



**AUTODESK**  
Official Press

**Don Bokmiller  
Simon Whitbread  
Plamen Hristov**

# Mastering Autodesk® Revit® MEP 2014



**SYBEX**  
A Wiley Brand





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**Autodesk® Revit® MEP 2014**



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**Don Bokmiller**

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Best regards,

A handwritten signature in black ink, appearing to read 'Neil Edde', with a stylized, flowing script.

Neil Edde  
Vice President and Publisher  
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To my wife, family, friends, and coworkers, with  
much gratitude.

—Don Bokmiller

To my wife and daughter for all their support, all the  
time, thank you.

—Simon Whitbread

To my family, friends, and coworkers, thank you all.

—Plamen Hristov

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—*Don Bokmiller*

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—*Simon Whitbread*

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—*Plamen Hristov*

# About the Authors



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**Plamen Hristov** is the director of design technology at Capital Engineering Consultants, Inc., where he is leading the implementation of building information modeling (BIM). Plamen has also worked as an application specialist, actively developing Autodesk Revit implementation strategies, techniques, and procedures for architectural and MEP companies. He has been establishing and updating company standards and best practices, as well as assisting project teams with pilot projects, implementations, on-site project consulting, custom content creation, and training. Plamen is an Implementation Certified Expert (ICE), and he has presented various BIM topics at Autodesk University, the Revit Technology Conference, Ecobuild America, and Revit user groups.



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# Introduction

Welcome to *Mastering Autodesk® Revit® MEP 2014*. We have worked diligently to bring you a book that takes you through the core features and functionality of Revit MEP 2014 from both the design and documentation perspectives.

Revit MEP started out as Revit Systems in 2006, and, in just a few years, it has been on a fast-track development pace in order to bring it up to speed with the Revit Architecture and Revit Structure platforms. The 2014 release of Revit MEP provides platform improvements along with MEP-specific features that make this a very exciting edition. When Revit Systems was first released, it was primarily to allow MEP engineers to join the move toward building information modeling (BIM) that was being taken on by architects and structural engineers. The features and functionality were, in the opinion of most, limited to provide a complete MEP project. The development team has been listening to the needs of users, and has delivered tools and features in this release that have been desired by many from the beginning. We now have tools for duct-mounted air terminals, applying lookup table files directly to fittings, temporary visibility overrides, and many other new features.

The primary focus of this book is, of course, on the MEP disciplines, but there is plenty of information that applies to Revit in general. The idea behind the format is to take you through the major points of the design process and requirements for completing a building design and project submittal. This book focuses on building engineering, but it may also be helpful for other types of engineering projects such as process piping design or any others that require a combination of data and model components.

The book is written in five parts, the first of which covers general functionality that is useful for all disciplines. You will find suggestions throughout the book for including features and components in your project templates. The first part does not cover every pick and click available in the software; it approaches the use of Revit from a best-practices standpoint, which we hope will inspire you to think about ways to make Revit MEP 2014 work best for you. Any topics not covered were not omitted to imply that they are unimportant, but simply because you can find information about these features in the documentation provided by Autodesk and in the Revit MEP 2014 Help.

The next three parts of the book are MEP-specific and have been written to cover the key design areas of each individual discipline. Again, we focus on best practices by relating our professional experience with not only the software but also the design industry. In an effort to tie it all together, the fifth part of the book contains information on how to optimize your Revit experience by learning the tools and features available for creating the various components that make up an MEP model.

## Who Should Buy This Book

This book is intended for readers who are at least somewhat familiar with Revit MEP. It is not intended to be a “how-to” book by simply explaining picks and clicks; it is more for readers who are looking to find ideas on how to make the software work for them. Engineers, designers, and CAD technicians will all find useful information related to their workflows. If you are looking to move further with your Revit MEP implementation, you should find this book to be a useful resource. Even if you know the topics discussed in this book, we hope you will be inspired to think of new ways to improve your Revit MEP experience.

### FREE AUTODESK SOFTWARE FOR STUDENTS AND EDUCATORS

The Autodesk Education Community is an online resource with more than five million members that enables educators and students to download—for free (see website for terms and conditions)—the same software used by professionals worldwide. You can also access additional tools and materials to help you design, visualize, and simulate ideas. Connect with other learners to stay current with the latest industry trends and get the most out of your designs. Get started today at [www.autodesk.com/joinedu](http://www.autodesk.com/joinedu).

## What’s Inside

Here is a glance at what’s in each chapter:

### Part 1: General Project Setup

**Chapter 1: Exploring the User Interface** The ribbon interface is designed for optimal workflow. In this chapter, you will discover the features of the user interface that allow you to work efficiently. Some new features in Revit MEP 2014 improve the user interface dramatically.

**Chapter 2: Creating an Effective Project Template** The key to success with Revit projects is to have a good template file. Chapter 2 takes you through the major areas of a template file, offering ideas for settings that will make starting a project as simple and efficient as possible.

**Chapter 3: Worksets and Worksharing** This chapter guides you through the process of setting up a project file in a multiuser environment. The features of a worksharing-enabled file are explained in a manner that promotes ideas for project workflow efficiency.

