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Speed up drawing creation through the power of templates in Fusion 360

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About the speakers

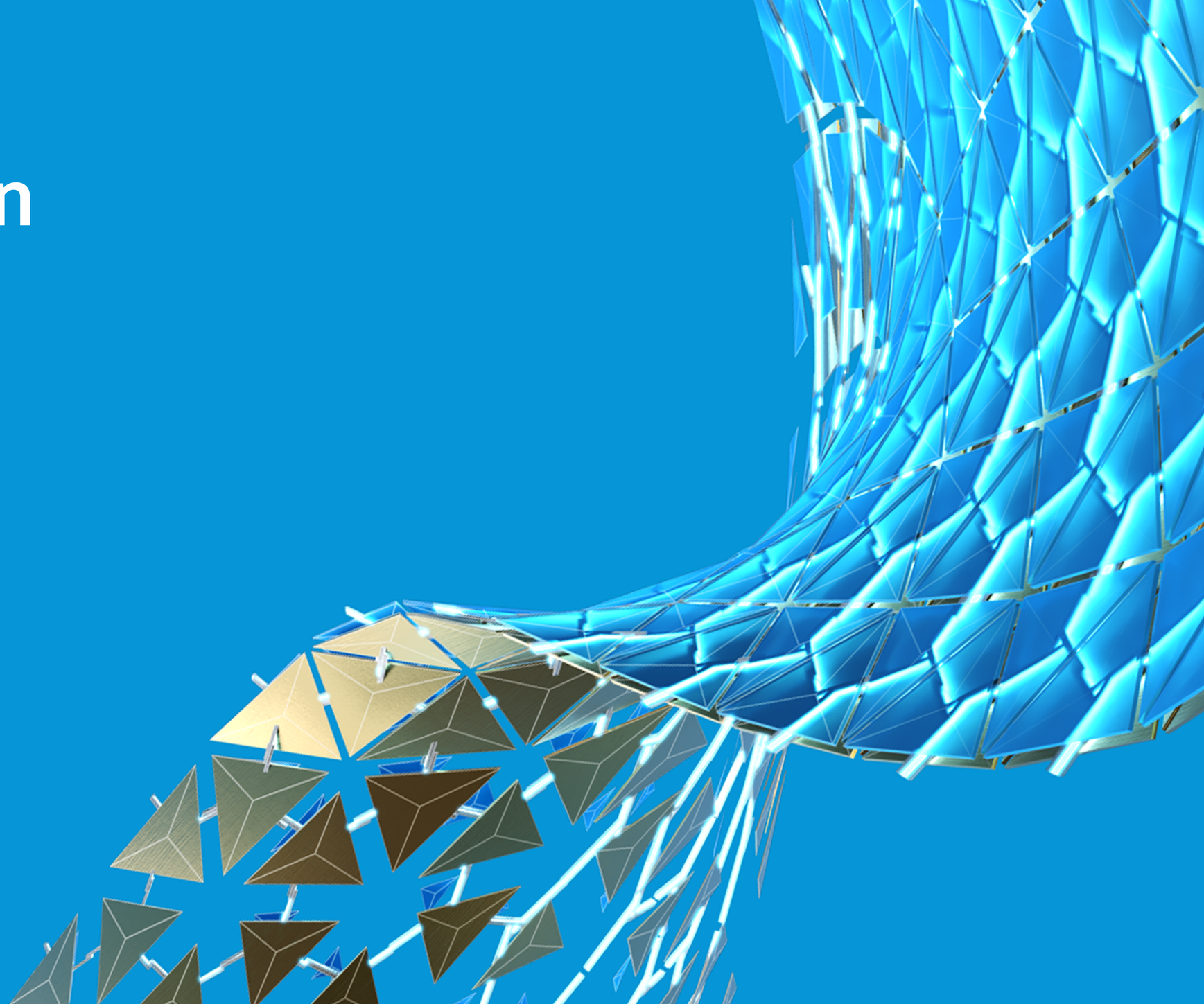
Stewart Sabadell

Stew Sabadell has spent his career working with Autodesk technology. He has developed add-on applications for AutoCAD, worked on DWG import technology for 3ds max, and contributed to five major releases of AutoCAD. He joined the Fusion 360 Drawings team in 2014 as development manager, and has been in the Chief Product Owner role for a little over a year.

