

2012 INTERNATIONAL
BUILDING CODE®
HANDBOOK

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2012 INTERNATIONAL BUILDING CODE® HANDBOOK

Douglas W. Thornburg, AIA | John R. Henry, P.E.



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Dedication

This book is dedicated to the memory of the late James E. Bihr, P.E., past chief executive officer of the International Conference of Building Officials (one of the three legacy founding members of the International Code Council) and past chairman of the board of directors of ASTM International (formerly the American Society of Testing and Materials). Mr. Bihr provided tremendous vision and leadership in various roles during his long and distinguished career. His integrity, professionalism, and compassion provided support and inspiration to the authors as well as so many others.

Chapter 5

General Building Heights and Areas 123

- Section 501 General124
- Section 503 General Building Height and Area Limitations124
- Section 504 Building Height128
- Section 505 Mezzanines and Equipment Platforms130
- Section 506 Building Area Modifications135
- Section 507 Unlimited-Area Buildings148
- Section 508 Mixed Use and Occupancy155
- Section 509 Incidental Uses165
- Section 510 Special Provisions168
- KEY POINTS172

Chapter 6

Types of Construction 175

- Section 602 Construction Classification176
- Section 603 Combustible Material in Type I and II Construction186
- KEY POINTS188

Chapter 7

Fire and Smoke Protection Features 189

- Section 703 Fire-Resistance Ratings and Fire Tests190
- Section 704 Fire-Resistance Rating of Structural Members . . .197
- Section 705 Exterior Walls201
- Section 706 Fire Walls215
- Section 707 Fire Barriers226
- Section 708 Fire Partitions228
- Section 709 Smoke Barriers231
- Section 710 Smoke Partitions232
- Section 711 Horizontal Assemblies232
- Section 712 Vertical Openings235
- Section 713 Shaft Enclosures237
- Section 714 Penetrations241
- Section 715 Joint Systems249
- Section 716 Opening Protectives250
- Section 717 Ducts and Air Transfer Openings255

- Section 718 Concealed Spaces260
- Section 719 Fire-Resistance Requirements for Plaster266
- Section 720 Thermal- and Sound-Insulating Materials266
- Section 721 Prescriptive Fire Resistance266
- Section 722 Calculated Fire Resistance270
- KEY POINTS272

Chapter 8

Interior Finishes 275

- Section 801 General276
- Section 803 Wall and Ceiling Finishes276
- Section 804 Interior Floor Finish279
- Section 805 Combustible Materials in Types I and II Construction280
- Section 806 Decorative Materials and Trim281
- KEY POINTS281

Chapter 9

Fire Protection Systems 283

- Section 901 General284
- Section 903 Automatic Sprinkler Systems286
- Section 904 Alternative Automatic Fire-Extinguishing Systems304
- Section 905 Standpipe Systems305
- Section 907 Fire Alarm and Detection Systems310
- Section 908 Emergency Alarm Systems317
- Section 909 Smoke-Control Systems317
- Section 910 Smoke and Heat Vents . . .320
- Section 911 Fire Command Center322
- Section 914 Emergency Responder Safety Features322
- KEY POINTS323

Chapter 10

Means of Egress 325

- Section 1001 Administration 327
- Section 1002 Definitions 327
- Section 1003 General Means of Egress 327
- Section 1004 Occupant Load 332
- Section 1005 Means of Egress Sizing . . . 344
- Section 1006 Means of Egress Illumination 351
- Section 1007 Accessible Means of Egress 353
- Section 1008 Doors, Gates, and Turnstiles 358
- Section 1009 Stairways 376
- Section 1010 Ramps 387
- Section 1011 Exit Signs 390
- Section 1012 Handrails 393
- Section 1013 Guards 400
- Section 1014 Exit Access 405
- Section 1015 Exit and Exit Access Doorways 408
- Section 1016 Exit Access Travel Distance 414
- Section 1017 Aisles 416
- Section 1018 Corridors 417
- Section 1019 Egress Balconies 423
- Section 1020 Exits 423
- Section 1021 Number of Exits and Exit Configuration 424
- Section 1022 Interior Exit Stairways and Ramps 428
- Section 1023 Exit Passageways 432
- Section 1024 Luminous Egress Path Markings 434
- Section 1025 Horizontal Exits 435
- Section 1026 Exterior Exit Stairways and Ramps 439
- Section 1027 Exit Discharge 441
- Section 1028 Assembly 444
- Section 1029 Emergency Escape and Rescue 457
- KEY POINTS 460

