

# Residential Inspector's Guide: Building and Energy

based on the 2009 International Residential Code® Chapters 1-11



# Residential Inspector's Guide

## Building and Energy

Based on the 2009 IRC, Chapters 1-11

ISBN 978-1-58001-883-8

Copyright © 2010



ALL RIGHTS RESERVED. This publication is a copyrighted work owned by the International Code Council. Without advance written permission from the copyright owner, no part of this book may be reproduced, distributed or transmitted in any form or by any means, including, without limitation, electronic, optical or mechanical means (by way of example and not limitation, photocopying, or recording by or in an information storage and retrieval system). For information on permission to copy material exceeding fair use, please contact: ICC Publications, 4051 W. Flossmoor Road, Country Club Hills, IL 60478, Phone 1-888-ICC-SAFE (422-7233).

The information contained in this book is believed to be accurate; however, it is being provided for informational purposes only and is intended for use only as a guide. The user should always refer to the code book for complete text of any subject matter noted in this guide. Publication of this book by the ICC should not be construed as the ICC engaging in or rendering engineering, legal or other professional services. Use of the information in this book should not be considered by the user as a substitute for the advice of registered professional engineer or architect, attorney or other professional. If such advice is required, it should be sought through the services of a registered professional engineer or architect, licensed attorney or other professional.

Trademarks: "International Code Council" and the "ICC" logo are trademarks of International Code Council, Inc.

First Printing: February 2010

Project Head: Peter Kulczyk

PRINTED IN THE U.S.A.

## PREFACE

The duties of an inspector are extensive and varied; however, the primary function continues to be the verification of construction work as complying with the codes adopted by the jurisdiction. Because many other responsibilities are placed upon the inspector, it is necessary that he or she develop an efficient and effective approach to the inspection process. This inspector's guide is designed to assist the inspector in verifying code compliance by identifying many of the more common code requirements. The guide provides the code in a format consistent with the inspection process, identifying not only the code provisions, but also the appropriate references in the *International Residential Code*<sup>®</sup> (IRC<sup>®</sup>). The use of this format can be a valuable tool for a building safety department for:

1. Providing consistency within the department when all of the inspectors are using the same criteria;
2. Serving as a training method for new employees or to assist in the updating of existing staff members on new code provisions;
3. Providing builders, particularly home-builders, with an easy-to-use document to assist them in complying with the code; and
4. Assisting the inspectors in staying focused and not overlooking items during their inspections.

This *Residential Inspector's Guide: Building and Energy, Based on the 2009 International Residential Code* only includes requirements from Chapters 1 through 11 of the IRC. Its consistent use can be an important asset during inspection activities.

One in the series of ICC Inspector Guides, this 2009 edition of the *Residential Inspector's Guide* has been completely revised and updated from the 2006 edition by Peter Kulczyk, technical staff member of the Product Development Department of the International Code Council<sup>®</sup>.

## About the International Code Council

The International Code Council® (ICC®) is a nonprofit membership association dedicated to protecting the health, safety, and welfare of people by creating better buildings and safer communities. The mission of ICC is to provide the highest quality codes, standards, products and services for all concerned with the safety and performance of the built environment. ICC is the publisher of the family of the International Codes® (I-Codes®), a single set of comprehensive and coordinated model codes. This unified approach to building codes enhances safety, efficiency and affordability in the construction of buildings. The Code Council is also dedicated to innovation, sustainability and energy efficiency. Code Council subsidiary, ICC Evaluation Service, issues Evaluation Reports for innovative products and reports of Sustainable Attributes Verification and Evaluation (SAVE).