Andrew de Leon

Andrew de Leon is a Senior Principal User Experience Designer at Autodesk, Inc., with 20 years' experience in the manufacturing industry and 15 years in user experience design. He has experience with AutoCAD, AutoCAD Mechanical, Inventor, and Fusion 360. He's passionate about manufacturing and design, and if he goes missing he's usually in the shed tinkering.

Introduction



Well Begun is Half Done

MECHANICAL ENGINEERING DRAWINGS ARE A NECESSITY

Well-documented designs ensure your parts and product are manufactured accurately. But creating mechanical engineering drawings can be tedious and repetitive.

SET UP YOUR DRAWINGS ONCE

Using Fusion 360 you can eliminate some of this repetition by understanding preferences and templates. And you should only have to create your customized title block once – then use it everywhere.

AUTOMATE AS MUCH AS YOU CAN

With the power of smart templates, Fusion 360 gets you on your way by laying out the views you want, on multiple sheets, for every model, just by creating a drawing.

WE ARE GOING TO SHOW YOU HOW!

Areas We Will Cover

PREFERENCES

Preferences are used on drawing creation, and there are some settings you can only control here.

TEMPLATES

Templates go beyond preferences and let you set up multiple sheets and title blocks.

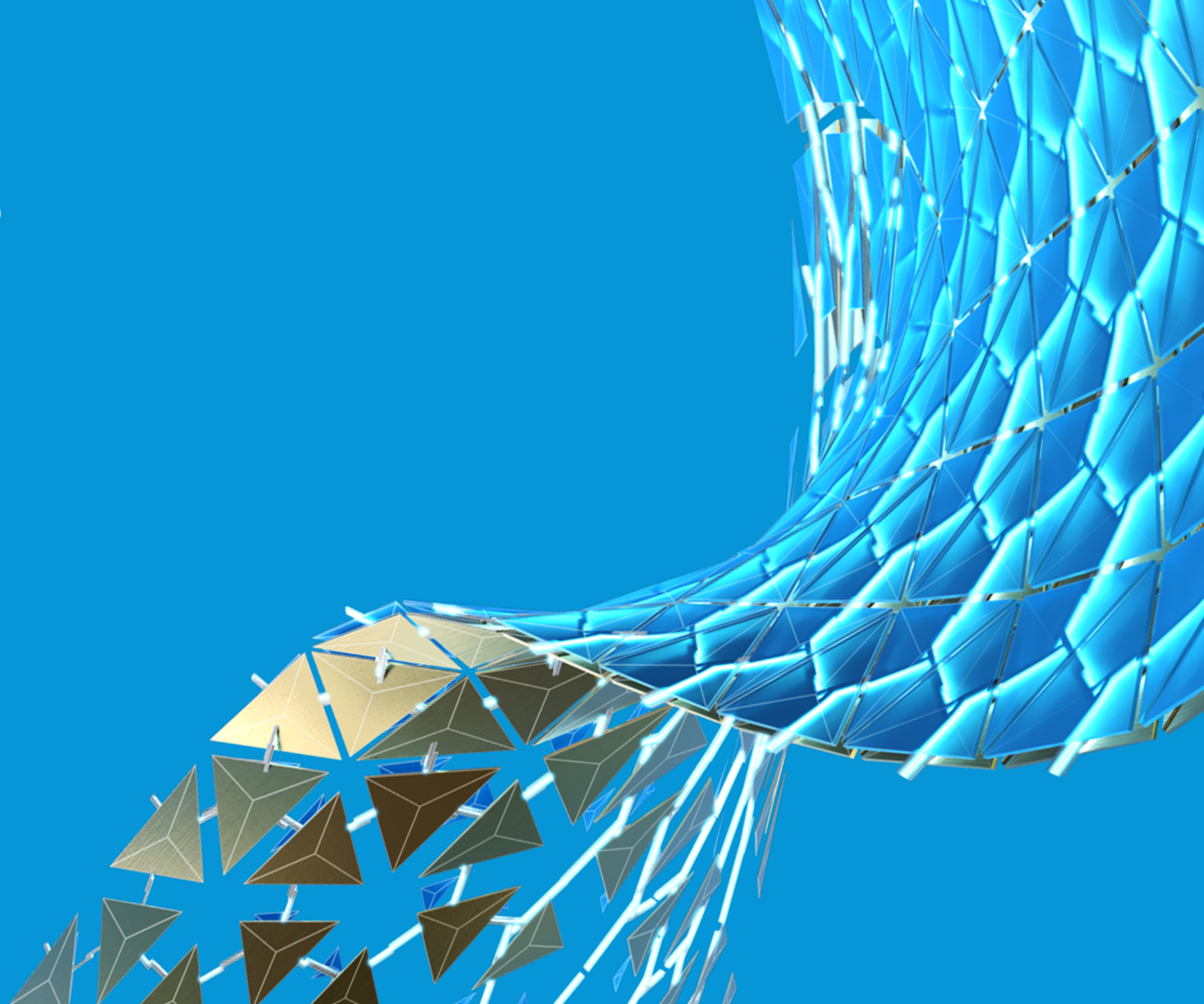
TITLE BLOCKS

Title blocks are a critical element in your drawings. Learn how best to customize and reuse them.

SMART TEMPLATES

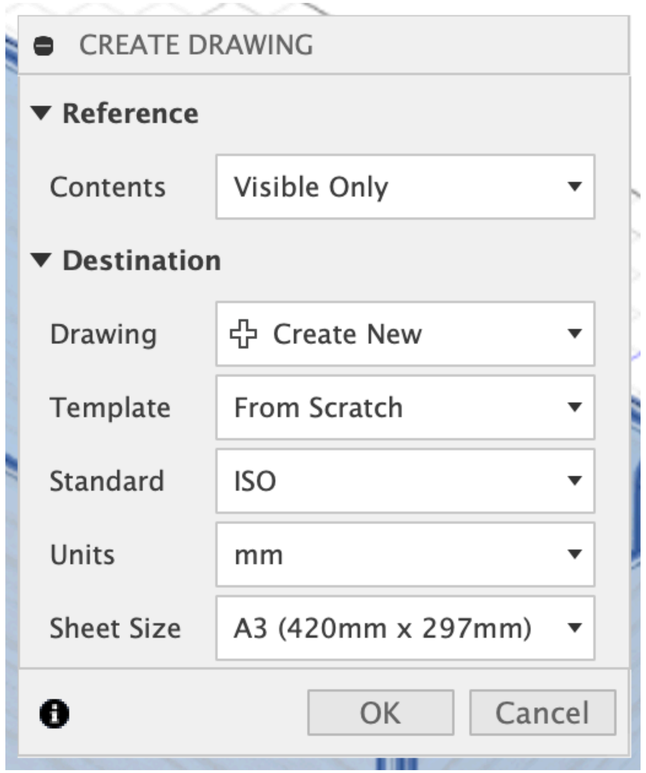
Smart templates go beyond drawing set up and lay out sheets with views based on your model and your project requirements.

