# Contents

**Introduction** ......................................................................................... v

**Exercise Files** ...................................................................................... ix

**Chapter 1: Getting Started** ................................................................. 1

  - **Lesson: Interacting with the User Interface** ........................................ 2
  - Exercise: Interact with the User Interface .............................................. 12
  - **Lesson: Common Drawing Setup** ..................................................... 14
  - Exercise: Create and Use Template Drawings .................................... 22

**Chapter 2: Object Property and Layer Management** .......................... 25

  - **Lesson: Property Management** ..................................................... 26
  - Exercise: Automatic Property Management ...................................... 35
  - **Lesson: Layer Control** ................................................................... 38
  - Exercise: Control Layer Display and Geometry on Layers .................. 46

**Chapter 3: Organizing Drawing Geometry** ........................................ 49

  - **Lesson: Drawing Creation Workflows and Organization** .................. 50
  - **Lesson: Structuring Data in Drawings** .......................................... 56
  - Exercise: Create a Drawing Using Structure .................................... 68
  - **Lesson: Reusing and Editing Structured Data** ............................... 73
  - Exercise: Reuse and Edit Structured Data ......................................... 93

**Chapter 4: Tools for Creating Key Geometry** ..................................... 99

  - **Lesson: Core Design Tools** ............................................................. 101
  - Exercise: Create Geometry Using the Core Design Tools .................. 115
  - **Lesson: Power Snaps** .................................................................... 118
  - Exercise: Configure and Activate Power Snaps ................................ 125
  - **Lesson: Centerlines** ...................................................................... 129
  - Exercise: Add Centerlines and Holes ................................................. 142
  - **Lesson: Construction Lines** .......................................................... 145
  - Exercise: Create and Use Construction Lines .................................... 153
  - **Lesson: Designing with Lines** ....................................................... 156
  - Exercise: Draw with Different Line Tools ......................................... 163
  - **Lesson: Adding Standard Feature Data for Holes and Slots** .......... 165
  - Exercise: Add Holes and Slots ......................................................... 179
Chapter 5: Tools for Manipulating Geometry .................................................. 183
Lesson: Editing Tools .................................................................................. 184
Exercise: Basic Editing Tools ...................................................................... 191
Lesson: Power Commands  ........................................................................... 193
Exercise: Use Power Commands .................................................................. 199
Lesson: Associative Hide ............................................................................. 202
Exercise: Create and Edit Associative Hides ............................................... 211
Exercise: Create and Edit Associative Hides - When Using Structure .......... 215

Chapter 6: Mechanical Part Generators ......................................................... 221
Lesson: Standard Parts ................................................................................. 224
Exercise: Insert and Notate Standard Parts ............................................... 246
Exercise: Insert from the Content Libraries Palette ..................................... 250
Lesson: Chains and Belts ............................................................................. 259
Exercise: Design Chains and Belts .............................................................. 264
Lesson: Shaft Generator ................................................................................ 267
Exercise: Place a Shaft in an Assembly ....................................................... 281
Lesson: Standard Shaft Parts ...................................................................... 284
Exercise: Insert Standard Shaft Parts ......................................................... 290
Lesson: Springs ............................................................................................ 292
Exercise: Insert a Spring .............................................................................. 303

Chapter 7: Creating Drawing Sheets ............................................................... 307
Lesson: Model Space Views in Layouts ......................................................... 308
Exercise: Create Viewports and Details in Layouts ..................................... 318
Lesson: Creating Drawing Sheets in Model Space ....................................... 323
Exercise: Create Drawing Sheets in Model Space ....................................... 328
Lesson: Annotation Views When Using Structure ...................................... 331
Exercise: Create and Edit Annotation Views .............................................. 340
Lesson: Title Blocks and Drawing Borders ................................................... 347
Exercise: Insert Title Blocks and Borders .................................................. 355

