, the Grantee returns the report to THDA for approval.

NOTE: If the construction work is in a jurisdiction that issues permits for construction work, the local inspector also would perform the required inspections from his/her jurisdiction to determine code compliance with local zoning, building and planning requirements. A copy of the certificate of occupancy must be provided to THDA by the Grantee.

## **Division 2: Existing Conditions**

### **1 Lead Based Paint:**

When federal funds are utilized, all project sites shall be certified free of Lead Based Paint upon completion of the project in conformance with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 4821-4846), the Residential Lead-Based Paint Hazard Reduction Act of 1992 (42 U.S.C. 4851-4856), and implementing regulations at part 35, subparts A, B, J, K, M and R of this title..

If the home was built prior to 1978, the home must be tested for LBP prior to the approval of the work.

## **Division 3: Concrete**

### **1 Exterior Concrete:**

Shall conform to the latest revised Standard Specification for Portland cement, ASTM C595. All concrete shall have a minimum 28-day compressive strength of 3000 psi and be entrained with 5 percent air with a minimum cement content of 520 lbs. per cubic yard (5.5 sacks). Expansion-joint material shall be ½” thick asphalt-impregnated pre-molded fiber, ASTM D1752. Follow American Concrete Institute (ACI) 318. Minimum 4” thick for driveways, parking areas, sidewalks, porches and stoops. Driveways to have fiberglass mesh or 6x6 WWF or 6” thick.

### **2 Concrete Finishes:**

Smooth formwork, no patterns, shall be used for all poured in place walls exceeding 3 feet or more exposure.



## **Division 4: Masonry**

### **1 Face Brick:**

Shall be ASTM C 216, Type FBS, Grade SW, or equivalent, modular size.

### **2 Concrete Masonry Units (CMU):**

Stucco or split face shall be used for all CMU walls exceeding 3 feet or more exposure.

## **Division 5: Metals**

### **1 Metal Ties:**

For rehabilitation, metal tie-down or “hurricane” straps shall be added at each bearing location of each roof truss, rafter and ceiling joist where a new roof or attic construction occurs. Correct nails and nailing pattern as required by the IRC Fastening Schedule, or the manufacturers’ installation requirements of the strap shall be used.

### **2 Steel Lintels:**

Steel lintels, when specified for openings in masonry walls, shall be galvanized, primed and painted.

## **Division 6: Wood, Plastics, and Composites**

### **1 Stair Riser and Tread Construction:**

All newly constructed steps shall conform to 2009 IRC requirements having a riser not greater than 7 3/4” and a tread of 11”.

### **2 Wood Exposed to Weathering Elements:**

All exterior wood shall have a minimum preservative retention rate of 25 percent for above ground applications and a minimum preservative retention rate of 40 percent for all wood in contact with the ground.

### **3 Wood Decking:**

Exterior wood decking shall consist of composite, natural durable wood or pressure treated wood material.

#### **4 Wood Stairs and Handrails:**

Exterior wood stairs shall be constructed with properly treated dimensional lumber. Handrails shall be constructed of composite, natural durable wood or pressure treated wood material. Handrails shall meet the graspability and size standards in the International Residential Code.

### **Division 7: Thermal and Moisture Protection**

#### **1 Fascia:**

- a. **Metal:** 0.019" minimum thickness aluminum, factory finish (coil stock).
- b. **Exposed Wood:** redwood, cedar, or pressure treated.
- c. **Composite:** Cement fiber board or other durable material as approved by THDA.

#### **2 Roof:**

- a. **Shingles:** 215 lb. seal tab type over 30 lb. felt with metal drip edge, with minimum 25-year product warranty.
- b. **Metal:** Metal roofs will be considered on a case-by-case basis if the house being rehabbed currently has a metal roof system.
- c. **Decking:** Decking shall be a minimum of ½" OSB with fastening clips.
- d. Minimum roof slope on all newly constructed roofs except porch roofs shall be 4" vertical to 12" horizontal.