Chapter 11

Accessibility 463

- Section 1101 General 466
- Section 1102 Definitions 466

- Section 1103 Scoping Requirements . . . 467
- Section 1104 Accessible Route 469
- Section 1105 Accessible Entrances . . . 470
- Section 1106 Parking and Passenger Loading Facilities 472
- Section 1107 Dwelling Units and Sleeping Units 473
- Section 1108 Special Occupancies . . . 476
- Section 1109 Other Features and Facilities 478
- Section 1110 Signage 481
- KEY POINTS 482

Chapter 12

Interior Environment 483

- Section 1203 Ventilation 484
- Section 1204 Temperature Control . . . 488
- Section 1205 Lighting 488
- Section 1206 Yards or Courts 489
- Section 1207 Sound Transmission . . . 490
- Section 1208 Interior Space Dimensions 490
- Section 1209 Access to Unoccupied Spaces 491
- Section 1210 Toilet and Bathroom Requirements 492
- KEY POINTS 493

Chapter 13

Energy Efficiency 495

Chapter 14

Exterior Walls 497

- Section 1402 Definitions 498
- Section 1403 Performance Requirements 498
- Section 1404 Materials 499
- Section 1405 Installation of Wall Coverings 499
- Section 1406 Combustible Materials on the Exterior Side of Exterior Walls 505
- Section 1407 Metal Composite Materials 505
- Section 1408 Exterior Insulation and Finish Systems (EIFS) 506
- KEY POINTS 506

**Chapter 15
Roof Assemblies and
Rooftop Structures 507**

- Section 1502 Definitions 508
- Section 1503 Weather Protection 508
- Section 1504 Performance Requirements 509
- Section 1505 Fire Classification 511
- Section 1506 Materials 512
- Section 1507 Requirements for Roof Coverings 513
- Section 1508 Roof Insulation 519
- Section 1509 Rooftop Structures 519
- Section 1510 Reroofing 521
- KEY POINTS 522

Introduction to the Structural Provisions 523

- Structural Design (Chapter 16):
Nonseismic 524
- Structural Design (Chapter 16): Seismic . . . 525
- Structural Design (Chapter 16):
Load Combinations 527

**Chapter 16
Structural Design 529**

- Introduction 530
- Section 1601 General 530
- Section 1602 Definitions and Notations 531
- Section 1603 Construction Documents 531
- Section 1604 General Design Requirements 532
- Section 1605 Load Combinations 539
- Section 1606 Dead Loads 541
- Section 1607 Live Loads 541
- Section 1608 Snow Loads 552
- Section 1609 Wind Loads 555
- Section 1610 Soil Lateral Loads 562
- Section 1611 Rain Loads 563
- Section 1612 Flood Loads 563
- Section 1613 Earthquake Loads 565
- Section 1614 Atmospheric Ice Loads 570
- Section 1615 Structural Integrity 570
- KEY POINTS 571

- Example 16-1 Design Axial Force, Shear Force, and Bending Moment for Shear Wall Due to Lateral and Gravity Loads (Strength Design) 573
- Example 16-2 Design Axial Force, Shear Force, and Bending Moment for Shear Wall Due to Lateral and Gravity Loads (Allowable Stress Design Using Basic Load Combinations) 574
- Example 16-3 Design Axial Force, Shear Force, and Bending Moment for Shear Wall Due to Lateral and Gravity Loads (Allowable Stress Design Using Alternate Basic Load Combinations) 575
- Example 16-4 Calculations of Live Load Reduction 576