Chapter 8: Dimensioning and Annotating Drawings ..................................... 359
Lesson: Annotation and Annotation Symbols .............................................. 362
Exercise: Annotate Parts and Subassemblies .............................................. 384
Lesson: Creating Dimensions ....................................................................... 389
Exercise: Use the Power Dimension Command .......................................... 406
Exercise: Add Different Power Dimensions .............................................. 409
Exercise: Place Multiple Dimensions Automatically .................................... 413
Lesson: Editing Dimensions ......................................................................... 415
Exercise: Edit Dimensions ........................................................................... 423
Lesson: Hole Charts and Fits Lists ............................................................... 427
Exercise: Add Hole Charts and Fits Lists .................................................... 434
Lesson: Revision Lists .................................................................................. 437
Exercise: Create a Revision List .................................................................. 442
Chapter 9: Bill of Materials, Parts Lists, and Balloons ........................................ 445
Lesson: Part References ......................................................................................... 448
Exercise: Create Part References .......................................................................... 454
Lesson: Bill of Materials ......................................................................................... 456
Exercise: Create and Edit a Bill of Materials .......................................................... 467
Exercise: Create and Edit a Bill of Materials - When Using Structure .................. 470
Lesson: Inserting Parts Lists .................................................................................... 473
Exercise: Insert and Edit Parts Lists ....................................................................... 479
Exercise: Insert and Edit Parts Lists When Using Structure ................................... 482
Lesson: Ballooning Parts ......................................................................................... 484
Exercise: Add Balloons to Assembly Drawings ...................................................... 491

Chapter 10: Design Calculations ............................................................................. 499
Lesson: Design Calculations .................................................................................... 500
Exercise: Calculate Moments of Inertia .................................................................. 514
Exercise: Calculate the Deflection Line ................................................................... 516
Exercise: Calculate Shaft Strength ......................................................................... 518
Exercise: Calculate FEA Stresses .......................................................................... 520

Chapter 11: Leveraging Your Existing Data ............................................................. 525
Lesson: DWG Files ................................................................................................. 526
Exercise: Remove Mechanical Content from a Drawing ........................................... 530
Lesson: IGES Files ................................................................................................ 532
Lesson: Model Documentation .............................................................................. 534
Exercise: Create Views Associated to an Autodesk Inventor 3D Model ............... 540

Chapter 12: Mechanical Options for the CAD Manager ........................................ 543
Lesson: Standards-Based Design ......................................................................... 544
Exercise: Create and Set a Default Standard Template ........................................... 551
Lesson: Configure Layer, Text, and Object Properties .......................................... 553
Exercise: Configure Layers and Object Properties ................................................. 561
Lesson: Configure the Annotation Tools .................................................................. 566
Exercise: Set Annotation Properties ....................................................................... 589
Lesson: Configure Component Properties, BOMs, Parts Lists, and Balloons ........ 592
Exercise: Configure Properties, BOM, Parts List, and Balloons ............................. 608
Introduction

Welcome to the AutoCAD® Mechanical 2017 (R1) Essentials student guide for use in Authorized Training Center (ATC®) locations, corporate training settings, and other classroom settings.

Although this student guide is designed for instructor-led courses, you can also use it for self-paced learning. The student guide encourages self-learning through the use of the AutoCAD® Mechanical Help system.

This introduction covers the following topics:

- Course objectives
- Prerequisites
- Using this guide
- Downloading and installing the Practice Files
- Notes, tips, and warnings
- Feedback
- Free Autodesk software for students and educators

This student guide is complementary to the software documentation. For detailed explanations of features and functionality, refer to the Help in the software.

Course Objectives

After completing this student guide, you will be able to:

- Identify the main interface elements, their setup and what Help information is available, and to create and use drawing template files.
- Describe the object property management system in which layers are configured and the tools for manipulating layers.
- Describe the workflows for organizing drawing geometry and create a Mechanical structure in a drawing by creating components, component views, and folders.
- Describe the core mechanical design tools of rectangle, hatch, fillet, chamfer, holes, slots, and threads and how to use them to create and modify geometry in your drawings.
- Modify and edit drawing objects by creating multiple offset copies, scaling them with separate values for the X and Y direction, or using a power command.
- Insert industry standard parts into your assembly designs.
- Create production-ready drawings in model space and layouts of structured and non-structured geometry and insert title blocks and borders.
- Notate a drawing through the creation and editing of dimensions, hole charts, fits lists, and mechanical symbols.
Explain how to create and edit a bill of materials, parts list, and balloons.

Describe the tools that you can use to verify whether or not the standard parts or custom parts within your design meet or exceed the requirements for operational use.

Exchange data between CAD systems in the form of Mechanical DWG™ and IGES files and create Mechanical drawings using Inventor Link.

