

COPILOT FAQ

What is Copilot?

Copilot is an AI-driven companion designed to support your work across multiple areas of the application. It can respond to questions about the software, provide data-driven insights into your CAD projects, draw on a broad AI knowledge base for general inquiries, and generate visual content from text descriptions. Copilot helps streamline navigation, accelerate project workflows, and offer meaningful analysis. It can guide you through early steps in the software, highlight details within your file, or discuss broader design concepts and principles.

Copilot operates through several specialized assistants, each activated by a specific prefix. These include tools for documentation lookup, CAD data analysis, general knowledge queries, image generation, and basic Text-to-CAD creation. Additional capabilities such as batch processing, visual scene reporting, and multilingual support further extend how you can interact with your files and the application. Copilot's effectiveness improves when questions are specific, context is provided, and relevant entities are selected in the drawing.

What is the difference between Copilot Help and Copilot Professional?

Copilot Help



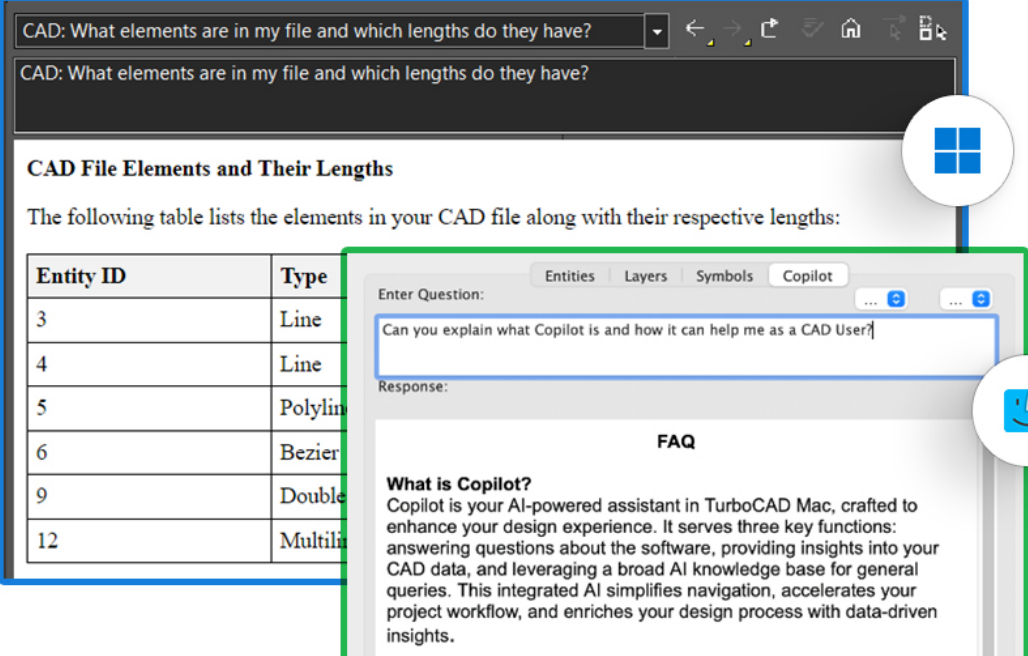
Copilot Help is limited to using "RAG" and documentation. RAG stands for **Retrieval-Augmented Generation** that searches for content for relevance to the question and adds this additional content as supplemental information to the AI along with the question. Our documentation sources include: **User Guide, FAQ, YouTube Channel videos, New Features docs, Press releases, Blogs**, and some categories from the **User Forum**.

Copilot Professional



Copilot Professional contains all the capabilities of Copilot Help, plus additional features such as **Talk to your CAD Data, General AI access**, and **Text to Image**. Copilot Professional is adept at handling diverse multilingual requests, from guiding you through the initial steps of using the software to sharing intriguing details about your file or providing insights on design trends and principles.

How do I interact with Copilot?



CAD: What elements are in my file and which lengths do they have?

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CAD File Elements and Their Lengths

The following table lists the elements in your CAD file along with their respective lengths:

Entity ID	Type
3	Line
4	Line
5	Polyline
6	Bezier
9	Double
12	Multiline

Enter Question: Can you explain what Copilot is and how it can help me as a CAD User?

Response:

FAQ

What is Copilot?

Copilot is your AI-powered assistant in TurboCAD Mac, crafted to enhance your design experience. It serves three key functions: answering questions about the software, providing insights into your CAD data, and leveraging a broad AI knowledge base for general queries. This integrated AI simplifies navigation, accelerates your project workflow, and enriches your design process with data-driven insights.