**Chapter 17
Structural Tests and Special Inspections . . . 579**

- Introduction 580
- Section 1701 General 581
- Section 1702 Definitions 582
- Section 1703 Approvals 584
- Section 1704 Special Inspections, Contractor Responsibility, and Structural Observations 590
- Section 1705 Required Verification and Inspection 596
- Section 1706 Design Strengths of Materials 612
- Section 1707 Alternate Test Procedures 612
- Section 1708 Test Safe Load 612
- Section 1709 In Situ Load Tests 613
- Section 1710 Preconstruction Load Tests 613
- Section 1711 Material and Test Standards 614
- KEY POINTS 618

**Chapter 18
Soils and Foundations 621**

- Introduction 622
- Section 1801 General 622

- Section 1802 Definitions623
- Section 1803 Geotechnical Investigations623
- Section 1804 Excavation, Grading, and Fill628
- Section 1805 Dampproofing and Waterproofing628
- Section 1806 Presumptive Load-Bearing Values of Soils.637
- Section 1807 Foundation Walls, Retaining Walls, and Embedded Posts and Poles639
- Section 1808 Foundations644
- Section 1809 Shallow Foundations.649
- Section 1810 Deep Foundations.654
- KEY POINTS680

**Chapter 19
Concrete 683**

- Introduction684
- Section 1901 General.684
- Section 1902 Definitions685
- Section 1903 Specifications for Tests and Materials685
- Section 1904 Durability Requirements691
- Section 1905 Modifications to ACI 318.692
- Section 1906 Structural Plain Concrete696
- Section 1907 Minimum Slab Provisions696
- Section 1908 Anchorage to Concrete—Allowable Stress Design697
- Section 1909 Anchorage to Concrete—Strength Design698
- Section 1910 Shotcrete.699
- Section 1911 Reinforced Gypsum Concrete700
- Section 1912 Concrete-Filled Pipe Columns700
- KEY POINTS701

**Chapter 20
Aluminum 705**

- Introduction706
- Section 2002 Materials.706
- KEY POINTS707

**Chapter 21
Masonry 709**

- Introduction710
- Section 2101 General711
- Section 2102 Definitions and Notations714
- Section 2103 Masonry Construction Materials.714
- Section 2104 Construction.717
- Section 2105 Quality Assurance.718
- Section 2106 Seismic Design718
- Section 2107 Allowable Stress Design.723
- Section 2108 Strength Design of Masonry725
- Section 2109 Empirical Design of Masonry727
- Section 2110 Glass Unit Masonry.728
- Section 2111 Masonry Fireplaces728
- Section 2112 Masonry Heaters729
- Section 2113 Masonry Chimneys729
- KEY POINTS729

**Chapter 22
Steel 733**

- Introduction734
- Section 2201 General734
- Section 2202 Definitions734
- Section 2203 Identification and Protection of Steel for Structural Purposes734
- Section 2204 Connections735
- Section 2205 Structural Steel.737
- Section 2206 Composite Structural Steel and Concrete Structures.739
- Section 2207 Steel Joists739
- Section 2208 Steel Cable Structures.741
- Section 2209 Steel Storage Racks.742
- Section 2210 Cold-Formed Steel.742
- Section 2211 Cold-Formed Steel Light-Framed Construction.745
- KEY POINTS747

**Chapter 23
Wood 749**

- Introduction750
- Section 2301 General750

- Section 2302 Definitions752
- Section 2303 Minimum Standards and Quality755
- Section 2304 General Construction Requirements767
- Section 2305 General Design Requirements for Lateral-Force-Resisting Systems778
- Section 2306 Allowable Stress Design.780
- Section 2307 Load and Resistance Factor Design786
- Section 2308 Conventional Light-Frame Construction786
- KEY POINTS829