Create a custom drafting standard and drawing template that includes the configuration settings for layers, object properties, symbols, text, BOMs, parts list, balloons, and other annotation tools.

**Prerequisites**

This guide is designed for users who are new to the AutoCAD® Mechanical 2017 (R1) software.

- A basic understanding of mechanical drafting or design.
- A working knowledge of the AutoCAD® software.
- A working knowledge of the Microsoft® Windows® 7 operating system.

**Using This Guide**

The lessons are independent of each other. However, it is recommended that you complete these lessons in the order in which they are presented unless you are familiar with the concepts and functionality described in those lessons.

Each chapter contains:

- **Lessons** - Usually two or more lessons in each chapter.
- **Exercises** - Practical, real-world examples for you to practice using the functionality that you have just learned. Each exercise contains step-by-step procedures and graphics to help you complete the exercise successfully.

**Downloading and Installing the Practice Files**

The Practice Files page in this Student Guide contains a link to all of the data and drawings required to complete the exercises. To install the data files for the exercises:

1. Type or click the link, provided in the Practice Files page of the student guide, into a web browser and download the .EXE file containing the Practice Files.
2. Extract the .EXE file to C:\. This should be a directory for which you have read/write privileges for your user account. A folder called C:\AutoCAD Mechanical 2017 Essentials Practice Files is created, containing the files that are required for each exercise in this student guide.
Notes, Tips, and Warnings

Throughout this student guide, notes, tips, and warnings are called out for special attention.

Notes contain guidelines, constraints, and other explanatory information.

Tips provide information to enhance your productivity.

Warnings provide information about actions that might result in the loss of data, system failures, or other serious consequences.

Feedback

We always welcome feedback on Autodesk Official Training Courseware. After completing this course, if you have suggestions for improvements or want to report an error in the student guide or with the Practice Files, please send your comments to feedback@ascented.com.

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 the same software used by professionals worldwide (see website for terms and conditions). 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. Register at the Autodesk Education Community (www.autodesk.com/joinedu) and download one of the many available Autodesk software applications.

Note: Free products are subject to the terms and conditions of the end-user license and services agreement that accompanies the software. The software is for personal use for education purposes only and is not intended for classroom or lab use.
Getting Started

In this chapter, you learn how the AutoCAD® Mechanical interface is set up. You become familiar with where to find various commands, and learn how to create drawing template files and to use them when creating new drawings.

Objectives

After completing this chapter, you will be able to:

- Identify the main interface elements, their setup, and the available Help information.
- Create and use drawing template files.
Lesson: Interacting with the User Interface

Overview

This lesson describes the AutoCAD Mechanical interface, how to change different parts of it, and how to access helpful information when required.

To work comfortably, confidently, and quickly in any software application, you need to learn the different parts of its user interface. When you know how to adjust the user interface to match your workflow requirements, you can work comfortably and efficiently. Learning where to access information when you need it helps you to continue to improve your abilities and skills.

The following illustration shows the upper-left area of the user interface in its default configuration.

Objectives

After completing this lesson, you will be able to:

- Describe the parts of the user interface.
- Explore and explain the purpose of the Ribbon and control its display.
- Access Help and other useful information using the InfoCenter.
The User Interface

The AutoCAD Mechanical software has a similar look and feel to the standard AutoCAD® software because it uses the AutoCAD software at its core. You interact with the AutoCAD Mechanical user interface to create and modify geometry as you do in the standard AutoCAD software. The Ribbon, drop-down lists, toolbars, drawing window, shortcut menus, Command Line, and Status Bar all function as they do in the standard AutoCAD software, depending on which workspace is selected. However, although the interface might feel the same and you can use the commands that you are accustomed to, you need to learn how to interact with the AutoCAD Mechanical software. It contains a number of commands, tools, and workflows that were specifically established to help you create mechanical designs and drawings more quickly while meeting the requirements of industry and company standards.

Start Screen

The initial Start window, shown in the illustration below, displays when you launch the software or when you click on the Start tab while working in an active drawing. It contains two frames: Learn and Create.