- 1- Open the Copilot Palette:
Windows: Navigate to the Tools > Palettes menu and select Copilot Palette.
Mac: Navigate to the Tools > TurboCAD Explorer menu. Within TurboCAD Explorer, click on the Copilot tab.
- 2- Ask your question:
Enter your query into the text field.
- 3- Submit your query:
Windows: Click on the Submit button or press <Ctrl>+<Enter>.
Mac: Click on the Apply button situated in the lower right corner.

Copilot Activation:

The first time you submit a request, you are asked to activate Copilot. Enter your registration information and Copilot key into the registration dialog to activate Copilot.

Use Example Prompts to Get Started

The Copilot Palette has a pull-down menu of interesting prompts to query into your CAD file or get started using the application. Below are some example questions Copilot can respond to:

1. How should I get started learning TurboCAD? Can you provide some getting started videos?
2. Tell me something interesting and engaging about my file.
3. Provide a table of steel alloy densities in grams and pounds. Provide a color swatch for steel.

How does Copilot work?

Copilot operates with different functions, each supported by a distinct set of AI Agents and Assistants. When you pose a question, the AI directs your query to the appropriate assistants, depending on the specific prefix to your question.

DOC (Document Assistant)



The DOC model extracts information from documents using Retrieval Augmented Generation (RAG). It leverages a vast collection of documentation, including the User Guide, FAQ, YouTube Channel videos, New Features docs, press releases, blogs, and selected categories from the user forum.

To use DOC, simply ask your question, and Copilot will consult relevant documentation to provide an effective response.

Example: *DOC: How does the blend tool work?*

Copilot Palette

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How the Blend Tool Works in TurboCAD

The Blend Tool in TurboCAD allows users to create smooth transitions between edges or surfaces. Here's a breakdown of its functionalities:

Basic Functionality

To use the Blend Tool, you need to:

1. Select the object and the edge or edges you want to round.
2. Specify the Start Radius and End Radius in the Inspector Bar.
3. Use the magenta arrows to indicate the direction of the edge for applying the radii.
4. Finish the operation by selecting the appropriate option from the Local menu or Inspector bar.

Types of Blends

TurboCAD offers several types of blends:

- **Holdline Blend:** Imposes limits and shapes to the fillet by selecting lines, circles, arcs, and curves.
- **Curvature Continuous Blend:** Creates explicit blends that are curvature-continuous with both faces.
- **Fixed Width Blend:** Produces a blend with a fixed width between two spring curves.
- **Three Face Blend:** Allows for a variable radius blend that is tangent to three support faces.
- **Variable Blend:** Creates complex blends using a series of points to specify radii.

Tools Copilot Palette

CAD (Computer-Aided Design Assistant)



The CAD model processes mathematical properties and attributes from your CAD data, allowing Copilot to analyze data, identify problems, perform calculations related to your designs, and provide Rendering Scene Analysis for deeper insight into your visualization workflows. Rendering Scene Analysis covers scene inventories, material characteristics, light source specifications, and renderer-specific information across LightWorks®, RedSDK®, Visualize, and TurboLux™. To activate CAD, prefix your question with “CAD:” and ask about CAD-related topics.

Example: CAD: What is the largest blend I can use on the selected part?

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CAD Analysis: Largest Blend for Selected Part

To determine the largest blend that can be applied to the selected part, we need to consider the bounding extents of the part and the available space for blending.

Bounding Extents of the Part

Dimension	Minimum	Maximum
X	-0.388 mm	-0.209 mm
Y	-0.204 mm	0.754 mm
Z	-0.329 mm	-0.121 mm

Calculation of Largest Blend

The largest blend radius is typically limited by the smallest dimension of the bounding box. In this case, the dimensions are:

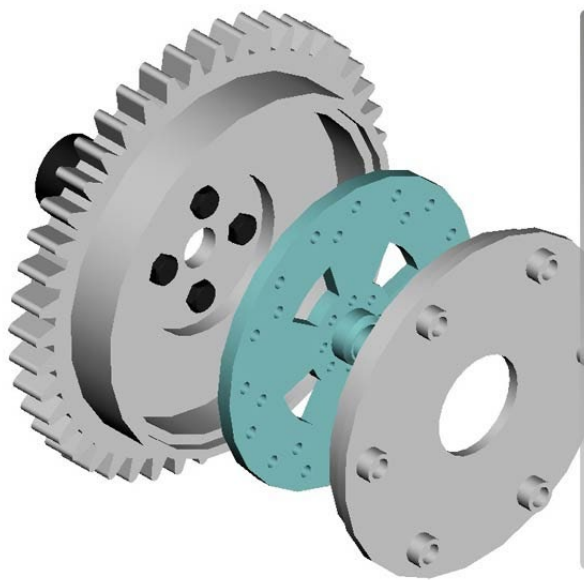
- $DX = 0.179\text{ mm}$
- $DY = 0.958\text{ mm}$
- $DZ = 0.208\text{ mm}$

Therefore, the largest blend radius that can be applied without exceeding the part's extents is 0.179 mm , which is the smallest dimension (DX).

Conclusion

Based on the bounding extents and dimensions of the selected part, the largest blend radius that can be used is 0.179 mm .

Example: CAD: Tell me about my scene



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CAD Scene Overview

Your CAD scene is set up with a specific visualization mode and configuration. Below are the key details about your scene:

General Scene Settings

Parameter	Value
Rendering Mode	Visualize, Gouraud Shaded
Number of Objects	8
Number of Materials	3
Materials by Pen Color	0
Textures	0
Light Objects	Off
Luminances	Off
Lighting Preset	Two Lights
Environment	None

Materials Details

The scene includes three distinct materials. Below is a detailed breakdown:

Material Name	Color (RGB)
step/Assemblage 2024_to_2023/Color_Black	
step/Assemblage 2024_to_2023/Color_Gray	
step/Assemblage 2024_to_2023/Color_Cadet Blue	

GKB (General Knowledge Base Assistant)



The GKB model processes your question independently of documentation and CAD data. It relies on a general knowledge base.

To engage GKB, prefix your question with “GKB:” and ask about general topics or concepts.

Example: GKB: What CAD modeling kernels supporting blending?

Copilot Palette

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CAD Modeling Kernels Supporting Blending

Blending is a crucial feature in CAD modeling, allowing for smooth transitions between surfaces. Here are some popular CAD modeling kernels that support blending:

Kernel	Description
ACIS	ACIS is a geometric modeling kernel developed by Spatial Corporation. It supports advanced blending operations and is widely used in various CAD applications.
Parasolid	Parasolid, developed by Siemens PLM Software, is another leading geometric modeling kernel known for its robust blending capabilities.
CGM (Convergence Geometric Modeler)	Developed by Dassault Systèmes, CGM is used in CATIA and SOLIDWORKS and offers comprehensive blending features.
Granite	PTC's Granite is a modeling kernel that provides powerful blending tools, used in products like Creo.
Open CASCADE	An open-source modeling kernel that supports blending and is used in various free and commercial CAD applications.

These kernels are integral to many CAD systems, providing the underlying technology for complex modeling tasks, including blending.