#### **3 Gutters and Downspouts:**

All structures shall have gutters and downspouts and be appropriately designed with a minimum 5" gutter and a 2"x 3" downspout. All downspouts shall empty onto a splash block or be piped to an appropriate location.

#### **4 Siding:**

- a. **Composite:** Fiber cement siding, primed, with two-coat minimum painted finish or factory finish.

- b. **Metal:** 26 gauge minimum thickness aluminum or galvanized steel with factory finish.
- c. **Vinyl:** 0.42" minimum thickness, UV protected.
- d. **Wood:** Cedar or redwood stained or primed once with 2-coat minimum finish sealer.

## 5 Insulation:

All crawl spaces shall contain cavity floor insulation equal to or greater than R-19. Combined wall insulation value shall be equal to or greater than R-13. Combined attic insulation value shall be equal to or greater than R-38. As per NAIMA (North American Insulation Manufacturers Association) standards, or ICC Energy Conservation Code as adopted by the State of Tennessee.

## Division 8: Openings

### 1 Exterior Doors:

Exterior Doors shall be 1  $\frac{3}{4}$ " thick 6 panel, steel material, or with limited panes of glass, insulated and be appropriately finished as recommended by the manufacturer. All opaque exterior doors shall have a U-factor equal to or less than 0.40.

- a. **Exterior Hardware:** All exterior doors, except sliding glass doors, shall have a lever key-lock latch and security accessories (eyelet peep hole and deadbolt).
- b. **Exterior Storm Doors:** All exterior storm doors, shall be provided with a manufacturer's designation specifying the type of glass and the safety glazing standard with which it complies, which is visible at the final installation. And shall have a storable glass and screen in the lower sash, as well as a self-closing device.

### 2 Interior Doors:

Solid Wood, Composite or hollow core panel doors. Interior doors shall be a minimum of 1  $\frac{3}{8}$ " thick.

#### a. **Interior Hardware:**

All doors, except bi-fold and bypass type doors, shall be equipped with passage lever-handle hardware. All bedrooms and bathrooms shall be equipped with privacy locks.

### 3 **Windows:**

- a. All window frames must be solid vinyl. Double hung or Single hung type to have at a minimum the lower sash able to slide with a removable bug screen.
- b. All glazing shall be double-paned with low E with Argon.
- c. The vapor seal on the glazing must have a minimum ten-year warranty.
- d. All windows shall have a minimum one-year warranty on the operation of the window.
- e. All windows shall have a National Fenestration Rating, SHGC Rating and U-Factor meeting minimum energy code requirements as required by the International Energy Conservation Code as currently adopted by the State of Tennessee.

## **Division 9: Finishes**

### 1 **Exterior Ceiling:**

Solid backing to be used when using vinyl or aluminum material for porch ceilings, provide a rigid, solid backing such as ½" OSB or plywood.

### 2 **Exterior Finishes:**

- a. **Wood:** All exterior exposed wood shall have a minimum preservative retention rate of 25 percent for above ground applications and a minimum preservative retention rate of 40 percent for all wood in contact with the ground. All structural posts below grade shall have the factory treated end of the post below grade. Use of CCA Treated lumber shall be prohibited.
- b. **Posts and Columns:** All posts columns and guardrails at deck level and above shall be factory made and finished, or meet the exterior wood finish in section "a".
- c. **Handrails:** Rails shall be smooth, splinter-free, painted or factory finished, withstanding weather, and resisting checking and splintering. All handrails shall meet the graspability standards as required by the International Residential Code as currently adopted by the State of Tennessee.
- d. **Fiber Cement Siding:** Shall be factory finished or be painted with at least two coats of exterior grade paint.