- The Learn frame: Contains videos, tips, and online resources to help you learn about new items in the software and how to start using the software.
- The Create frame: Contains tools to enable you to create new drawings, open existing drawings or samples, and view recently used files. You can also access product updates and connect to Autodesk® A360 to access online services.
Parts of the User Interface

The initial display and position of the Ribbon, menus, toolbars, and palettes in the user interface depends on the active workspace. The AutoCAD Mechanical Ribbon is organized to align with the AutoCAD Ribbon where possible and includes additional tabs and panels for unique AutoCAD Mechanical commands. The Ribbon panels are organized to align with the tasks for completing a mechanical design and include the unique tools and commands of the AutoCAD Mechanical software.

As you create and edit geometry in the AutoCAD Mechanical software, using the various palettes can be beneficial. Different palettes help you access commands more efficiently and others make it easier and faster to change the properties of objects. Each palette can be independently set to dock, anchor, float, or auto hide at a specific location within the user interface.

The Ribbon, Quick Properties, and Properties palettes are all palettes that are available in the standard AutoCAD software and in the AutoCAD Mechanical software. You can use the Ribbon to access a number of AutoCAD and AutoCAD Mechanical commands from a single location. The Properties and Quick Properties palettes enable you to make various edits to all types of existing drawing objects.

When you are creating and editing drawings that use the Mechanical structure, you interact with two additional palettes that are unique to the AutoCAD Mechanical: Browser and Structure Catalog. The Browser palette is used to display, hide, move, and edit 2D mechanically structured content. You also use it to create and modify viewports in a layout. The Structure Catalog palette enables you to access and reuse structured geometry.

In the following illustration, the default workspace Mechanical is active and the different primary areas of the user interface are identified.
1. Application Menu and Quick Access Toolbar
2. Ribbon
3. Drawing Area
4. Command Window
5. Status Bar and workspace
6. InfoCenter and Communication Center
7. File Tabs

Application Menu

You can use the Application Menu to access several key commands as shown in the following illustration. Most of these commands contain submenus with more detailed options.

Tasks that you can accomplish include:

- Saving or exporting files.
- Opening recently opened documents.
- Accessing the options.
- Searching for a command.
- Printing documents.
Using the Search function, you can locate one or more commands that are related to the keyword that you in the Search field. For example, if you want to know which commands are available to draw centerlines, entering **centerline** returns all commands that contain the word centerline, as shown in the following illustration. The search results list the commands and the menu in which they are located. Clicking a listed search result starts that command.

![Search Results](image)

**Workspaces**

To help you access the commands that you want to use, the AutoCAD Mechanical software has several preset workspaces you can use. Each workspace controls the display settings and location of the Ribbon, toolbars, and Browser. The tabs that are available on the Ribbon also change, depending on the selected workspace. These different workspaces can help you work more efficiently, and enable you to create a design environment that suits your needs. You can create a custom workspace from one of the preset workspaces to further refine the interface with the tools that you want to use. If you change the display settings or position of items in the interface, you can quickly reset the interface by reselecting the workspace.

By default, the software includes the following workspace configurations:

- Mechanical
- Structure
- 3D Basics
- 3D Modeling
You can switch between defined workspaces by selecting the required workspace from the Workspace Switching icon in the Status Bar, as shown in the following illustration.

Exploring the Ribbon

The Ribbon is an important part of the user interface and it enables you to efficiently access multiple commands. As you become increasingly familiar with the Ribbon, you can use it to improve your design creation and editing time.

The Ribbon supports the heads-up design process because it is space efficient and eliminates the clutter of tool palettes and toolbars. Using the Ribbon alone provides you with more space on your screen in the drawing area and enables you to maintain access to the tools and controls you need.

About the Ribbon

The Ribbon is a special tool palette that contains the tools and controls that are relevant to the active workspace. It is divided into areas that contain groups of tools called panels. Each separate panel contains related tools, such as those used for adding dimensional constraints, adding symbols, or adding hole features. Some panels can be expanded to display more tools. You can also customize and save your Ribbon configuration.

Examples of the Mechanical and Structure Ribbons

The following illustration shows the contents of the Ribbon when the Mechanical workspace is active.

The following illustration shows the contents of the Ribbon when the Structure workspace is active. Note the extra tab on the Ribbon for managing Structure.
Ribbon Controls

The Ribbon is toggled on by default when you start the software in either the Mechanical or Structure workspace. The Ribbon is organized into a series of tabs. Each tab includes a different set of panels with related commands and controls that can be found on the Mechanical Classic toolbars and dialog boxes.