Preferences



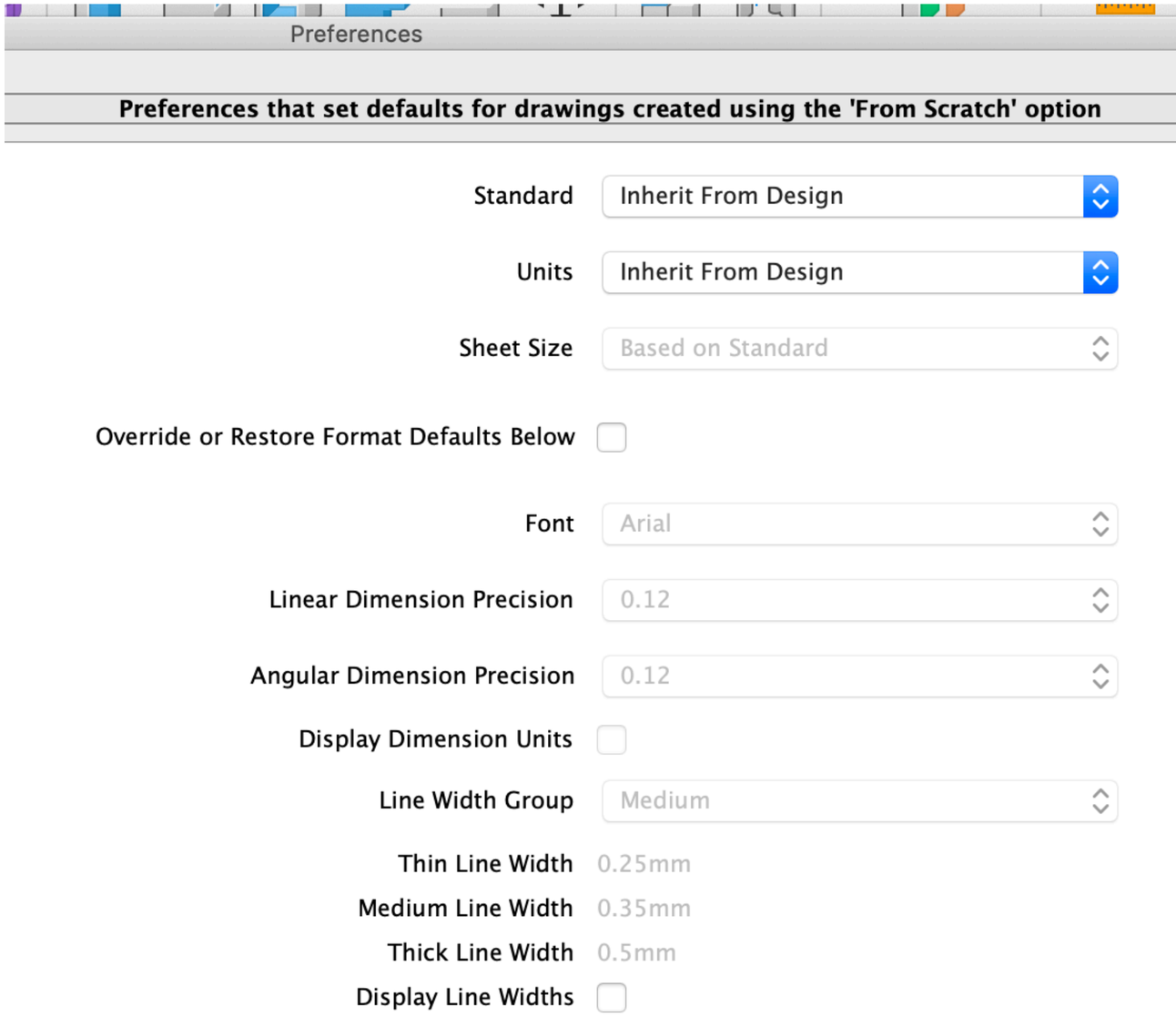
Drawing Preferences

- Used for new drawing creation only
- No impact to existing drawings
- Preference settings are applied when using the “From Scratch” option for Template
- Some settings can only be controlled through preferences
- Can be used when creating a new template