Tools

Copilot Palette

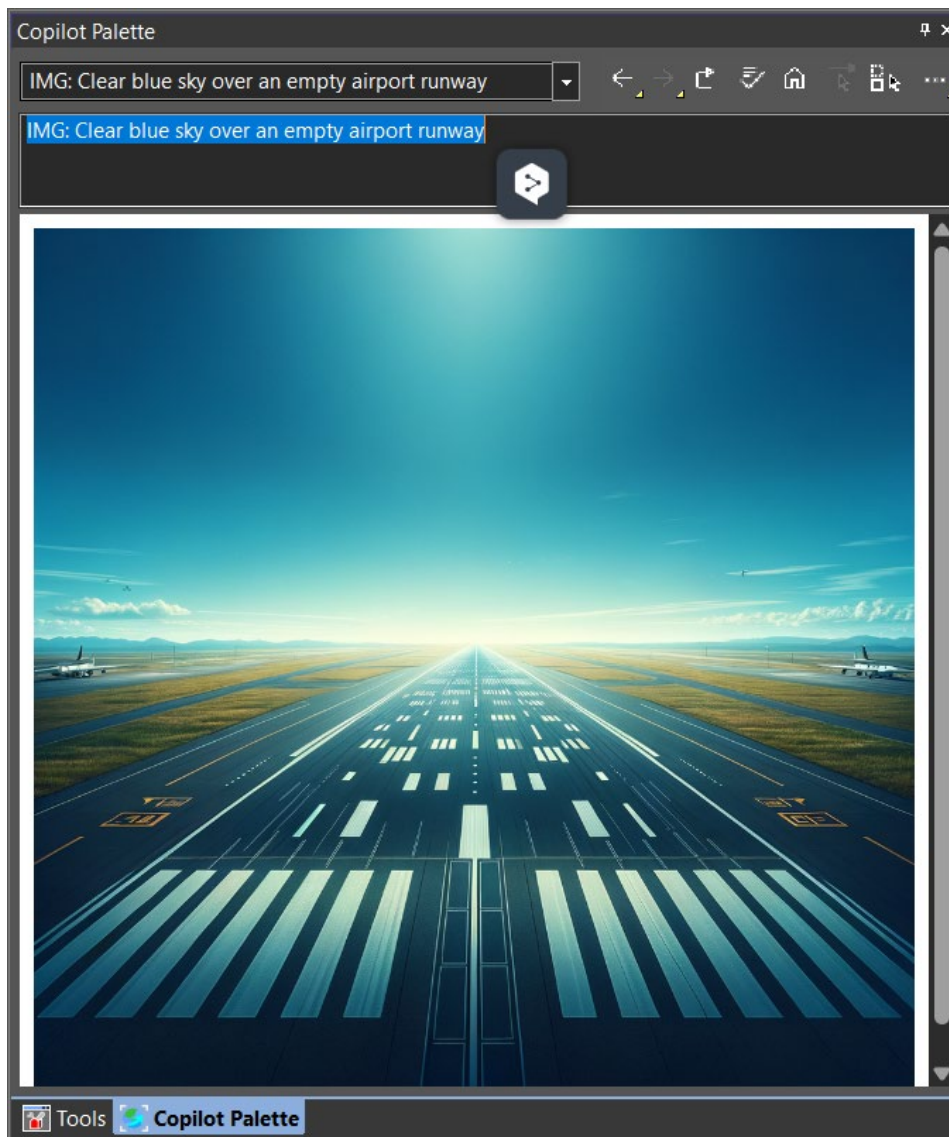
IMG (Image Assistant)



The IMG model creates 1024x1024 images that you can use for textures, backgrounds, or prototype inspirations.

To generate an image, prefix your request with “IMG:” and describe what you need.

Example: *IMG: Clear blue sky over an empty airport runway*



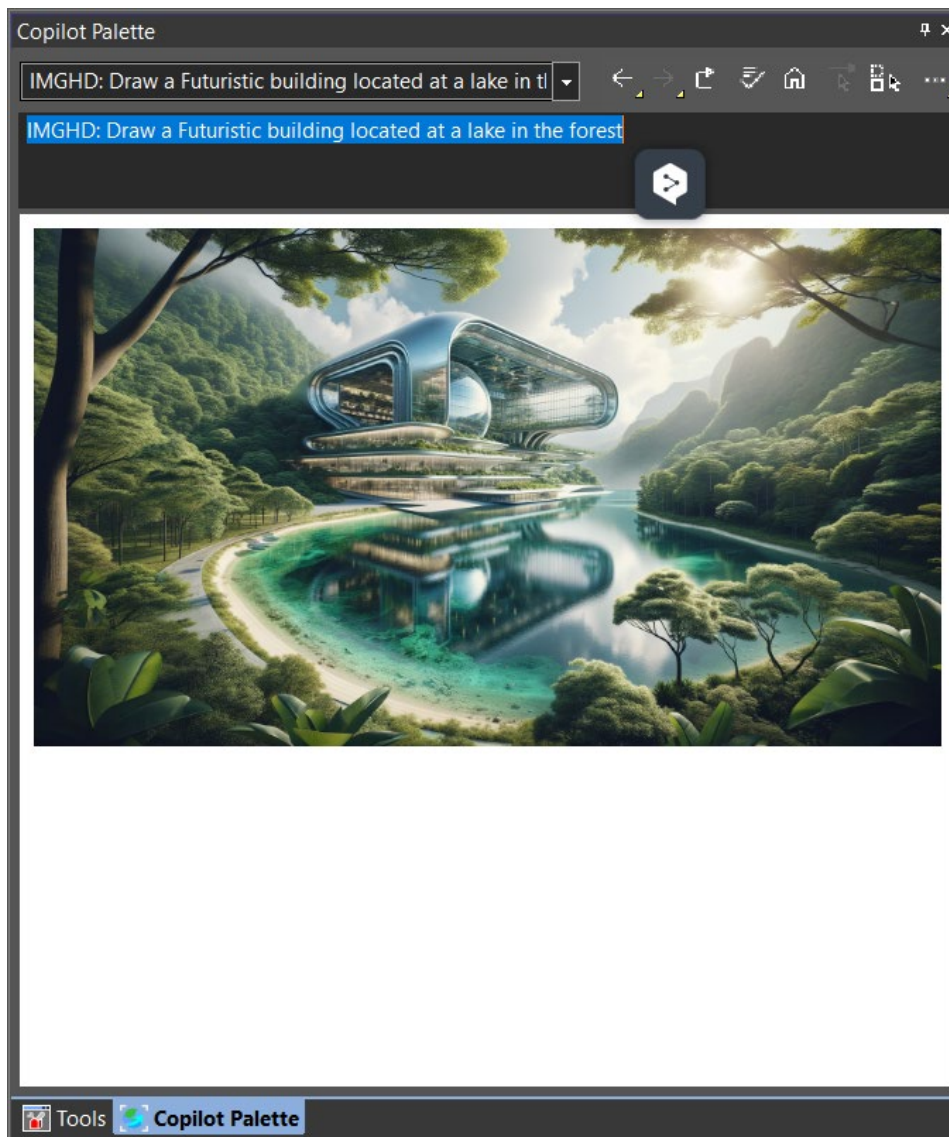
IMGHD (High-Definition Image Assistant)