You can toggle the tabs and associated panels in the Ribbon on or off by right-clicking in the Ribbon area and selecting Show Tabs or Show Panels. You can also toggle panel titles on or off by right-clicking on the panel tabs. Additionally, you can save your Ribbon configuration.

Each tab in the Ribbon has its own set of panels that contain groups of related tools, such as those for using content, adding text, or adding dimensions. Some panels can be expanded to display more tools. Some tools can also be expanded to display more options (such as the Power Dimension tool), as indicated by an arrow in the corner of the icon.

Add or Remove Tabs

To toggle specific tabs on or off, right-click on the Ribbon and select Show Tabs. You can then select a tab name to display or remove tabs from the Ribbon. Tabs that are currently displayed are indicated by a checkmark as shown in the illustration below.
Panels

The AutoCAD Mechanical software uses Ribbon panels as one method of accessing commands and settings. Each panel consists of a collection of tools that perform related or similar tasks.

When using the Mechanical workspace, a standard set of panels is displayed on each of the tabs in the Ribbon at the top of the drawing area. Note that when you select a different tab, a different set of panels is displayed.

By default, each panel is docked at the top of the drawing area in the Ribbon.

Panel Visibility

To toggle specific panels on or off, right-click in the Ribbon and select Show Panels. Select to display or remove panels from the Ribbon tab. Panels that are currently displayed are indicated by a checkmark, as shown in the illustration below. Panels containing toolbars display in the last position (docked or floating) that they were in before they were removed from the display.

Panel Tools Visibility

Some panels cascade to reveal additional tools when you select the black arrow in the lower right corner of the panel. You can keep these panels open to display all of the tools by selecting the thumbtack located in the lower left corner of the expanded panel.
**File Tabs**

The drawing File Tabs enable you to quickly open and close drawings, or create new ones. If you close all of the drawings that are currently open or click the Start tab, the initial Start window displays containing two content frames: Learn and Create. By default, the Start tab is always the first tab in the File Tabs. Clicking (New Drawing) in the File Tabs starts a new blank drawing, which also becomes the active drawing. You can close a drawing by clicking (Close) in the File tabs. You can also close a single drawing or close all the open drawings together by right-clicking on a drawing filename in the File Tabs and selecting either Close, Close All, or Close All Other Drawings.

**Accessing Help Information**

A key part of your continual learning is knowing how and where to get more information when you need it. In the AutoCAD Mechanical software, you can access different areas and types of information that you can use to help you relearn a topic, expand your understanding of a topic, or learn a new topic.

**Accessing Help Information**

Your point of access for additional information is through the InfoCenter toolbar, which is located on the title bar of the main AutoCAD Mechanical interface. From the InfoCenter, you can search the Help System, sign in to A360, launch the Autodesk Exchange Apps website, and download offline help.
The AutoCAD Mechanical Help system window gives you access to a variety of topics on the Home page. You can directly access product information on specific topics, learn what’s new in the latest version of the AutoCAD Mechanical software, and access the online community. If you need to access the Help system when you are not connected to the internet, you can download the Offline Help system for use during that time.

**Procedure: Accessing Help Information**

To access help information in the AutoCAD Mechanical software, complete the following steps:

1. On the InfoCenter toolbar, type a keyword or phrase and press ENTER. Alternatively, to the right of Help, click the drop-down arrow and select Help.

2. Determine the topic or type of information you need assistance with or are trying to learn more about.
Exercise: Interact with the User Interface

In this exercise, you will interact with the AutoCAD Mechanical user interface by accessing commands using different workflows and changing the display of different parts of the user interface.

1. Open *Interact with the User Interface.dwg*.

2. To begin drawing a rectangle, click Home tab > Draw panel > expand the Rectangle dropdown list.

3. All of the rectangles are displayed with their icons. To create a rectangle with its middle aligned with the center of the existing circle, select the second rectangle in the Center area. Click OK.

4. To set the rectangle location and size:
   - In the drawing area, object snap to the center of the circle.
   - Move the cursor horizontally, enter 400 in the edit box, and then press ENTER.
   - Move the cursor vertically, enter 100 in the edit box (as shown in the illustration below) and then press ENTER.

5. In the Status Bar, click the workspace switching icon. In the list of workspaces, select **Structure**. The Ribbon and Mechanical Browser should display as shown in the following illustration.