### 3 **Finished Floor Treatments:**

- a. **Carpet Padding:** 7/16" thick, 6-lb. minimum re-bond polyurethane.
- b. **Sheet Carpet:** 25 oz. minimum, 100 percent nylon. Other options include Berber type with blended fiber.
- c. **Sheet Vinyl:** Shall be Armstrong or equivalent minimum 10 mil wear layer. Provide product adhesive and underlayment as recommended by the manufacturer. All surfaces shall be clean, dry, and appropriate temperature during installation. Vinyl sheet flooring shall conform to the requirements of ASTM F 1303, Type I.
- d. **Vinyl Composition Tile (VCT):** Shall be Armstrong or other approved equal, 1/8" x 12" x 12". Provide product adhesive and underlayment as recommended by the manufacturer. All surfaces shall be clean, dry, and appropriate temperature during installation. Follow manufacture's recommendation for pattern layout.
- e. **Wood Flooring:** Flooring shall be tongue and groove hardwood; factory finished, or have a minimum of three coats of site-applied, UV-protective polyurethane.
- f. **Laminate Wood Flooring:** Composite panel(s) comprised of four main components: a high pressure decorative laminate surface, an Aqua Resist high density fiberboard (HDF) core, a high pressure balancing backer, and an attached high density polyethylene underlayment. Typical size: 7.6" x 47.55" x .385". Aluminum locking system for glue-free installation. Wax-impregnated edges. The floor shall be resistant to stains and reagents. The floor shall have a horizontal joint strength of not less than 1,000 lbs./lineal ft. and Ball Impact Resistance (ANSI/NEMA LD3-2000, 3.8)

### 4 **Other Flooring Products: Ceramic Tile and Laminates:**

At the interior side of the main entry door within each dwelling unit, there shall be an uncarpeted, finished floor area. This area shall be no less than sixteen (16) square feet.

### 5 **Interior Doors:**

- a. **Paint:** Primed once, with two-coat semi-gloss finish on all sides and faces. No VOC.
- b. **Stain:** Stain or oil on all sides and faces, with three-coat varnish, polyurethane finish. Low VOC.

c. **Factory Finished:** Factory finish doors are acceptable with factory warranty.

**6 Water-Resistant Drywall:**

Water-resistant gypsum board (commonly called “green board”) or equivalent must be used on all walls in the bathroom and within six feet of wall surfaces where the drywall can be splashed such as kitchen sink, next to water heater and/or washer. Water-resistant/ mold resistant gypsum board or equivalent shall be provided behind any tub/shower unit located on an exterior wall. Water-resistant gypsum, when used on ceilings must be rated for the span. Prefer non-paper faced drywall or a product that meets ASTM D3273 for mold resistance above and immediately around tubs, showers.

**7 Interior Wall Finishes:** Primed once and two finish coats of flat, eggshell or satin. Use semi-gloss, or satin finish for bathrooms, laundry, and kitchens. No VOC.

## **Division 10: Specialties**

**1 Roof Offsets:**

Projects of four (4) or more attached units shall be designed in such a way as to vary the roof line with offsets, gable porch roofs, etc.

**2 Entries:**

All main entries shall have a roof or awning over the entry area. The roof shall cover at least a 5' x 5' area.

**3 Closet Storage/Accessories:**

Closets shall include a 12” deep vinyl wrapped wire shelf in coat, laundry and bedroom closets. Minimum of (4) 24” deep vinyl wrapped wire shelves for kitchen pantries.

**4 Mailboxes:**

All units shall have a United States Postal Service (USPS) approved mailbox either at each individual unit, common area, or a designated location per USPS post master.

**5 Bath Accessories:**

At minimum, all bathrooms shall have:

- a. Medicine cabinet with mirror 16" wide by 20" tall (minimum) if in a full bath
- b. Wall hung toilet paper dispenser
- c. 24" (minimum) towel bar
- d. Mirror above vanity backsplash

Other combinations of mirror and storage may be acceptable with the approval of THDA. All electrical outlets in the bathroom are required to be of the GFCI Type or GFCI Protected.

## **Division 11: Equipment**

### **1 Refrigerator:**

A refrigerator shall be minimum 18 cubic foot frost free provided in all dwelling units to match color with the dishwasher and range on all projects where identified in the PCNA (physical/capital needs assessment). All refrigerators must be Energy Star qualified. The Energy Star mark must be clearly marked on the front/top of the product, clearly displayed in product literature and listed on the manufacturer's Internet site.