**Chapter 24
Glass and Glazing 833**

- Section 2403 General Requirements for Glass834
- Section 2404 Wind, Snow, Seismic and Dead Loads on Glass.834
- Section 2405 Sloped Glazing and Skylights835
- Section 2406 Safety Glazing838
- Section 2407 Glass in Handrails and Guards.847
- Section 2408 Glazing in Athletic Facilities847
- KEY POINTS848

**Chapter 25
Gypsum Board and Plaster. 849**

- Section 2501 Scope850
- Section 2502 Definitions850
- Section 2504 Vertical and Horizontal Assemblies851
- Section 2506 Gypsum Board Materials.852
- Section 2508 Gypsum Construction.853
- Section 2509 Gypsum Board in Showers and Water Closets854
- Section 2510 Lathing and Furring for Cement Plaster (Stucco)855
- Section 2511 Interior Plaster856
- Section 2512 Exterior Plaster857
- KEY POINTS859

**Chapter 26
Plastic 861**

- Section 2603 Foam Plastic Insulation862
- Section 2604 Interior Finish and Trim.868
- Section 2605 Plastic Veneer869
- Section 2606 Light-Transmitting Plastics869
- Section 2607 Light-Transmitting Plastic Wall Panels.870
- Section 2608 Light-Transmitting Plastic Glazing.870
- Section 2609 Light-Transmitting Plastic Roof Panels870
- Section 2610 Light-Transmitting Plastic Skylight Glazing871
- KEY POINTS871

**Chapter 27
Electrical 873**

- Section 2702 Emergency and Standby Power Systems874

**Chapter 28
Mechanical 877**

**Chapter 29
Plumbing 879**

- Section 2902 Minimum Plumbing Facilities880
- KEY POINTS883

**Chapter 30
Elevators and Conveying Systems. 885**

- Section 3002 Hoistway Enclosures.886
- Section 3003 Emergency Operations888
- Section 3004 Hoistway Venting889
- Section 3006 Machine Rooms.889
- Section 3007 Fire Service Access Elevator.889
- Section 3008 Occupant Evacuation Elevators.891
- KEY POINTS892

**Chapter 31
Special Construction 893**

- Section 3102 Membrane Structures . . . 894
- Section 3104 Pedestrian Walkways and Tunnels 895
- Section 3105 Awnings and Canopies 896
- Section 3106 Marquees 896
- Section 3109 Swimming Pool Enclosures and Safety Devices 896
- KEY POINTS 898

**Chapter 32
Encroachments in the Public Right-of-Way 899**

- Section 3201 General 900
- Section 3202 Encroachments 900

**Chapter 33
Safeguards During Construction 905**

- Section 3302 Construction Safeguards 906
- Section 3303 Demolition 906
- Section 3304 Site Work 906
- Section 3306 Protection of Pedestrians 908
- Section 3307 Protection of Adjoining Property 910
- Section 3308 Temporary Use of Streets, Alleys and Public Property 911
- Section 3309 Fire Extinguishers 911
- Section 3310 Means of Egress 911
- Section 3311 Standpipes 911
- KEY POINTS 912

**Chapter 34
Existing Structures 913**

- Section 3404 Alterations 914
- Section 3408 Change of Occupancy . . . 915

- Section 3411 Accessibility for Existing Buildings 915
- Section 3412 Compliance Alternatives 916
- KEY POINTS 917

**Chapter 35
Referenced Standards 919**

Appendixes 921

- Appendix A Employee Qualifications . . 922
- Appendix B Board of Appeals 922
- Appendix C Group U Agricultural Buildings 923
- Appendix D Fire Districts 923
- Appendix E Supplementary Accessibility Requirements 925
- Appendix F Rodentproofing 925
- Appendix G Flood-Resistant Construction 926
- Appendix H Signs 926
- Appendix I Patio Covers 926
- Appendix J Grading 927
- Appendix K Administrative Provisions 927
- Appendix L Earthquake Recording Instrumentation 927
- Appendix M Tsunami-Generated Flood Hazard 927

Metric Conversion Table 929

- Metric Units, System International (SI) 930
- Soft Metrication 930
- Hard Metrication 930

Index 937

Foreword

How often have you heard these questions when discussing building codes: “What is the intent of this section?” or, “How do I apply this provision?” This publication offers the code user a resource that addresses much of the intent and application principles of the major provisions of the *2012 International Building Code*[®] (IBC[®]).