6. To minimize the Ribbon so that only the panel titles are displayed, click on the Ribbon title bar twice to cycle through different minimizing options. You can also select the Minimize to Panel Titles from the arrow drop-down list.
7. To remove the Parametric tab from the Ribbon, right-click on one of the tab titles in the Ribbon, select **Show Tabs**, and then select **Parametric** to uncheck the box. Review the Ribbon to see that the Parametric tab has been removed.

![Ribbon showing Parametric tab unselected](image1.png)

8. To restore the Ribbon, double-click on the Ribbon title bar until the required display method is restored.

9. To search for the commands that enable you to draw centerlines, do the following:
   - Click Application Menu.
   - In the Search field, enter **centerline**.
   - In the Matches list, click **Centerline Cross** to start the command.

![Centerline Cross command in Matches list](image2.png)

10. In the drawing area, object snap to the center of the circle and then to a quadrant on the circle to create the centerline as shown in the following illustration.

![Centerline created in drawing area](image3.png)

11. Save and close the file.
Lesson: Common Drawing Setup

Overview

This lesson describes the creation of drawing template files and the use of drawing templates for the creation of a new drawing.

Using drawing template files, you can maintain a consistent look and style across your drawings. Template files can also improve your productivity by decreasing the repetitive task of configuring the settings in a new drawing.

Objectives

After completing this lesson, you will be able to:

- Describe the purpose and benefit of drawing template files.
- Explain how mechanical standards impact the creation of drawing geometry.
- Create a new drawing based on an existing template file.
- Create a new drawing template file.
- Change the default location from which template files are accessed and saved.
About Drawing Templates

Learning to create and use template files is easier and more understandable if you know the purpose and benefits of using drawing templates.

Definition of Drawing Templates

You use drawing templates to provide a starting point for all of the new drawings that you create. In most design environments, the drawings that you create share some common properties and settings. Your company might have specific standards that each drawing must match, or your client might have specific requirements to which your drawing must adhere.

Several drawing templates are included with the software. Most of them are suitable for getting started and you can build on them to create a custom set of templates that are specific to your drawing requirements. When you save a drawing template, you save all of the drawing commonalities, eliminating the need to create or adjust properties and settings each time you create a new drawing.

Commonalities between drawings include:

- Configuration settings in the drawing, such as text styles and unit precision.
- Common blocks that you use to annotate drawings.
- Layout configurations and the insertion of borders and title blocks.
- Various settings in the Options dialog box. If the AutoCAD drawing symbol precedes a setting in the Options dialog box, any changes you make to that setting are specific to that drawing or template file. Therefore, ensure that the settings you change from the defaults are saved as part of your template. The AutoCAD Mechanical software adds seven tabs to the Options dialog box with additional configuration options and settings. Each of these tabs has \textit{AM:} as a prefix to its name.
- The standard on the \textit{AM:Standards} tab that you want active in the drawing. Within that standard, the different categories, such as layers, dimensions, borders, title blocks, parts lists, etc., would have their settings configured to match your requirements for the use of this template.

Drawing template files are differentiated from drawing files by their DWT file extension.

Example of Drawing Templates

You can set and save many options in a template file so that they are already configured in any drawing created from that template file. For AutoCAD Mechanical software drawing files, one of the most important items to configure and set to be current is the mechanical standard.

In the following illustration, the template file being created has the custom mechanical Standard of COMPANY XYZ set to active. This standard is based on the ISO standard and is configured to have all layers, dimensions, hole charts, drawing sheets, etc., match the final requirements for the drawings that use this template as a starting point.
About Standards Based Design

To assist in the communication of design data, different industry organizations have established different standards. By learning how to configure and use the AutoCAD Mechanical software, your drawings conform to these standards and to any variations specified by your company.

In the following illustration, the custom standard called COMPANY XYZ is being selected to make it the active standard. This custom standard is initially based on one of the industry standards.

![Options dialog box](image)

Definition of Standards Based Design

Standards-based design means that you create geometry and annotation that meets industry-accepted standards, such as ANSI, ISO, and DIN. It also means that you meet any company-specific variation to those industry standards. A standard contains multiple elements that you can edit to achieve the settings specific to your requirements. Customizing an existing standard can include, but is not limited to, changing the assigned layer geometry, changing how dimensions are to display, selecting which welding symbols can be added to the drawing, and defining the information to be stored in the BOM. You can activate or modify a standard on the AM:Standards tab in the Options dialog box.