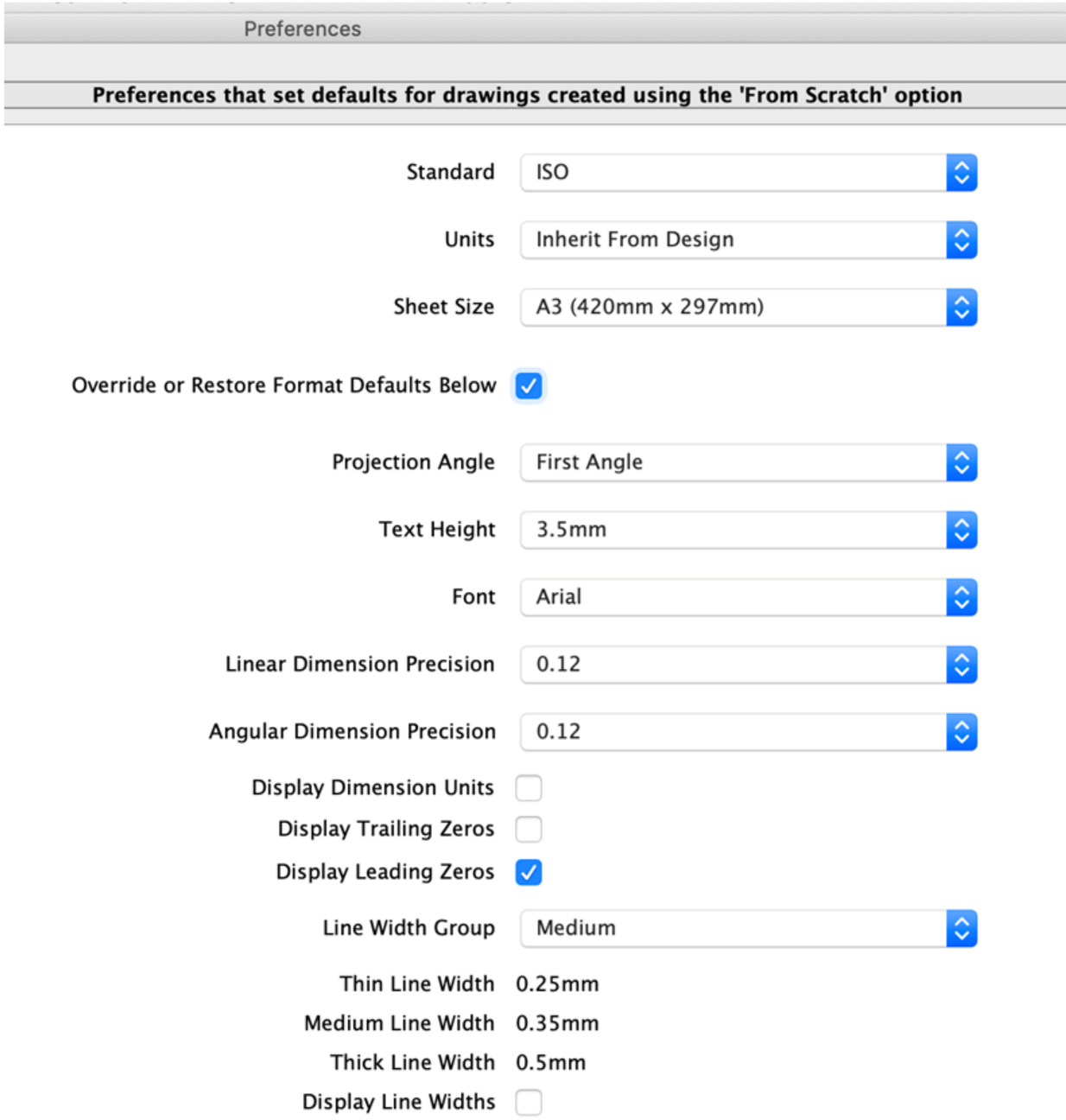
Drawing Preferences

- **Standard – ISO and ASME**
- **Standard is fixed once drawing is created**
- **Three options**
  - Inherit From Design – based on design units
  - ISO or ASME – adds additional preferences
- **Related preferences**
  - Units
  - Sheet Size
- **Override or Restore Format Defaults**
  - Resets settings when cleared

