

ENERGY CONSERVATION CODE



CITY OF ABILENE

BUILDING INSPECTION

TO BE USED IN CONJUNCTION WITH THE
2012 INTERNATIONAL ENERGY CONSERVATION CODE

This booklet is to be used in conjunction with the *2012 International Energy Conservation Code* published by the International Code Council, Inc. This pamphlet and the *2012 International Energy Conservation Code* comprise the Energy Conservation Code for the City of Abilene, Texas.

This code was adopted by the City Council on **July 24, 2014** Ordinance No. **42-2014** of the Municipal Code, with an effective date of **August 26, 2014**.

TELEPHONE

Building Inspections--- (325) 676-6273/676-6232
Building Inspectors (325) 676-6275/676-6353

FAX NUMBER

(325) 676-6288

WEBSITE

<http://www.abilenetx.com/BuildingInspection>

E-MAIL

BuildingPermits@abilenetx.com

BUILDING INSPECTIONS

**555 Walnut St, Room 100
Abilene, Texas 79601**

The following Chapters of the *2012 International Energy Conservation Code* are adopted in their entirety:

IECC – COMMERCIAL PROVISIONS

Chapters 3 and 5

IECC – RESIDENTIAL PROVISIONS

Chapters 3 and 5

IECC – COMMERCIAL PROVISIONS

TABLE OF CONTENTS

CHAPTER 1 – SCOPE AND ADMINISTRATION	1
CHAPTER 2 – DEFINITIONS	2
CHAPTER 3 – GENERAL REQUIREMENTS	No Amendments
CHAPTER 4 – COMMERCIAL ENERGY EFFICIENCY	2
CHAPTER 5 – REFERENCED STANDARDS	No Amendments
INDEX	No Amendments

IECC – RESIDENTIAL PROVISIONS

TABLE OF CONTENTS

CHAPTER 1 – SCOPE AND ADMINISTRATION	7
CHAPTER 2 – DEFINITIONS	8
CHAPTER 3 – GENERAL REQUIREMENTS	No Amendments
CHAPTER 4 – RESIDENTIAL ENERGY EFFICIENCY	8
CHAPTER 5 – REFERENCED STANDARDS	No Amendments
INDEX	No Amendments

ABILENE ENERGY CONSERVATION CODE

Adopt the *2012 International Energy Conservation Code* in its entirety, with the following amendments.

IECC - COMMERCIAL PROVISIONS

CHAPTER 1 [CE]: SCOPE AND ADMINISTRATION

Section C101 SCOPE AND GENERAL REQUIREMENTS

C101.1 Title. *{Amend to read as follows.}*

This code shall be known as the *Energy Code of the City of Abilene, Texas*, and shall be cited as such. It is referred to herein as “this code.”

C101.5.1 Compliance materials. *{Amend to add a new subsection C101.5.1.1 as follows:}*

C101.5.1.1 Approved software program. COMcheck, 2009 edition or later, is an acceptable computer software program to be used to determine compliance with specific provisions of this code.

SECTION C107 FEES

{Delete entire section and amend as follows:}

C107.1 Fees. Permit fees shall be in accordance with section 109 of the Building Code.

SECTION C108 STOP WORK ORDER

{Delete entire section and amend as follows:}

C108.1 Stop Work Order. Stop work orders shall be in accordance with section 115 of the Building Code.

SECTION C109 BOARD OF APPEALS

{Delete entire section and amend as follows:}

C109.1 Board of Appeals. Appeals regarding the Energy Code shall be made in accordance with section 113 of the Building Code.

Chapter 2 [CE] Definitions

SECTION C202 GENERAL DEFINITIONS

EXTERIOR WALL. *{Add a new second sentence as follows:}*

An above-grade wall enclosing conditioned space which is vertical or sloped at an angle of sixty (60) degrees (1.1rad) or greater from the horizontal.

Chapter 4 [CE] Building Envelope Requirements

C402.2.1.1 Roof solar reflectance and thermal emittance *{Delete in its entirety without substitution.}*

Table C402.1.2 *{Delete 2012 values and numbers and insert the values and numbers of Table 502.1.2 from 2009 IECC as follows:}*

(See table on page 3 of this pamphlet.)