To create design data that meets these standards, you can use the AutoCAD Mechanical software tools in place of the AutoCAD software drawing and modifying tools. You can apply your drawing standards to all new drawings that you create in the AutoCAD Mechanical software and to previously existing AutoCAD software drawing (DWG™) files that are opened in the AutoCAD Mechanical software.
In the following illustration, the Object Property Settings dialog box displays a list of some of the layer and object property configuration settings for the active standard. The settings in the active standard help you to ensure that all of the geometry that you create in the drawing is created on the correct layer with the correct properties. Because the objects are mapped to a layer that you configure to meet your company standards, you can focus on creating the design geometry and not on the layer on which you are creating the geometry.

**Example of Standards Based Design**

Using the standards-based drafting and design tools in the AutoCAD Mechanical software, the two views of a spacer plate for planting corn seed were created following both the industry standards for notation and the company standards for layer settings and use.
Creating a New Drawing Based on a Template

To realize how much time you save when using a template file, you must know how to create a new drawing that is based on an existing template.

In the following illustration, the AutoCAD Mechanical software default templates are shown in the Select template dialog box.

![Select template dialog box]

Access

- Command Line: NEW
- Menu Bar: File > New
- Toolbar: Quick Access Toolbar
- Application Menu: New

If you use the QNEW command, and the Default Template File Name for QNEW option is set to a value other than the default None, you are not prompted to select which template to use for the new drawing. Also, starting a new drawing from the Start window or clicking (New Drawing) in the File Tabs uses the most recently used drawing template and does not open the Select template dialog box.

Procedure: Creating a New Drawing Based on a Template

To create a new drawing based on an existing template file, complete the following steps:

1. In the Quick Access toolbar, click New.
2. In the Select Template dialog box, select the DWT template file that best matches your starting configuration requirements in the default folder or a folder to which you navigate.
Creating a New Template

You can create multiple templates when your setting requirements for new drawings vary. Each of the multiple templates contains the settings that match the requirements for those new drawings. To create a single template or multiple templates with varying settings, you need to learn how to create a new drawing template.

In the following illustration, a new drawing template file is being saved with the name COMPANY XYZ.

Access

Command Line: SAVEAS
Menu Bar: File > Save As
Toolbar: Quick Access Toolbar
Application Menu: Save As

To save the file as a template after executing the Save As command, you must select AutoCAD Mechanical Drawing Template (*.DWT) from the Files of type drop-down list in the Save Drawing As dialog box. When you select this file format, the active folder for saving this file is changed to the folder specified in the Options dialog box.

Procedure: Creating a New Template

An overview of creating a new drawing template file is shown in the following steps:

1. Open a drawing or template on which you want to base a new template.
2. Change the mechanical standard and other settings in the opened file to match your requirements for the new template file.
3. Click Application Menu > Save As.
4. In the Save Drawing As dialog box, in the Files of type drop-down list, select AutoCAD Mechanical Drawing Template (*.DWT).
5. Navigate to the folder in which you want to save the template.
6. Enter a filename for the new template.
7. In the Template Options dialog box, click OK.
Changing the Location of Templates

For file security and productivity, you should learn why and how to change the default location from which template files are accessed and saved.

In the following illustration, the default folder location from which the template files are accessed and saved has been changed. Now when the Select Template dialog box opens, it automatically accesses this new location. This new location only contains the template files that are used by you and members of your design team.

![Select Template Dialog Box](image)

CAD Management of Templates

For file management purposes, you should save your template files in a central location within your file backup system. You can then change the path in your installation of the AutoCAD Mechanical software so that each time you create a new drawing, you can select the templates from that central location. If you are working in an environment in which multiple people need to create new drawings using the same template or set of templates, you can locate that central storage for the templates on a network drive and then change the template file location path to point to that network location.

It is easy to update templates when they are stored in a single location because you only need to edit a single file in a single location. Because everyone who uses the template accesses it from a single location, when you save the template with the changes, people automatically use that template’s current settings when they create a new drawing.
Drawing Template File Location

To change the location from which the template files are accessed and saved, you can specify a new path in the Options dialog box. To access this path setting on the Files tab, click the plus sign (+) to expand the tree view for Template Settings and then select Drawing Template File Location, as shown in the following illustration. To specify a new path, click on the current path and a new one, or click Browse to navigate to and select the folder.