### **2 Dishwasher:**

A dishwasher shall be 24" under counter mount unit to match manufacturer and model line with the refrigerator and range including new construction and rehabilitation projects where identified in the PCNA (physical/capital needs assessment). Standard dishwashers shall use less than 4.25 gallons per cycle and 295 kWh per year. All dishwashers must be Energy Star qualified. The Energy Star mark must be clearly marked on the front/top of the product, clearly displayed in product literature and listed on the manufacturer's Internet site.

***\*Note: For homeowner rehabilitation activities, dishwashers will only be considered for replacement if the appliance is causing physical damage to the unit. In such activities, THDA will not replace non-working dishwashers or dishwashers that are not currently causing damage to the unit. All dishwashers in homeowner rehabilitation activities must be approved by THDA for replacement prior to adding to the write-up sheet.***

### **3 Range:**

An electric or gas range shall be minimum 30" 4 burner with self-cleaning oven provided in all dwelling units to match color with the refrigerator and dishwasher on all rehabilitation projects where identified in the PCNA (physical/capital needs assessment). They must also have an Energy Star Rating and Label on the equipment at the final inspection.

### **4 Laundry:**

All clothes washers supplied in individual units shall have an MEF equal to or greater than 2.0 and a WF equal to or less than 6.0.

All laundry facilities located inside any habitable space shall be equipped with a properly installed washer overflow pan indirectly discharging to an overflow waste receptor, floor drain, or to the exterior of the building. Water supply shut off valve to be single throw cutoff. All washer / dryer areas are required to have a washer box installed into the wall at the location of the washer / dryer.

### **5 Trash Collection:**

Provisions for dumpsters or trash cans are required. Screening of trash cans and/or dumpsters shall be provided for multi-family units.

### **6 Playgrounds:**

For multifamily rental units only, playgrounds shall be comprised of construction grade equipment approved by THDA prior to installation. The area immediately in and around the playground shall be mulched with 6" of appropriate material such as cypress mulch, pine bark or rubber mulch.

Playground equipment is not an eligible single family expense.

## **Division 12: Furnishings**

### **1 Casework:**

Cabinet fronts shall be made of solid wood (not particleboard); doors, draws and fronts shall be factory finished. Cabinet ends shall be finished with appropriate veneer. All cabinets shall be Kitchen Cabinet Manufacturers Association (KCMA) approved.



## **2 Countertops:**

Tops shall be post form plastic laminate, bullnose front edge, rolled backsplash, finished exposed ends and sealed at the cut out for sink, and the backsplash at the wall. Other appropriate materials may be used such as solid surface, and cultured marble for bathroom vanities. Any other types of countertops must be approved by THDA.

## **Division 13: Special Construction**

### **1 Office/ Laundry/ Maintenance Building:**

Unless individual units are supplied with laundry facilities, all projects consisting of four (4) or more units shall provide common laundry facilities including a minimum of one (1) washer and one (1) dryer per every twelve units up to a maximum total of four (4) washers and four (4) dryers. All clothes washers in common areas shall have a Modified Energy Factor (MEF) equal to or greater than 2.2 and a Water Factor (WF) equal to or less than 4.5.

## **Division 14-20: Reserved for Future Use**

## **Division 21: Fire Suppression**

All rehabilitation construction must comply with the International Residential, Building and Fire Codes as currently adopted by the State of Tennessee.

## **Division 22: Plumbing**

All plumbing, including piping, fixtures and appurtenances must meet or exceed the standards of the International Residential or Plumbing Code.

### **1 Bath Tub:**

Tubs shall be 30" deep white porcelain finish steel, or cultured marble.

### **2 Shower:**

Showers shall be 36" x 36" minimum with 4" curb; made of fiberglass, acrylic, or cultured marble. Shower head flow not to exceed 2.5 gpm.