**Headquarters: 500 New Jersey Avenue, NW, 6th Floor,  
Washington, DC 20001-2070**

**District Offices: Birmingham, AL;  
Chicago, IL; Los Angeles, CA**

**1-888-422-7233**

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

# TABLE OF CONTENTS

|   |           |
|---|-----------|
| PREFACE. . . . .  | xii       |
| <b>INSPECTION PREPARATION . . . . .</b>                                 | <b>1</b>  |
| I. GENERAL. . . . .   | 1         |
| II. ACCEPTED ENGINEERING PRACTICE . . . . .                             | 3         |
| III. FLOOD RESISTANT CONSTRUCTION . . . . .                             | 4         |
| <b>PIER AND FOOTING INSPECTIONS . . . . .</b>                           | <b>6</b>  |
| I. GENERAL. . . . .   | 6         |
| II. FOOTINGS ON OR ADJACENT TO SLOPES. . . . .                          | 6         |
| A. Ascending Slope . . . . .  | 7         |
| B. Descending Slope . . . . .   | 7         |
| C. Foundation Elevation . . . . .                                       | 7         |
| D. Alternative Setbacks and Clearances . . . . .                        | 7         |
| III. CONCRETE AND MASONRY FOOTINGS. . . . .                             | 7         |
| IV. FOOTINGS FOR WOOD FOUNDATIONS. . . . .                              | 9         |
| V. FROST-PROTECTED SHALLOW FOUNDATIONS . . . . .                        | 9         |
| VI. FOOTINGS FOR MASONRY FIREPLACES<br>AND CHIMNEYS . . . . .           | 11        |
| <b>FOUNDATION AND RETAINING WALL<br/>AND PIER INSPECTION . . . . .</b>  | <b>12</b> |
| I. CONCRETE AND MASONRY FOUNDATION WALLS. . . . .                       | 12        |
| II. PRECAST CONCRETE FOUNDATION WALLS . . . . .                         | 14        |
| III. WOOD FOUNDATIONS AND WALLS . . . . .                               | 15        |
| IV. PRESSURE PRESERVATIVELY TREATED<br>WOOD FLOORS (ON GROUND). . . . . | 16        |
| V. FOUNDATION ANCHORAGE . . . . .                                       | 16        |
| VI. FOUNDATION DRAINAGE . . . . .                                       | 17        |

|       |   |           |
|-------|---|-----------|
| VII.  | FOUNDATION WATERPROOFING AND DAMPPROOFING . . . . .       | 18        |
| VIII. | WINDOW WELLS . . . . .                                    | 19        |
| IX.   | CONCRETE FLOORS (ON GROUND) . . . . .                     | 19        |
| X.    | RETAINING WALLS. . . . .                                  | 20        |
|       | <b>FRAMING INSPECTION—GENERAL . . . . .</b>               | <b>21</b> |
| I.    | LOCATION ON LOT. . . . .                                  | 21        |
| II.   | LIGHT, VENTILATION AND HEATING . . . . .                  | 22        |
|       | A. Habitable Rooms . . . . .                              | 22        |
|       | B. Bathrooms . . . . .                                    | 22        |
|       | C. Air Intake Opening Location. . . . .                   | 23        |
|       | D. Stairway Illumination . . . . .                        | 23        |
|       | E. Heating . . . . .                                      | 23        |
| III.  | MINIMUM ROOM DIMENSIONS . . . . .                         | 24        |
| IV.   | CEILING HEIGHT . . . . .                                  | 24        |
| V.    | SANITATION . . . . .                                      | 25        |
| VI.   | TOILET, BATH AND SHOWER SPACES. . . . .                   | 25        |
| VII.  | GLAZED OPENINGS . . . . .                                 | 25        |
|       | A. Hazardous Locations Requiring Safety Glazing . . . . . | 26        |
|       | B. Skylights and Sloped Glazing . . . . .                 | 27        |
| VIII. | GARAGES AND CARPORTS. . . . .                             | 29        |
| IX.   | AUTOMATIC FIRE SPRINKLER SYSTEMS . . . . .                | 29        |
| X.    | SMOKE ALARMS . . . . .                                    | 29        |
| XI.   | CARBON MONOXIDE ALARMS . . . . .                          | 30        |
| XII.  | EMERGENCY ESCAPE AND RESCUE OPENINGS . . . . .            | 30        |
|       | A. WINDOW WELLS . . . . .                                 | 31        |
| XIII. | MEANS OF EGRESS . . . . .                                 | 31        |
|       | A. GENERAL . . . . .                                      | 31        |