Table C402.2 *{ Delete 2012 values and numbers and insert the values and numbers of Table 502.2(1) from 2009 IECC as follows:}*

(See table on page 4 of this pamphlet.)

TABLE C402.1.2

BUILDING ENVELOPE REQUIREMENTS OPAQUE ELEMENT, MAXIMUM U-FACTORS

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8				
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R			
Roofs																			
Insulation entirely above deck	U-0.063	U-0.048	U-0.048	U-0.048	U-0.048	U-0.048	U-0.048	U-0.048	U-0.048	U-0.048	U-0.048	U-0.048	U-0.039	U-0.039	U-0.039	U-0.039	U-0.039		
Metal buildings	U-0.065	U-0.065	U-0.055	U-0.055	U-0.055	U-0.055	U-0.055	U-0.055	U-0.055	U-0.055	U-0.049	U-0.049	U-0.049	U-0.049	U-0.049	U-0.035	U-0.035		
Attic and other	U-0.034	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027		
Walls, Above Grade																			
Mass	U-0.58	U-0.151	U-0.123	U-0.123	U-0.104	U-0.104	U-0.104	U-0.090	U-0.090	U-0.080	U-0.080	U-0.071	U-0.071	U-0.071	U-0.071	U-0.071	U-0.052	U-0.052	
Metal building	U-0.093	U-0.093	U-0.084	U-0.084	U-0.084	U-0.084	U-0.084	U-0.069	U-0.069	U-0.069	U-0.069	U-0.069	U-0.057	U-0.057	U-0.057	U-0.057	U-0.057	U-0.057	
Metal framed	U-0.124	U-0.124	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.057	U-0.064	U-0.052	U-0.064	U-0.064	U-0.064	U-0.037	
Wood framed and other	U-0.089	U-0.089	U-0.089	U-0.089	U-0.089	U-0.089	U-0.064	U-0.064	U-0.064	U-0.051	U-0.051	U-0.051	U-0.051	U-0.051	U-0.051	U-0.036	U-0.036	U-0.036	
Walls, Below Grade																			
Below-grade wall ^a	C-1.140	C-1.140	C-1.140	C-1.140	C-1.140	C-1.140	C-1.140	C-0.119	C-0.119	C-0.119	C-0.119	C-0.119	C-0.119	C-0.119	C-0.119	C-0.119	C-0.092	C-0.092	C-0.075
Floors																			
Mass	U-0.322	U-0.107	U-0.087	U-0.087	U-0.087	U-0.087	U-0.074	U-0.074	U-0.064	U-0.064	U-0.064	U-0.057	U-0.064	U-0.051	U-0.064	U-0.051	U-0.051	U-0.051	U-0.051
Joist/Framing	U-0.282	U-0.282	U-0.052	U-0.052	---	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033
Slab-on-Grade Floors																			
Unheated slabs	F-0.730	F-0.730	F-0.730	F-0.730	F-0.730	F-0.730	F-0.540	F-0.540	F-0.540	F-0.540	F-0.540	F-0.520	F-0.540	F-0.520	F-0.520	F-0.520	F-0.520	F-0.520	F-0.510
Heated slabs	F-1.020	F-1.020	F-1.020	F-1.020	F-0.900	F-0.900	F-0.860	F-0.860	F-0.860	F-0.860	F-0.860	F-0.830	F-0.860	F-0.830	F-0.830	F-0.830	F-0.688	F-0.688	F-0.688

a. When heated slabs are placed below-grade, below grade walls must meet the *F*-factor requirements for perimeter insulation according to the heated slab-on-grade construction.