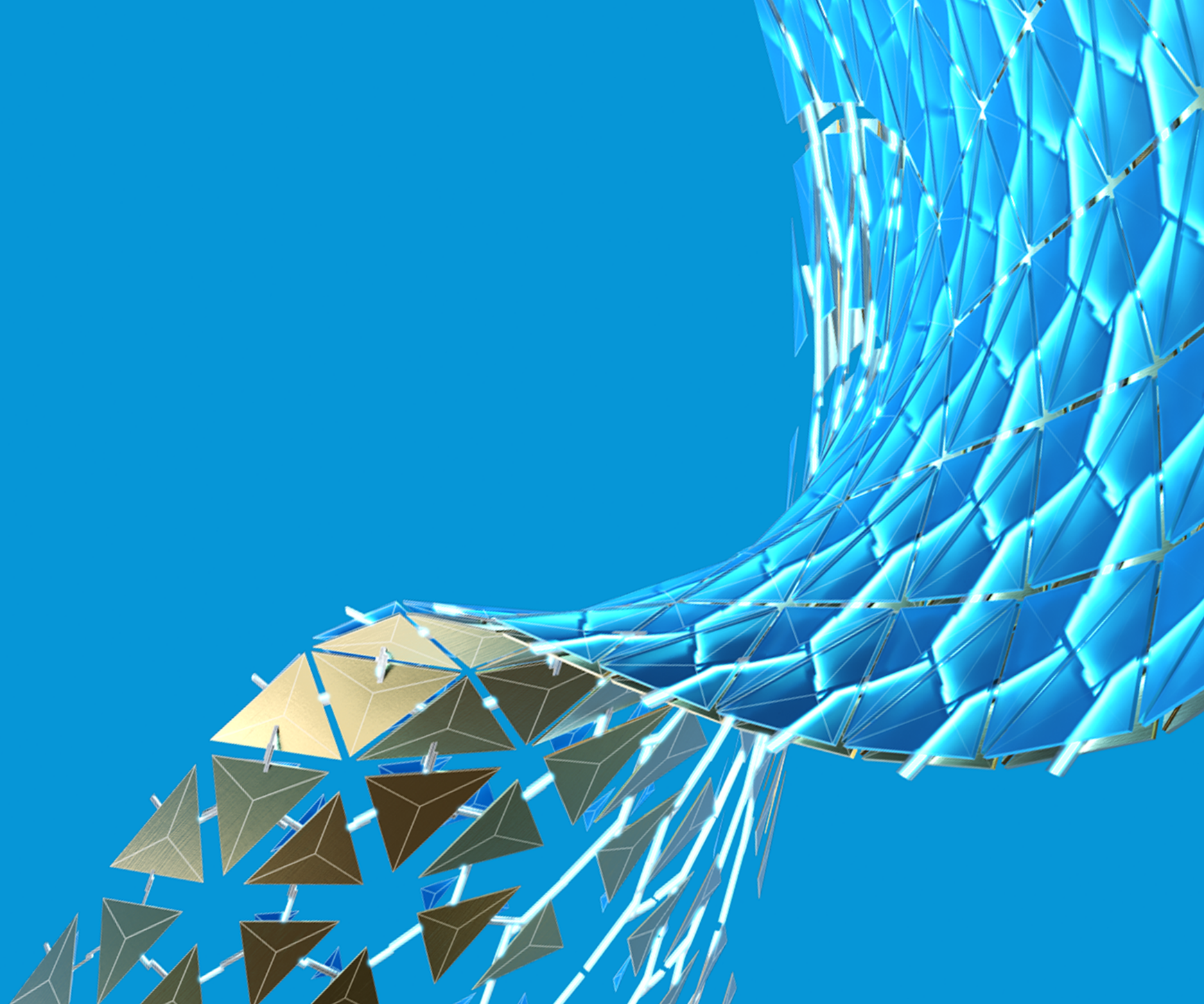


Drawing Preferences

- **Standard**
  - If you choose ISO and ASME it adds additional preferences
- **Sheet Size**
  - Available sizes determined by the standard
- **Projection Angle**
  - The only way to deviate from the standard is through preferences
- **Text Height**
  - Available heights based on the standard
- **Dimension Format**
  - Only for inches – decimal or fractional
- **Display Dimension Units**