|   |           |
|---|-----------|
| B. STAIRWAYS . . . . .  | 31        |
| XIV. UNDER-FLOOR SPACE . . . . .                              | 32        |
| <b>FRAMING INSPECTION - STRUCTURE . . . . .</b>               | <b>34</b> |
| I. GENERAL . . . . .  | 34        |
| A. Notching and Boring in Beams, Joists and Rafters . . . . . | 35        |
| B. Columns . . . . .  | 36        |
| C. Draftstopping and Fireblocking . . . . .                   | 36        |
| D. Framing around Openings . . . . .                          | 37        |
| E. Wood Trusses . . . . .                                     | 38        |
| F. Nailing Schedule . . . . .                                 | 38        |
| II. PROTECTION AGAINST DECAY AND TERMITES . . . . .           | 39        |
| A. Protection against Decay . . . . .                         | 39        |
| B. Protection against Termites . . . . .                      | 40        |
| III. WOOD FLOOR FRAMING . . . . .                             | 41        |
| A. Floor Construction . . . . .                               | 41        |
| B. Wood Floor Sheathing . . . . .                             | 42        |
| IV. WALL CONSTRUCTION . . . . .                               | 43        |
| A. Wood Wall Framing . . . . .                                | 43        |
| B. Design and Construction . . . . .                          | 43        |
| C. Interior Nonbearing Walls . . . . .                        | 44        |
| D. Drilling and Notching Studs . . . . .                      | 44        |
| E. Headers . . . . .  | 45        |
| F. Cripple Walls . . . . .                                    | 45        |
| G. Wall Bracing . . . . .                                     | 45        |
| H. Wall Anchorage . . . . .                                   | 46        |
| V. WOOD ROOF FRAMING . . . . .                                | 47        |
| A. Framing Details . . . . .                                  | 47        |
| B. Allowable Ceiling Joist Spans . . . . .                    | 48        |

|  |           |
|--|-----------|
| C. Allowable Rafter Spans . . . . .                                    | 48        |
| D. Bearing . . . . .   | 48        |
| E. Lateral Support . . . . .   | 49        |
| F. Roof Sheathing . . . . .  | 49        |
| <b>FRAMING – WINDOWS AND DOORS . . . . .</b>                           | <b>50</b> |
| I.    GENERAL . . . . .  | 50        |
| A. Anchorage Methods for Window and Glass<br>Door Assemblies . . . . . | 50        |
| <b>FRAMING INSPECTION - WALL COVERING . . . . .</b>                    | <b>52</b> |
| I.    WEATHER PROTECTION . . . . .                                     | 52        |
| II.   INTERIOR COVERING . . . . .                                      | 52        |
| A. Interior Plaster . . . . .  | 53        |
| B. Gypsum Board . . . . .  | 53        |
| C. Ceramic Tile . . . . .  | 54        |
| III.  EXTERIOR COVERING . . . . .                                      | 54        |
| A. Wood, Hardboard and Wood Structural<br>Panel Siding . . . . .       | 55        |
| B. Wood Shakes and Shingles . . . . .                                  | 55        |
| C. Exterior Plaster . . . . .  | 57        |
| D. Stone and Masonry Veneer . . . . .                                  | 58        |
| E. Building Flashing . . . . .   | 61        |
| F. Exterior Insulation Finish Systems (EIFS). . . . .                  | 62        |
| G. Fiber Cement Siding . . . . .                                       | 62        |
| H. Vinyl Siding . . . . .  | 63        |
| <b>FIRE RESISTANT CONSTRUCTION . . . . .</b>                           | <b>64</b> |
| I.    LOCATION ON LOT . . . . .  | 64        |
| II.   DWELLING UNIT SEPARATION – TWO-FAMILY<br>DWELLINGS . . . . .     | 64        |