TABLE C402.2
BUILDING ENVELOPE REQUIREMENTS - OPAQUE ASSEMBLIES

CLIMATE ZONE	1		2		3		4		5		6		7		8	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Roofs																
Insulation entirely above deck	R-15ci	R-20ci	R-20ci	R-20ci	R-20ci	R-20ci	R-20ci	R-20ci	R-20ci	R-20ci	R-20ci	R-20ci	R-25ci	R-25ci	R-25ci	R-25ci
Metal buildings (with R-5 thermal blocks ^{a, b})	R-19	R-19	R-13 + R-13	R-19	R-13 + R-13	R-19	R-19	R-13 + R-13	R-19	R-13 + R-13	R-19	R-19	R-13 + R-19	R-19 + R-10	R-19 + R-10	R-19 + R-10
Attic and other	R-30	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-49	R-49
Walls, Above Grade																
Mass	NR	R-5.7ci ^c	R-7.6ci	R-9.5ci	R-11.4ci	R-13.3ci	R-13.3ci	R-13.3ci	R-13.3ci	R-13.3ci	R-13.3ci	R-13.3ci	R-15.2ci	R-15.2ci	R-25ci	R-25ci
Metal building ^b	R-16	R-16	R-16	R-19	R-19	R-19	R-13 + R-5.6ci	R-13 + R-5.6ci	R-13 + R-5.6ci	R-13 + R-5.6ci	R-13 + R-5.6ci	R-13 + R-5.6ci	R-19 + R-5.6ci	R-19 + R-5.6ci	R-19 + R-5.6ci	R-19 + R-5.6ci
Metal framed	R-13	R-13	R-13 + R-3.8ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci
Wood framed and other	R-13	R-13	R-13	R-13	R-13 + R-3.8ci	R-13 + R-3.8ci	R-13 + R-3.8ci	R-13 + R-3.8ci	R-13 + R-3.8ci	R-13 + R-3.8ci	R-13 + R-3.8ci	R-13 + R-3.8ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci
Walls, Below Grade																
Below grade wall ^d	NR	NR	NR	NR	NR	NR	NR	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci
Floors																
Mass	NR	NR	R-6.3ci	R-8.3ci	R-10ci	R-10.4ci	R-10ci	R-12.5ci	R-12.5ci	R-14.6ci	R-15ci	R-15ci	R-16.7ci	R-15ci	R-15ci	R-16.7ci
Joist/Framing (steel/wood)	NR	NR	R-19	R-30	R-30	R-30	R-30	R-30	R-30	R-30	R-30	R-30	R-30	R-30	R-30	R-30
Slab-on-Grade Floors																
Unheated slabs	NR	NR	NR	NR	NR	NR	NR	NR	NR	R-10 for 24 in. below	R-10 for 24 in. below	R-15 for 24 in. below	R-15 for 24 in. below	R-15 for 24 in. below	R-20 for 24 in. below	R-20 for 24 in. below
Heated slabs	R-7.5 for 12 in. below	R-7.5 for 12 in. below	R-10 for 24 in. below	R-10 for 24 in. below	R-15 for 24 in. below	R-15 for 24 in. below	R-15 for 24 in. below	R-15 for 24 in. below	R-15 for 24 in. below	R-15 for 24 in. below	R-20 for 48 in. below	R-20 for 48 in. below	R-20 for 48 in. below	R-20 for 48 in. below	R-20 for 48 in. below	R-20 for 48 in. below
Opaque doors																
Swinging	U-0.70	U-0.70	U-0.70	U-0.70	U-0.70	U-0.70	U-0.70	U-0.70	U-0.70	U-0.70	U-0.70	U-0.70	U-0.50	U-0.50	U-0.50	U-0.50
Roll-up or sliding	U-1.45	U-1.45	U-1.45	U-1.45	U-1.45	U-1.45	U-1.45	U-0.50	U-0.50	U-0.50	U-0.50	U-0.50	U-0.50	U-0.50	U-0.50	U-0.50

For SI: 1 inch = 25.4 mm.

ci = Continuous insulation, NR = No requirement.

a. When using R-value compliance method, a thermal spacer block is required, otherwise use the U-factor compliance method. (See Table C402.1.2 and ANSI/ASHRAE/IESNA Appendix A.)

b. Assembly descriptions can be found in ANSI/ASHRAE/IESNA Appendix A.

c. R-5.7 ci is allowed to be substituted with concrete block walls complying with ASTM C 90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with material having a maximum thermal conductivity of 0.44 Btu-in./hr · ft² · °F.

d. When heated slabs are placed below grade, below-grade walls must meet the exterior insulation requirements for perimeter insulation according to the heated slab-on-grade construction.

e. Steel floor joist systems shall to be R-38.