### **3 Tub/ Shower Surround:**

Tub/ shower surrounds shall be 3 piece integral panels of plastic, fiberglass, or cultured marble minimum 72" above flood rim.

### **4 Lavatories:**

Sinks shall be 15" minimum diameter; made of white porcelain finish steel or cultured marble.

### **5 Faucets:**

Polished chrome finish two handle with pop-up stopper. Lever handle type shall be used when ADA requirements apply. Faucets containing plastic material for exterior housing are prohibited. Flow not to exceed 1.5 gpm.

### **6 Water Closets:**

Water closets shall be white porcelain elongated bowls with acrylic seat maximum 1.6 GPF.

### **7 Kitchen Sink:**

Sinks shall be a minimum eight inches (8") deep, 33 x 20 stainless steel double bowl. For ADA compliance when applicable, roll under sink depth shall be shallower as required in mobility impaired dwelling units

### **8 Plumbing Accessories:**

Water heaters located in any interior space shall have a metal 2" deep overflow pan with discharge pipe indirectly plumbed into DWV receptor, floor drain or to the exterior. Discharge pipe end shall have a bug screen.

### **9 Piping:**

Potable water lines shall be copper or PEX material. Installation in exterior walls must be centered in the insulation. Hose bibs must be of the freeze proof kind. All piping located in attic or crawl space shall be insulated. All hot water lines shall be insulated equal to or greater than R-4 pipe wrap. All lines within the crawl space or attic must have an insulation equal to or greater than R-2 pipe wrap. All exterior hose bibs shall be of the frost-free type.

## **10 Water Heater:**

Water Heater shall be minimum 40 gallon electric with a minimum Energy Factor (EF) equal to or greater than .92. Gas fired water heaters shall an EF equal to or greater than .59. Instantaneous gas water heaters shall have an EF equal to or greater than .94 (96%AFUE). Prefer direct vent on gas water heaters or sealed combustion.

## **11 Radon Reduction:**

Radon venting is currently not required unless otherwise specified by local codes or regulations. Refer to the IRC Appendix F.

## **Division 23: Heating, Ventilating, and Air Conditioning**

All mechanical systems, shall be regulated, including the design, installation, maintenance, and alteration of mechanical systems that are permanently installed and used to control environmental conditions within buildings to meet or exceed the standards of the International Residential or Mechanical Code.

### **1 Heating Ventilating and Air Conditioning Equipment:**

All units shall have a central HVAC system comprised of a split system heat pump or a package unit with emergency heat strips for heating and cooling using high-efficiency equipment. Units shall consist of a system air conditioner and furnace. Split System Heat pump/ AC systems shall have a minimum SEER (Seasonal Energy Efficiency Rating) rating of 14.5 with a minimum HSPF (Heating Seasonal Performance Factor) rating of 8.5. Fuel oil, gas fired furnaces and boilers shall have an Annual Fuel Utilization Efficiency (AFUE) equal to or greater than ninety-two percent (92%). Packaged A/C and Heat Pumps shall have a minimum SEER (Seasonal Energy Efficiency Rating) rating of 14 with a minimum HSPF (Heating Seasonal Performance Factor) rating of 8.0. Fuel oil, gas fired furnaces and boilers shall have an Annual Fuel Utilization Efficiency (AFUE) equal to or greater than eighty percent (80%). Electric-resistance-only heat systems are prohibited. Prefer direct vent on gas furnace or sealed combustion. All HVAC Systems shall be sized by using the ACCA Manual J & S as required by the state adopted International Residential Code.

If any of the above units cannot be included in any building because of structural constraints, please submit to THDA alternate systems for review and issuance of a determination.