The IMGHD model generates higher-resolution images, typically exceeding 1024x1024 pixels.

These images are ideal for detailed visualizations, printing, or any use where higher clarity is essential.

Example: *IMGHD: Draw a futuristic building located at a lake in the forest*



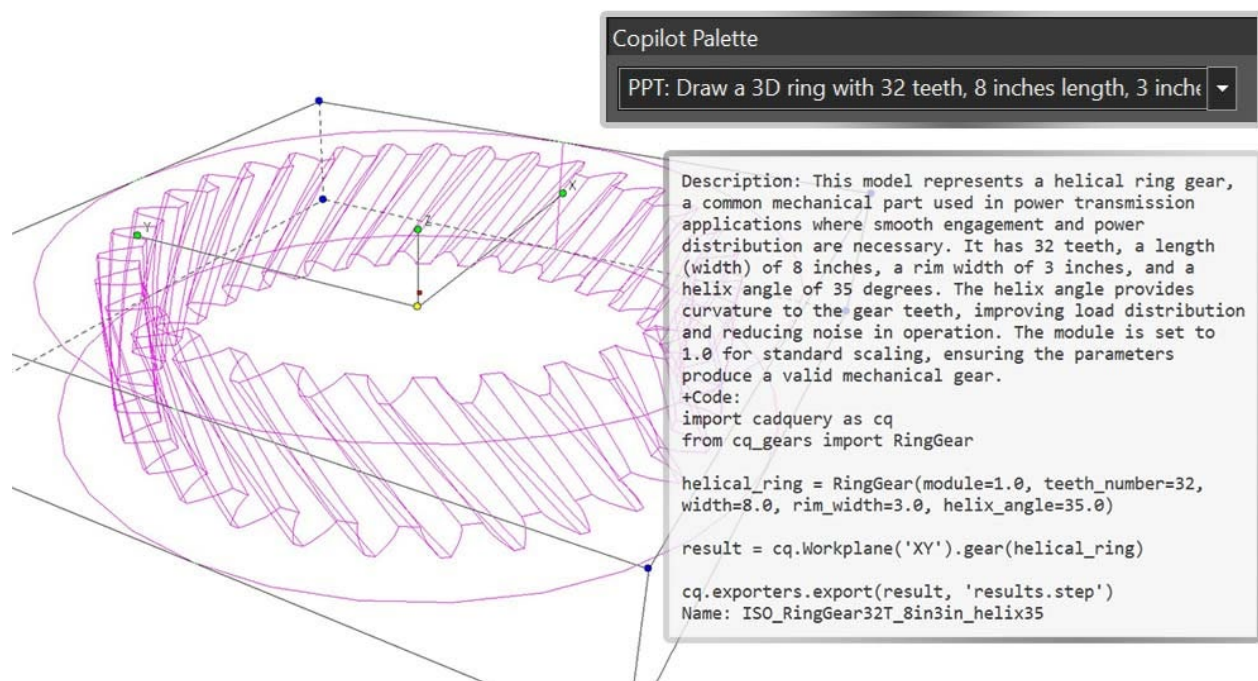
PPT (Text-to-CAD)



Basic Text-to-CAD enables the creation of CAD objects through natural language commands, allowing users to move from concept to geometry with simple, direct instructions. This capability supports a more intuitive way of working, where written descriptions can be translated into basic CAD elements.