**SECTION C403
BUILDING MECHANICAL SYSTEMS**

Table C403.3.1(1) *{Delete table in its entirety and amend as follows:}*

**TABLE C403.3.1(1)
ECONOMIZER REQUIREMENTS**

CLIMATE ZONES	ECONOMIZER REQUIREMENT
1A, 1B, 2A, 7, 8	No requirement
2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B	Economizers on all cooling systems ≥ 54,000 Btu/h ^a

For SI: 1 British thermal unit per hour = 0.293 W.

a. The total capacity of all systems without economizers shall not exceed 480,000 Btu/h per building, or 20 percent of its air economizer capacity, whichever is greater.

**SECTION C405
ELECTRICAL POWER AND LIGHTING SYSTEMS
(MANDATORY)**

C405.2.1.2 Light reduction controls. *{Amend Exception #1 in this section to read as follows.}*

1. Areas that have 4 or less luminaires.

{Amend section C408 as follows:}

**SECTION C408
HVAC SYSTEM COMPLETION**

C408.1 HVAC system completion. Prior to the issuance of a certificate of occupancy, the design professional shall provide evidence of system completion in accordance with Sections C408.2 through C408.4.

C408.2 Air system balancing. Each supply air outlet and *zone* terminal device shall be equipped with means for air balancing in accordance with the requirements of Chapter 6 of the *International Mechanical Code*. Discharge dampers are prohibited on constant volume fans and variable volume fans with motors 10 horsepower (hp) (7.5 kW) and larger.

C408.3 Hydronic system balancing. Individual hydronic heating and cooling coils shall be equipped with means for balancing and pressure test connections.

C408.4 Manuals. The construction documents shall require that an operating and maintenance manual be provided to the building owner by the mechanical contractor.

The manual shall include, at least, the following:

1. Equipment capacity (input and output) and required maintenance actions.
2. Equipment operation and maintenance manuals.
3. HVAC system control maintenance and calibration information, including wiring diagrams, schematics, and control sequence descriptions. Desired or field-determined setpoints shall be permanently recorded on control drawings, at control devices or, for digital control systems, in programming comments.
4. A complete written narrative of how each system is intended to operate.

IECC - RESIDENTIAL PROVISIONS

CHAPTER 1 [RE]: SCOPE AND ADMINISTRATION

SECTION R101 SCOPE AND GENERAL REQUIREMENTS

R101.1 Title. *{Amend to read as follows:}*

This code shall be known as the *Energy Code of the City of Abilene, Texas*, and shall be cited as such. It is referred to herein as “this code.”

R101.4.3 Additions, alterations, renovations or repairs. *{Amend to add additional exception as follows:}*

9. Replacement of 50% or less of the area of all glazed fenestration products (where the entire unit, including the frame, sash and glazing, is replaced).

R101.5.1 Compliance materials. *{Amend to add a new subsection R101.5.1.1 as follows:}*

R101.5.1.1 Approved software programs. REScheck or IC3, 2009 or later editions, are acceptable computer software programs to be used to determine compliance with specific provisions of this code.

SECTION R107 FEES

C107.1 Fees. *{Delete entire section and amend as follows:}*

Permit fees shall be in accordance with section 108 of the Residential Building Code.

SECTION R108 STOP WORK ORDER

R108.1 Stop Work Order. *{Delete entire section and amend as follows:}*

Stop work orders shall be in accordance with section 114 of the Residential Building Code.

**SECTION R109
BOARD OF APPEALS**

R109.1 Board of Appeals. *{Delete entire section and amend as follows:}*

Appeals regarding the Energy Code shall be made in accordance with section 112 of the Residential Building Code.

**Chapter 2 [RE]
Definitions**

**SECTION R202
GENERAL DEFINITIONS**

EXTERIOR WALL. *{Add a new second sentence as follows:}*

An above-grade wall enclosing conditioned space which is vertical or sloped at an angle of sixty (60) degrees (1.1rad) or greater from the horizontal.