**Chapter 4: Project Collaboration** Revit has many features that make project collaboration easy to manage. In this chapter, you will learn about ways to use the power of Revit MEP to coordinate your design and documents with other members of the project team.

**Chapter 5: Multiplatform Interoperability: Working with 2D and 3D Data** This chapter provides best-use techniques for importing non-Revit data into your projects. You will learn about the data types available and how to use them effectively in your Revit project files.

**Chapter 6: Parameters** Parameters are the intelligence within a BIM project. This chapter explores how parameters can be used in both projects and families for applying computable data to your Revit models. The creation of shared parameters and their use is also covered.

**Chapter 7: Schedules** The best way to extract the data contained in your Revit project model is to use the power of schedules. In this chapter, you will learn the tools available for scheduling model components and how to use schedules to manage data within your projects. The panel schedule template feature is also covered in this chapter.

## **Part 2: Autodesk Revit MEP for Mechanical Design**

**Chapter 8: HVAC Cooling and Heating Load Analysis** Mechanical design must first start with understanding how your building will perform in different weather conditions and climates. In Chapter 8, you will learn that properly produced building loads can ensure that the mechanical design has been sized for maximum efficiency, saving energy and money while reducing the impact on the environment.

**Chapter 9: Creating Logical Systems** In this chapter, you will learn how to set up logical systems, and how each system is affected by the type of systems you have created. From mechanical systems to fire-protection systems, all have a certain role to play in BIM.

**Chapter 10: Mechanical Systems and Ductwork** Understanding how to route ductwork successfully can lead to error reduction and better coordination. In Chapter 10, you will learn how to locate mechanical equipment, and how to use the proper routing methods for ductwork.

**Chapter 11: Mechanical Piping** Routing mechanical piping can be a daunting task. In this chapter, you will learn how to route and coordinate your piping and how, through these techniques, you can speed up production and take full advantage of what Revit MEP 2014 has to offer.

## **Part 3: Autodesk Revit MEP for Electrical Design**

**Chapter 12: Lighting** In this chapter, you will learn how to place lighting fixtures into your projects, including site lighting. The use of lighting switches is also discussed, along with the relationship between lighting fixtures and the spaces they occupy. This chapter also covers the basics for using Revit MEP for lighting analysis.

**Chapter 13: Power and Communications** In this chapter, the basics for placing power and communication devices into a model are covered. You will also learn how to place electrical equipment and connections for use in distribution systems. Conduit and cable tray modeling tools are also explored in this chapter.

**Chapter 14: Circuiting and Panels** Creating systems for your electrical components is just as important as it is for mechanical components. In this chapter, you will learn how to set up your projects to your standards for wiring, create circuits within your model, and create panel schedules to report the loads. The tools for load classification and demand factors are also covered in this chapter.

## **Part 4: Autodesk Revit MEP for Plumbing**

**Chapter 15: Plumbing (Domestic, Sanitary, and Other)** In this chapter, you will learn how to modify plumbing fixture families and create custom systems to speed up plumbing design. You will also learn how to use the Copy/Monitor features in ways never discussed before.

**Chapter 16: Fire Protection** Fire-protection systems protect buildings and lives. You will learn how to lay out a fire pump system and assemble components to help in your design process. You will learn how to coordinate with other disciplines and how to enter into the BIM arena effectively through the use of Revit MEP 2014.

### **Part 5: Managing Content in Autodesk Revit MEP**

**Chapter 17: Solid Modeling** The foundation for custom content creation is having the ability to create the forms required to build component families. In this chapter, you will learn how to use the tools available in Revit MEP to create model geometry. You will also learn how to make geometry parametric, increasing its usability.

**Chapter 18: Creating Symbols and Annotations** Because so much of MEP design information is conveyed with schematic symbols, it is important to have the symbols and annotative objects commonly used for projects. Revit MEP has the tools needed to create schematic symbols for use in component families or directly in projects. In this chapter, you will learn how to use these tools, and how to create constraints within families for display of the symbols in your projects.

**Chapter 19: Creating Equipment** Equipment families are an important component of a Revit model because of the space they occupy within a building. In this chapter, you will learn how to use solid modeling tools to create equipment. You will also learn how to add connectors for systems, and how to create clearance spaces for coordination with other model elements.

**Chapter 20: Creating Lighting Fixtures** Lighting fixture families are special because they can hold photometric data that allow for lighting analysis directly in your Revit model. This chapter covers how to create lighting fixture families and add the data needed for analysis. You will also learn how lighting fixture families can be represented in project model views using detail components, linework, and annotation within the family file.

**Chapter 21: Creating Devices** This chapter examines the process for creating MEP system devices and how to use annotations to represent them on construction documents. In this chapter, you will also learn how parameters can be used to control and manage symbol visibility.

**Chapter 22: Details** Although creating a model with computable data is the primary reason for using Revit MEP, you do not want to model every minute detail of the design. The tools for creating detail drawings of your design are examined in this chapter. You will also learn how to use existing CAD details along with strategies for creating a library of Revit details.

**Chapter 23: Sheets** When it comes time to submit a project, you need to have a set of coordinated construction documents. In this chapter, you will learn the ways you can create and manage your project sheets. You will also learn about how you can print and export your project sheets for submittal or coordination with clients.