## **2 Ducting:**

Duct system can be a mix of; hard duct main trunk lines (sheet metal) from the air handlers with flex duct branching out to the individual vents. All duct must be insulated with a minimum R-5, unconditioned space R-8 and installed per SMACNA standards. All joints and connections shall be sealed tight compliant with UL 181 and pass pressure testing. Exhaust vent piping shall be insulated. All ducts shall be installed per manufactures requirements and free of restrictions. Vent louvers shall be white adjustable type. Dryer vent shall be through wall weather type with damper. All supply ducts shall have individual dampers enabling supply air adjustments at each register grill and repositioning damper. All completely replaced HVAC systems and ducts shall be Tested and Balanced within 20% of the ACCA Manual J, S, and D calculations.

## **3 Thermostat:**

All individual HVAC systems shall be controlled by a digital programmable thermostat.

## **4 Range Hoods:**

All units shall be equipped with a minimum 200 CFM range hood. All range hoods shall be Energy Star qualified. The Energy Star mark must be clearly marked on the front/top of the product, clearly displayed in product literature and listed on the manufacturer's Internet site.

Recirculation hoods shall be equipped with an activated charcoal filter. Gas appliances must be ducted to the exterior. Hood shall have a light with the ability to accept a CFL or LED bulb.

## **5 Ceiling Fans:**

Ceiling fans shall be minimum 42" 4 paddle with light kit located in all bedrooms and a 52" 5 paddle with light kit in the living room. Fans shall be Energy Star qualified. The Energy Star mark must be clearly marked on the front/top of the product, clearly displayed in product literature and listed on the manufacturer's Internet site. Minimum 120 cfm/watt at medium speed setting. Fans shall have the ability to accept a CFL or LED bulb.

## **5 Bathroom Exhaust Fans:**

Exhaust air from bathrooms and toilet rooms shall not be recirculated within a residence or to another dwelling unit and shall be exhausted directly to the outdoors. Exhaust air from bathrooms and toilet rooms shall not discharge into an attic, crawl space or other areas inside the building. Ventilation systems shall be designed to have

the capacity to exhaust the minimum air flow rate and mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous, and may be of the exhaust, heat, or light types, or combo units.

## **Division 24-25: Reserved for Future Use**

## **Division 26: Luminaries / Electrical**

All electrical work must conform to the currently adopted National Electrical Code (NFPA 70), as adopted by the State of Tennessee. All electrical work will require the obtaining of electrical permits and receiving a passing final inspection by a Tennessee Licensed Electrical Inspector for that jurisdiction or area.

### **1 Exterior Luminaries:**

Luminaries shall be located at all entrances and common areas. All on-site parking areas shall be lighted. The electrical supply for all-common areas, stairways, walkways and parking areas shall not originate from an individual unit. Each fixture should have dusk/ dawn and motion sensor capabilities with CFL or LED lamp.

### **2 Interior Luminaries:**

Each room, hall, stair, and walk in closet shall have a minimum of one switched overhead light (color to match door hardware) with energy efficient CFL or LED lamp and globe (ceiling fan light kit is acceptable in bedrooms and living room). Kitchens shall include adequate lighting over the counter top, appliances, and sink. Bathrooms shall be equipped with adequate lighting over the vanity sink with CFL or LED lamps and a combination exhaust fan light in the ceiling near the water closet/ tub

## **Division 27: Communications**

### **1 Telephone and Cable:**

All dwelling units requiring re-wiring shall be wired in the master bedroom and living room for telephone, internet jacks, and cable for television. Common areas, community rooms and on-site management offices in multifamily developments to have communication lines as required.

## **Division 28: Electronic Safety and Security**

### **1 Fire Alarm & Smoke Detectors:**

Provide smoke detectors and Fire Alarm Systems as required by NFPA 72, and the International Fire Code as adopted by the State of Tennessee. Provide hardwired with battery back-up smoke detectors in all bedrooms and hallways. No bedroom door shall be more than eight (8) feet from a hallway smoke detector. Install devices per manufactures installation requirements. Instructions for specific locations and other details shall be strictly observed and tested. Comply with all state, county, and local codes.

### **2 Carbon Monoxide Detectors:**

UL listed carbon monoxide detectors shall be installed outside each sleeping area in the immediate vicinity of all bedrooms if the dwelling contains fuel burning appliances or has an attached garage.