It is impossible for building codes and similar regulatory documents to contain enough information, both prescriptive and explanatory narrative, to remove all doubt as to the intent of the various provisions. If such a document were possible, it would be so voluminous that it would be virtually useless.

Because the IBC must be reasonably brief and concise in its provisions, the user must have knowledge of the intent and background of these provisions to apply their intent appropriately. The IBC places great reliance on the judgment of the building official and design professional for the specific application of its provisions. Where the designer and building official have knowledge of the rationale behind the provisions, the design and enforcement of the code will be based on informed judgment rather than arbitrariness or rote procedure.

The information that this handbook provides, coupled with the design professional’s and building official’s experience and education, will result in better use of the IBC and more uniformity in its application. As lengthy as this document may seem, it still cannot provide all of the answers to questions of code intent, that is why the background, training, and experience of the reader must also be called on to properly apply, interpret, and enforce the code provisions.

The preparation of a document of this nature requires consulting a large number of publications, organizations, and individuals. Even so, the intent of many code provisions is not completely documented. Sometimes the discussion is subjective; therefore, individuals may disagree with the conclusions presented. It is, however, important to note that the explanatory narratives are based on many decades of experience by the authors and the other contributors to the manuscript.

Preface

Internationally, code officials and design professionals recognize the need for a modern, up-to-date building code addressing the design and installation of building systems through requirements emphasizing performance. The *International Building Code*[®] (IBC[®]) meets those needs by providing model code regulations that safeguard the public health and safety in all communities, large and small. The *IBC Handbook* is a valuable resource for those who design, plan, review, inspect, or construct buildings or other structures regulated by the 2012 IBC.

The IBC is one of a family of codes published by the International Code Council[®] (ICC[®]) that establishes comprehensive minimum regulations for building systems using prescriptive and performance-related provisions. It is founded on broad-based principles that use new materials and new building designs. Additionally, the IBC is compatible with the entire family of International Codes[®] published by the ICC.

There are three major subdivisions to the IBC:

1. The text of the IBC
2. The referenced standards listed in Chapter 35
3. The appendices

The first 34 chapters of the IBC contain both prescriptive and performance provisions that are to be applied. Chapter 35 contains those referenced standards that, although promulgated and published by separate organizations, are considered as a part of the IBC as applicable. The provisions of the appendix do not apply unless specifically included in the adoption ordinance of the jurisdiction enforcing the code.

The *2012 IBC Handbook* is designed to present commentary only for those portions of the code for which commentary is helpful in furthering the understanding of the provision and its intent. This handbook uses many drawings and figures to help clarify the application and intent of many code provisions.

This handbook examines the intent and application of many code provisions for both the nonstructural- and structural-related aspects of the IBC. It addresses in detail many requirements that are considered as “fire- and life-safety” provisions of the code. Found in IBC Chapters 3 through 10, these provisions focus on the important considerations of occupancy and type of construction classification, allowable building size, fire and smoke protection features, fire protection systems, interior finishes, and means of egress.

The discussion of the structural provisions in this handbook is intended to help code users understand and properly apply the requirements in Chapters 16 through 23 of the 2012 IBC. Although the discussion is useful to a broad range of individuals, the discussion of the structural provisions was written primarily so that building officials, plans reviewers, architects, and engineers can get a general understanding of the IBC’s structural requirements and gain some insight into their underlying basis and intent. To that end, the numerous figures, tables, and examples are intended to illustrate and help clarify the proper application of many structural provisions of the IBC.