Basic Text-to-CAD represents an early stage in the development of a fully integrated Text-to-CAD workflow. While the current feature set focuses on essential operations and not all functionality is available yet, it establishes the foundation for continued expansion as the technology evolves.

Example: PPT: Draw a 3D ring with 32 teeth, 8 inches length, 3 inches rim width, helix angle 35 degrees



Batch mode for multiple queries



This feature lets you ask multiple questions at once. It breaks down questions, processes them individually, and combines answers into one document, bypassing character limits. A progress bar shows the current question, text, and total questions in the queue.

Example:

GKB: What material options are available for 3D printing? Can you provide cost estimates as well as strengths and weakness of the options?

CAD: Is my file suitable for 3D printing?

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CAD: Is my file suitable for 3D printing?

3D Printing Material Options

Below is a table listing various materials used in 3D printing, along with their estimated costs, strengths, and weaknesses.

Material	Cost Estimate	Strengths	Weaknesses
PLA (Polylactic Acid)	\$20-\$30 per kg	Biodegradable, easy to print, low warping	Brittle, low heat resistance
ABS (Acrylonitrile Butadiene Styrene)	\$25-\$35 per kg	Strong, durable, heat resistant	Emits fumes, prone to warping
PETG (Polyethylene Terephthalate Glycol)	\$25-\$40 per kg	Tough, good layer adhesion, food safe	Can be stringy, less rigid than PLA
Nylon	\$50-\$75 per kg	High strength, flexible, wear resistant	Absorbs moisture, difficult to print
TPU (Thermoplastic Polyurethane)	\$60-\$100 per kg	Flexible, impact resistant, durable	Slow printing, requires precise settings
Resin	\$50-\$100 per liter	High detail, smooth finish	Brittle, requires post-processing

3D Printing Suitability Analysis

The analysis of your CAD file for 3D printing suitability is summarized below:

Entity ID	Material	Volume (mm³)	Area (mm²)	Tests Passed	Tests Failed
4	TOP_SIDE_SPAR	0.001332	0.250199	No duplicate facets, No collapsed facets, Watertight body, No non-manifold edges	Improperly aligned normals
5	TOP_SIDE_SPAR	0.001332	0.250200	No duplicate facets, No collapsed facets, Watertight body, No non-manifold edges	Improperly aligned normals
6	TOP_CROSS_SPAR	0.001224	0.229907	No duplicate facets, No collapsed facets, Watertight body, No non-manifold edges, Proper normals	No serious issues

Overall Assessment

Most parts of your CAD file are suitable for 3D printing. However, several entities have improperly aligned normals, which could affect the print quality. It is recommended to address these issues before proceeding with printing.

Tools

Copilot Palette

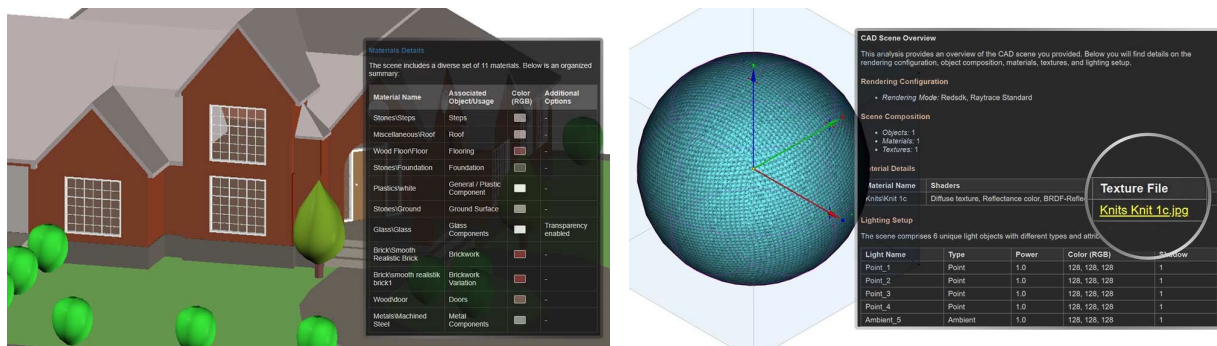
What kind of keywords are recognized for CAD data extraction?