**Chapter 4 [RE]
Residential Energy Efficiency**

**SECTION R402
BUILDING THERMAL ENVELOPE**

{Amend columns in Table R402.1.1 as follows:}

**TABLE R402.1.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a**

CLIMATE ZONE	GLAZED FENESTRATION SHGC ^{b,c}	CEILING R-VALUE	WOOD FRAME WALL R-VALUE
3	0.30	30	13

{Remainder of table unchanged.}

{Amend to add the following sub-section and table as follows :}

R402.1.1.1 Prescriptive path for additions. As an alternative to demonstrating compliance with Section R402, additions with a conditioned floor area 500 square feet (46.5m²) or less to existing single-family residential buildings and structures shall meet the prescriptive envelope component criteria in Table R402.1.1.1. The *U*-factor of each individual fenestration product (windows, doors and skylights) shall be used to calculate an area-weighted average fenestration product *U*-factor for the addition, which shall not exceed the applicable listed values in Table R402.1.1.1. The *R*-values for opaque thermal envelope components shall be equal to or greater than the applicable listed values in Table R402.1.1.1

**Table R402.1.1.1
Prescriptive Path for Additions**

% Glazing	Maximum	Minimum					
	Glazing U-factor	Ceiling R-value	Exterior wall R-value	Floor R-value	Basement wall R-value	Slab perimeter R-value and depth	Crawl space wall R-value
<20%	0.55	R-30	R-13	R-11	R-5	R-0	R-5
<25%	0.55	R-30	R-13	R-11	R-5	R-0	R-5
<30%	0.47	R-38	R-13	R-19	R-7	R-0	R-8

R402.3.6 Replacement fenestration. *{Delete in its entirety and amend as follows:}*

When replacing more than 50% of the area of all glazed fenestration products (where the entire unit, including the frame, sash and glazing, is replaced) they shall meet the prescriptive fenestration U-factor criteria in Table R402.1.1

R402.4.1.2 ~~Air sealing and insulation. Testing.~~ *{Delete in its entirety and amend as follows:}*

Building envelope airtightness and insulation installation shall be demonstrated to comply with one of the following options given by Section 402.4.2.1 or 402.4.2.2:

R402.4.2.1 Testing option. Building envelope tightness and insulation installation shall be considered acceptable when tested air leakage is less than seven air changes per hour (ACH) when tested with a blower door at a pressure of 50 pascals (1 psf). Testing shall occur after rough in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation and combustion appliances.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed;
2. Dampers shall be closed, but not sealed, including exhaust, intake, makeup air, backdraft and flue dampers;
3. Interior doors shall be open;
4. Exterior openings for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling system(s) shall be turned off;
6. HVAC ducts shall not be sealed; and
7. Supply and return registers shall not be sealed.

R402.4.2.2 Visual inspection option. Building envelope tightness and insulation installation shall be considered acceptable when the items listed in Table 402.4.2, applicable to the method of construction, are field verified. Where required by the *code official*, an *approved* party independent from the installer of the insulation shall inspect the air barrier and insulation.

**SECTION R403
SYSTEMS**

R403.2.2 Sealing (Mandatory). *{Delete in its entirety and amend as follows:}*

All ducts, air handlers, filter boxes and building cavities used as ducts shall be sealed. Joints and seams shall comply with Section M1601.4.1 of the *International Residential Code*.

Duct tightness shall be verified by either of the following:

1. Postconstruction test: Leakage to outdoors shall be less than or equal to 8 cfm (226.5 L/min) per 100 ft² (9.29 m²) of *conditioned floor area* or a total leakage less than or equal to 12 cfm (12 L/min) per 100 ft² (9.29 m²) of *conditioned floor area* when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.
2. Rough-in test: Total leakage shall be less than or equal to 6 cfm (169.9 L/min) per 100 ft² (9.29 m²) of *conditioned floor area* when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the roughed in system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 ft² (9.29 m²) of *conditioned floor area*.

R403.5.1 Whole-house mechanical ventilation system fan efficacy. *{Delete in its entirety}*

TABLE R403.5.1 MECHANICAL VENTILATION SYSTEM FAN EFFICACY
{Delete in its entirety}

**SECTION R404
ELECTRICAL POWER AND LIGHTING SYSTEMS
(MANDATORY)**

R404.1 Lighting equipment (Mandatory). *{Amend to read as follows:}*

A minimum of 50 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps or a minimum of 50 percent of the permanently installed lighting fixtures shall contain only high efficacy lamps. (Exception unchanged.)