![Illustration of Options dialog box with Template Settings expanded]

By changing the path under the Default Template File Name for QNEW category, you can specify which template file should be used automatically when the QNEW command is executed.

Procedure: Changing the Location of Templates

To change the folder location for accessing and saving template files, complete the following steps:

1. In the Options dialog box, click the Files tab.
2. In the Search paths, filenames, and file locations drop-down list, expand the tree view for Template Settings and then select Drawing Template File Location.
3. Enter a new local or network folder location or click Browse to select one.

Lesson: Common Drawing Setup
Exercise: Create and Use Template Drawings

In this exercise, you will create template drawings and new drawings using one of the template files. You will also set a new folder location for saving and accessing template files.

1. Open **Common Drawing Setup.dwg**.

2. To change the active mechanical standard, do the following:
   - On the Application Menu, click Options.
   - In the Options dialog box, AM:Standards tab, on the Standard list, click PROJECT ABC.
   - Click OK.

3. To change the display precision for the units, on the Application Menu, click Drawing Utilities > Units. In the Drawing Units dialog box, change the precision to three decimal places and click OK.

4. To create a template from this open drawing, do the following:
   - On the Application Menu, click Save As.
   - In the Save Drawing As dialog box, from the Files of type list, select AutoCAD Mechanical Drawing Template (*.DWT). Note the template files listed in the current folder.
   - Enter **Common Setup** in the File name box.
   - Click Save.

5. In the Template Options dialog box, click OK.

6. Close all open files.

7. To create a new drawing based on the template you just created, do the following:
   - On the Quick Access Toolbar, click New.
   - In the Select template dialog box, review the list of available templates from which you can select.
   - Select **Common Setup.dwt**.
   - Click Open.

8. On the Application Menu, click Options to ensure that PROJECT ABC is the active standard.

9. To change the folder in which template drawings are saved and accessed, do the following:
   - In the Options dialog box, click the left scroll arrow to the right of the tabs to scroll and view the Files tab.
   - Click the Files tab.
10. On the Files tab, in the Search paths, filenames, and file locations list, expand the tree view for Template Settings and expand Drawing Template File Location. Click the listed path.

11. Note the current folder location and path so that you can specify it again after completing this exercise. The default path is C:\Users\<User Name>\appdata\local\autodesk\\autocad\mechanical\<version>\<revision>\<language>\acadm\template.

12. To specify a new folder location, do the following:
   - Click Browse.
   - In the Browse for Folder dialog box, expand the folders to the location in which you installed the dataset for this training guide (C:\AutoCAD Mechanical 2017 Essentials Practice Files) and select the Custom Templates folder.
   - Click OK.

Note that the Drawing Template File Location changes to the selected path.

13. In the Options dialog box, click OK.

14. On the Application Menu, click Save As.

15. To save the file as a template, do the following:
   - In the Save Drawing As dialog box, in the Files of type list, select AutoCAD Mechanical Drawing Template (*.DWT).
   - Note the folder location (Custom Templates) in which this template will be saved.
   - Enter Common Setup2.
   - Click Save.

16. In the Template Options dialog box, click OK.

17. Close all open files.

18. Using Windows Explorer, copy the Common Setup.dwt file from the default template file location (C:\Users\<user name>\appdata\local\autodesk\AutoCAD Mechanical \mechanical\<version>\<revision>\<language>\\acadm\template) to the new template path (C:\\AutoCAD Mechanical 2017 Essentials Practice Files\Custom Templates).

   Note: You might need to enter all or part of the path if the Appdata subfolder is not visible.

19. In the software, on the Quick Access Toolbar, click New. Do the following:
   - Review the available templates.
   - Select Common Setup.dwt.
   - Click Open.

20. Close all open files.
Chapter Summary

In this chapter, you learned how to use the AutoCAD Mechanical interface. You also became familiar with finding various tools and menus, learned how to create drawing template files, and how to use drawing templates for the creation of a new drawings.

Having completed this chapter, you can:

- Identify the main interface elements, their setup, and the available Help information.
- Create and use drawing template files.