|                                   |  |           |
|-----------------------------------|--|-----------|
| III.                              | DWELLING UNIT SEPARATION – TOWNHOUSES . . .    | 65        |
| IV.                               | GARAGE AND CARPORT SEPARATION . . . . .        | 66        |
| <b>FINAL INSPECTION . . . . .</b> |  | <b>68</b> |
| I.                                | ROOF-CEILING CONSTRUCTION . . . . .            | 68        |
|                                   | A. Roof Drainage . . . . .                     | 68        |
|                                   | B. Ceilings . . . . .                          | 68        |
|                                   | C. Roof Ventilation . . . . .                  | 68        |
|                                   | D. Attic Access . . . . .                      | 69        |
| II.                               | ROOF COVERINGS AND ASSEMBLIES. . . . .         | 70        |
|                                   | A. Roof Classification. . . . .                | 70        |
|                                   | B. Weather Protection . . . . .                | 70        |
|                                   | C. Materials. . . . .                          | 71        |
|                                   | D. Roof Covering Requirements . . . . .        | 71        |
|                                   | E. Roof Insulation . . . . .                   | 79        |
|                                   | F. Reroofing . . . . .                         | 79        |
| III.                              | FINAL GRADE FOR DRAINAGE . . . . .             | 80        |
| IV.                               | ADDRESS . . . . .                              | 80        |
| V.                                | GARAGES AND CARPORTS. . . . .                  | 80        |
| VI.                               | ACCESSIBILITY. . . . .                         | 81        |
| VII.                              | MEANS OF EGRESS . . . . .                      | 81        |
|                                   | A. General . . . . .                           | 81        |
|                                   | B. Stairways . . . . .                         | 82        |
|                                   | C. Handrails . . . . .                         | 83        |
|                                   | D. Ramps. . . . .                              | 84        |
| VIII.                             | GUARDS . . . . .                               | 84        |
| IX.                               | CHIMNEYS AND FIREPLACES . . . . .              | 86        |
|                                   | A. Ash Dump Cleanout - When Provided . . . . . | 86        |
|                                   | B. Firebox Dimensions . . . . .                | 86        |

- C. Lintel and Damper . . . . . 86
- D. Smoke Chamber . . . . . 87
- E. Hearth and Hearth Extension . . . . . 87
- F. Termination . . . . . 87
- G. Spark Arrestors, Where Installed . . . . . 88
- H. Cleanouts for Masonry Chimneys . . . . . 88
- I. Chimney Crickets . . . . . 88
- J. Factory-built Fireplaces and Chimneys . . . . . 88
- K. Exterior Air Supply . . . . . 89

**SPECIAL TOPICS. . . . . 91**

**COLD-FORMED STEEL FRAMING . . . . . 91**

- I. GENERAL REQUIREMENTS . . . . . 91
  - A. Applicability Limits . . . . . 91
- II. STRUCTURAL FRAMING. . . . . 92
  - A. Structural Framing of Floor Members . . . . . 92
  - B. Materials . . . . . 92
  - C. Holes . . . . . 92
  - D. Fasteners . . . . . 93
  - E. Bearing Stiffeners . . . . . 94
  - F. Splices, Cutting and Notching . . . . . 94
  - G. Openings in Floors and Roofs. . . . . 94
  - H. In-line Floor Framing . . . . . 95
  - I. Joists . . . . . 95
  - J. Trusses . . . . . 96
- III. COLD-FORMED STEEL FLOORS . . . . . 96
  - A. Floor Construction . . . . . 96
  - B. Allowable Floor Joist Spans . . . . . 97