As the IBC adopts many national standards by reference rather than transcribing the structural provisions of the standards into the code itself, in some cases the discussion in this handbook pertains to the provisions found in the referenced standard such as

ASCE 7 and ACI 318 rather than the IBC. The structural provisions addressed focus on the general design requirements related to structural load effects; special inspection and verification, structural testing, and structural observation; foundations and soils; and specific structural materials design requirements for concrete, masonry, steel, and wood.

Questions or comments concerning this handbook are encouraged. Please direct any correspondence to *handbook@iccsafe.org*.

Acknowledgments

The publication of this handbook is based on many decades of experience by the authors and other contributors. Since its initial publication, the handbook has become a living document subject to changes and refinements as newer code editions are released. This latest edition reflects extensive modifications based on the requirements found in the *2012 International Building Code*.

The initial handbook, on which the nonstructural portions of this document are based, was published in 1988. It was authored by Vincent R. Bush. In developing the discussions of intent, Mr. Bush drew heavily on his 25 years of experience in building safety regulation. Mr. Bush, a structural engineer, was intimately involved in code development work for many years.

In addition to the expertise of Mr. Bush, major contributions were made by John F. Behrens. Mr. Behrens' qualifications were as impressive as the original author's. He had vast experience as a building official, code consultant, and seminar instructor. Mr. Behrens provided the original manuscript of the means of egress chapter and assisted in the preparation of many other chapters.

Revisions to the handbook occurred regularly over the years, with content based on the provisions of the *International Building Code* authored by Doug Thornburg, AIA, C.B.O. Mr. Thornburg, a certified building official and registered architect, has over 32 years of experience in the building regulatory profession. Previously a building inspector, plans reviewer, building code administrator, seminar instructor, and code consultant, he is currently vice-president and technical director/Product Development and Education for the International Code Council (ICC). In his present role, Mr. Thornburg develops and reviews technical publications, reference books, resource materials, and educational programs relating to the International Codes. He continues to present building code seminars nationally and has developed numerous educational texts, including *Significant Changes to the IBC, 2012 Edition*. Mr. Thornburg was presented with ICC's inaugural Educator of the Year Award in 2008, recognizing his outstanding contributions in education and training.

The basis of the discussion on the 2012 structural requirements is the *2000 IBC Handbook—Structural Provisions*, authored by S. K. Ghosh, Ph.D., and Robert Chittenden, S.E. Both authors have extensive knowledge, expertise, and experience in the development of many of the structural provisions of the IBC. Dr. Ghosh initially authored Chapters 16 and 19, and Mr. Chittenden authored Chapters 17, 18, 20, 21, 22, and 23. John Henry, ICC principal staff engineer, is the author of the current commentary addressing IBC Chapters 16 through 23. Mr. Henry, a registered civil engineer and certified plans examiner, has over 25 years of experience in structural-related aspects of building code safety including responsibilities as a design engineer in private practice, plans check engineer, and code consultant. A member of the Product Development group with the ICC, he provides technical support for the *International Building Code* and has developed and presented many seminars on the structural provisions of the IBC. Mr. Henry was presented with ICC's John Nosse Award for Technical Excellence in 2011, recognizing his outstanding contributions and technical expertise.

Special acknowledgement goes to Alan Carr, S.E., ICC senior staff engineer/Codes and Standards, who updated and contributed a significant portion of the discussion in Chapters 16 and 19, and to Sandra Hyde, P.E., ICC staff engineer/Product Development, who updated the discussion in Chapter 18. Such recognition also goes to Scott Stookey,

engineering associate for the Austin, Texas, Fire Department, and ICC product Development group member Jay Woodward, senior staff architect, for their contributions to discussions of Chapters 9 and 10, respectively.

The information and opinions expressed in this handbook are those of the present and past authors, as well as the many contributors, and do not necessarily represent the official position of the International Code Council. Additionally, the opinions may not represent the viewpoint of any enforcing agency. Opinions expressed in this handbook are only intended to be a resource in the application of the IBC, and the building official is not obligated to accept such opinions. The building official is the final authority in rendering interpretations of the code.