When your question contains certain keywords, Copilot is triggered to extract certain data or calculate certain data. Some example keywords Copilot recognizes include:

- Position, Length, Area, Volume, Distance, Extents, Perimeter
- Mass Properties, Weight, Center of Gravity, Clash, Clearance, Counts, Layers, BOM, Hidden
- Problems, Issues, Check Object, Topology
- Materials, Textures, Scene, Lights, Camera
- Curvature, Continuity, Inflections
- Pen Color, Pen Style, Font
- 3D Print

Visual Features in Copilot

Copilot includes visual options that support a clear scene evaluation and fast navigation. These options provide color marks for quick swatch recognition, texture links for direct access to texture files, a dark theme to reduce eye strain during extended work, and the ability to view reports in raw HTML before post-processing.



How can I improve my questions?

Great question! To improve response success, you can do the following:

1. Tell the AI that you want to analyze the selected object or the entire file by including “*selected*” or “*my file*” in your question.
2. Label your entities with a context-sensitive name.
3. Add custom attributes using Bill of Materials.
4. Set material properties.
5. If you need to specify styles of output, tell the AI to use a color theme.

Does Copilot support different languages?

Yes. Copilot when using an OpenAI engine is a multilingual application that supports multiple languages. Currently, it supports more than 50 languages, including English, Spanish, French, German, Chinese, Japanese, Arabic, and many more.

Are the answers 100% accurate?

No, the answers are not 100% accurate. Copilot uses OpenAI API to generate answers. While OpenAI is a powerful language model, it can sometimes make mistakes and may not always provide a comprehensive explanation, opting for brevity. Furthermore, Copilot employs semantic search to identify the most relevant chunks and does not process the entire document. This means it may not find all the relevant information and could struggle with summary-type questions or questions that require extensive context from the document.

However, for most use cases, Copilot is very helpful in responding to questions. **Always** verify the original sources to ensure the accuracy of the answers.

How does it know what entities or properties to use?

Copilot works best on “*selected*” entities. Select the entities in your file that you want to ask questions about and use the keyword “*selected*” in your question. Otherwise, use “*my file*” to perform an analysis on all the visible entities in the file.

What advice do you have for improving results?

To improve results when interacting with Copilot, consider the following advice:

1. **Be Specific About Your CAD Needs:** When asking questions, be as specific as possible about your CAD project or issue. For example, instead of asking, “*How do I create a 3D model?*” you might ask “*What are the steps to create a 3D architectural model of a four-bedroom house in TurboCAD?*” Specificity helps the AI understand the exact nature of your query and provide more targeted advice.
2. **Include Technical Details:** If your question is about a problem or error, include any relevant technical details. For instance, “*I encounter a rendering issue with CAD when I try to apply textures to curved surfaces. How can I resolve this?*” Providing error messages, software versions, or specific tools you're using can significantly enhance the accuracy of the response.
3. **Utilize Sequential Queries for Complex Tasks:** If you're working on a complex CAD task, break it down into smaller queries. For example, if designing a complex machine part, ask about specific components or stages of the design process. This approach can provide more manageable and detailed guidance for each step.
4. **Incorporate Feedback for Refinement:** If the initial response doesn't fully address your query, use the feedback to refine your question. Sometimes, rephrasing or providing additional context can lead to more precise answers. For example, if the guidance on using a particular tool in the product isn't clear, ask for a more detailed explanation or request an example.
5. **Leverage Examples and Scenarios:** When appropriate, ask for examples or hypothetical scenarios that are relevant to your CAD work. For instance, “*Can you provide an example of how to use the Smart Dimension tool in TurboCAD for mechanical engineering drawings?*”
6. **Stay Updated on TurboCAD® Features:** Ensure your queries consider the latest features and updates of TurboCAD®. This helps in receiving current and relevant advice, especially for software-specific functionalities.

By following these strategies, you can enhance the effectiveness of Copilot in addressing your CAD-related questions, leading to more productive and efficient design work.

Why do responses change for the same question?

LLM AI models are non-deterministic, meaning that identical inputs can yield different outputs.

Open AI Guide

The [OpenAI Guide](#) offers various strategies and tactics to achieve better results. You can often combine these methods for enhanced effectiveness. We encourage you to experiment and discover the approaches that work best for you.