## **Division 29 - 30: Reserved for Future Use**

## **Division 31: Earthwork**

### **1 Site Layout:**

Property line, setbacks, easements, right-of-way and clearances must be properly identified. Other engineered designs may be required by THDA for approval.

## **Division 32: Exterior Improvements**

### **1 Landscaping:**

Adequate landscaping is required on all multifamily projects. The developer shall submit a landscape plan as part of final plans and specifications. Each building shall include a minimum landscaping package.

### **2 Turf:**

All lawn areas shall be seeded with the seed variety, lime, and fertilizer application rate, which is appropriate to establish a good lawn cover. All slopes in excess of 3:1 within 10 feet of the building, driveway and/or walkway shall receive sod or other

approved erosion control materials which will enhance the establishment of a permanent ground cover.

### **3 Sodded Areas:**

Sod is optional in building front yards and common areas for all projects.

### **4 Fencing:**

All multifamily projects shall be fenced to provide security around the site boundaries.

### **5 Parking/Driveways:**

All multifamily projects shall have adequate parking as determined by the local zoning or building. Unless prohibited by local code, jurisdiction or structural constraints all projects shall have a minimum of one parking space per unit. Single Family Dwellings shall have a minimum parking space for 2 vehicles.

### **6 Parking Lots:**

All on-site parking lots and access drives are to be paved and parking spaces shall have bumper stops or curbs. If walkways are used as bumper stops, the walkway shall be 6' wide.

### **7 Concrete pads and walks:**

All entry walks shall be a minimum of 3' wide, 3000 psi concrete, and shall be provided at all units from the entry to parking area. Provide ¼ inch per foot crown or cross slope in the direction of drainage. Expansion-joint material shall be ½" thick asphalt-impregnated pre-molded fiber, ASTM D1752. Follow ACI 318. Minimum concrete thickness shall be 4".

### **8 Walkways:**

Units which have a walkway that needs repairing or replacing shall be 3' wide or to match existing width, 3,000 psi concrete with broom finish walkway from the parking area to the main entrance.

### **9 Ramps:**

All newly constructed accessible ramps shall be a minimum 42" wide with 5' turning areas at each landing, a maximum slope of 1:12, maximum rise 30" and a minimum load capacity of 1500 lbs. Existing ramps may be no steeper than 1:8.

- a. **Composite:** Wood/ fiberglass with non-skid surface.
- b. **Concrete:** With non-skid surface.
- c. **Metal:** Galvanized steel, or aluminum with non-skid surface.
- d. **Wood:** All exterior wood shall have a minimum preservative retention rate of 25 percent for above ground applications and a minimum preservative retention rate of 40 percent for all wood in contact with the ground. Use of CCA treated lumber is prohibited. Portable or temporary ramps are prohibited.

## **10 Asphalt:**

Asphalt shall consist of a hot-mix asphaltic concrete pavement complying with TDOT design mix standards for parking areas. Batching and placement of the asphalt may be tested at the request of THDA. Placement of the asphalt in 2 lifts. 2 ½” base course with a 1 ½” finish course. Pavement striping to be completed within 30 days after asphalt placement.

## **11 Soil Treatment-Termite Protection:**

A proper and complete termite inspection of all properties is required. The inspection must be completed by a licensed exterminator who shall report any activity located and treatment applied. A warranty for a period of a minimum one year on all inspections is required.

## **Division 33: Utilities**

### **1 Electric:**

Electrical service shall be installed underground except in cases where deemed structurally infeasible. Overhead service is allowed for infill sites.

### **2 Water:**

Water service to be replaced or constructed to units shall be installed with methods and materials as approved by the IRC and the International Plumbing Code.



### **3 Sanitary Sewer / Private Septic:**

Sanitary Sewer / Private Septic service to be replaced or constructed to units shall be installed with methods and materials as approved by the IRC, the International Plumbing Code, the Private Sewer Disposal Code and the State of Tennessee Department of Environment and Conservation rules and regulations.