|     |   |            |
|-----|---|------------|
|     | C. Joist Bracing . . . . .                        | 97         |
|     | D. Floor Cantilevers . . . . .                    | 97         |
| IV. | COLD-FORMED STEEL WALLS . . . . .                 | 97         |
|     | A. Wall Construction . . . . .                    | 97         |
|     | B. Wall Bracing . . . . .                         | 98         |
|     | C. Headers . . . . .                              | 98         |
|     | D. Structural Sheathing . . . . .                 | 99         |
| V.  | COLD-FORMED STEEL ROOFS . . . . .                 | 100        |
|     | A. Roof Construction . . . . .                    | 100        |
|     | B. Allowable Ceiling Span . . . . .               | 100        |
|     | C. Ceiling Joist Bracing . . . . .                | 100        |
|     | D. Allowable Rafter Span . . . . .                | 101        |
|     | E. Rafter Bottom Flange Bracing . . . . .         | 102        |
|     | <b>MASONRY WALL INSPECTION (ABOVE GRADE). . .</b> | <b>103</b> |
| I.  | GENERAL MASONRY CONSTRUCTION . . . . .            | 103        |
|     | A. Minimum Thickness of Masonry . . . . .         | 103        |
|     | B. Corbeling . . . . .                            | 104        |
|     | C. Supports . . . . .                             | 104        |
|     | D. Piers . . . . .                                | 105        |
|     | E. Chases . . . . .                               | 105        |
|     | F. Stack Bond . . . . .                           | 105        |
|     | G. Lateral Support . . . . .                      | 105        |
|     | H. Lintels . . . . .                              | 106        |
|     | I. Coverage for Reinforcement . . . . .           | 106        |
|     | J. Beam Supports . . . . .                        | 107        |
|     | K. Metal Accessory Standards . . . . .            | 107        |
| II. | WALL CONSTRUCTION . . . . .                       | 108        |
|     | A. Unit Masonry . . . . .                         | 108        |

- B. Multiple Wythe Masonry . . . . . 109
- C. Grouted Masonry. . . . . 111
- D. Glass Unit Masonry . . . . . 113

**EXTERIOR CONCRETE WALL INSPECTION  
(ABOVE GROUND) . . . . . 117**

- I. GENERAL . . . . . 117
  - A. Applicability Limits . . . . . 118
  - B. Concrete Wall Systems . . . . . 118
  - C. Stay-in-place Forms . . . . . 119
  - D. Materials . . . . . 119
  - E. Above-grade Wall Requirements . . . . . 119
  - F. Solid Walls for Resistance to Lateral Forces . . . . 120
  - G. Requirements for Lintels and Reinforcement  
around Openings . . . . . 120

**ENERGY EFFICIENCY INSPECTION. . . . . 121**

- I. PRE-INSPECTION. . . . . 121
  - A. General. . . . . 121
  - B. Specific Insulation Requirements . . . . . 122
- II. FOUNDATION INSPECTION . . . . . 124
  - A. Slab-on-grade Floors. . . . . 124
  - B. Basement Wall Exterior Insulation . . . . . 125
  - C. Crawl Space Walls . . . . . 125
  - D. Masonry Veneer . . . . . 125
- III. FRAMING INSPECTION. . . . . 125
  - A. Fenestration (Glazing and Frames) . . . . . 126
- IV. INSULATION INSPECTION . . . . . 127
  - A. Wall Insulation . . . . . 127
  - B. Vapor Retarder. . . . . 128

|    |  |     |
|----|--|-----|
| C. | Ceiling Insulation . . . . .                   | 128 |
| D. | Basement Wall Insulation . . . . .             | 128 |
| E. | Insulation in Floor above Crawl Space. . . . . | 128 |
| V. | FINAL INSPECTION . . . . .                     | 129 |
| A. | Attic Insulation . . . . .                     | 129 |
| B. | Mechanical Systems . . . . .                   | 129 |
| C. | Lighting. . . . .                              | 129 |
| D. | Permanent Certificate . . . . .                | 130 |