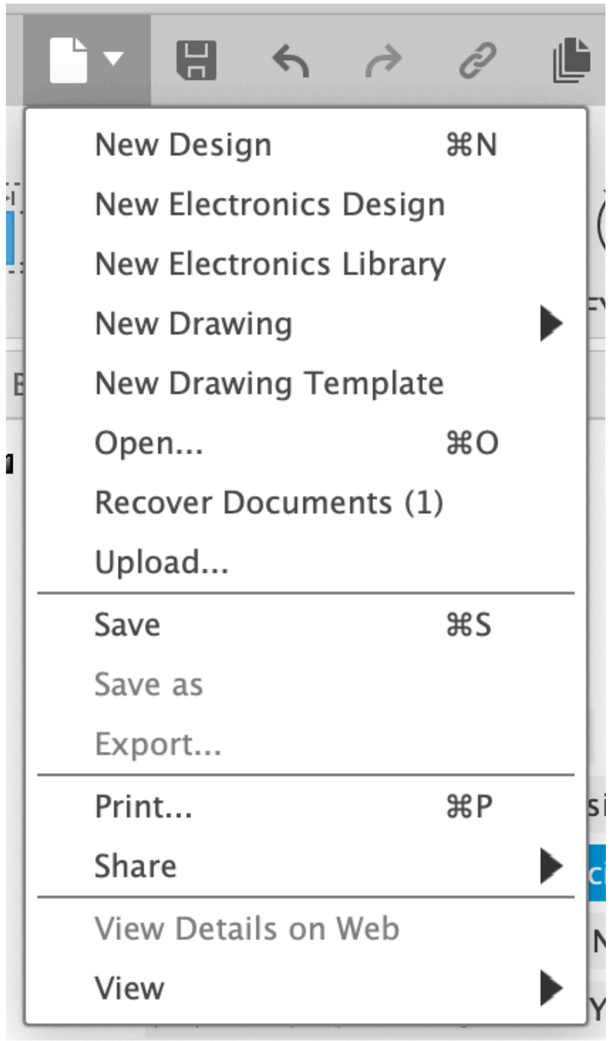


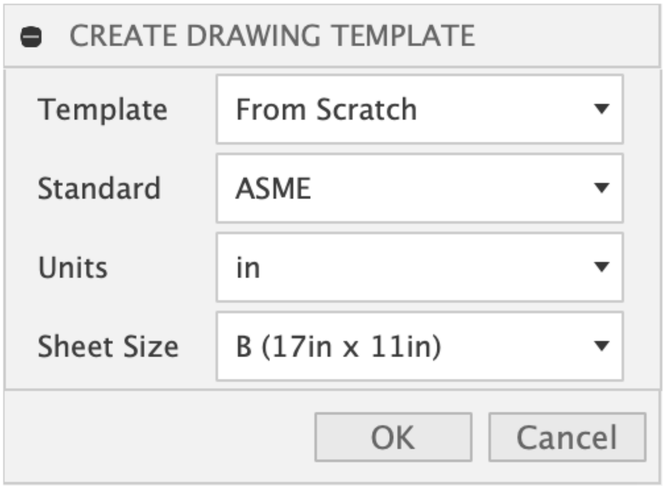
Templates



Templates

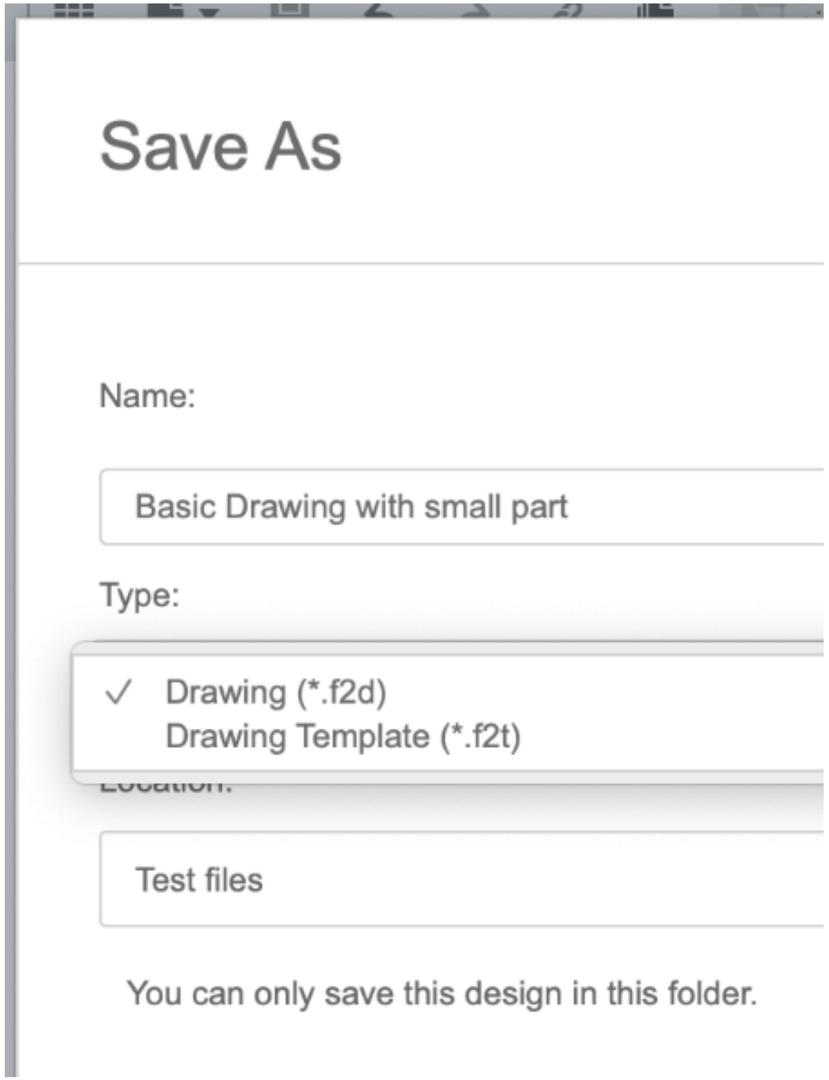
- Similar to preferences, but you are able to control more aspects of your drawings
- Similar to preferences: Template settings only used on drawing creation
- The template specifies the standard, drawing units, and projection angle
  - These settings cannot be changed in your drawing after it is created
- Create a template “from scratch” or from an existing drawing
- Access on File menu





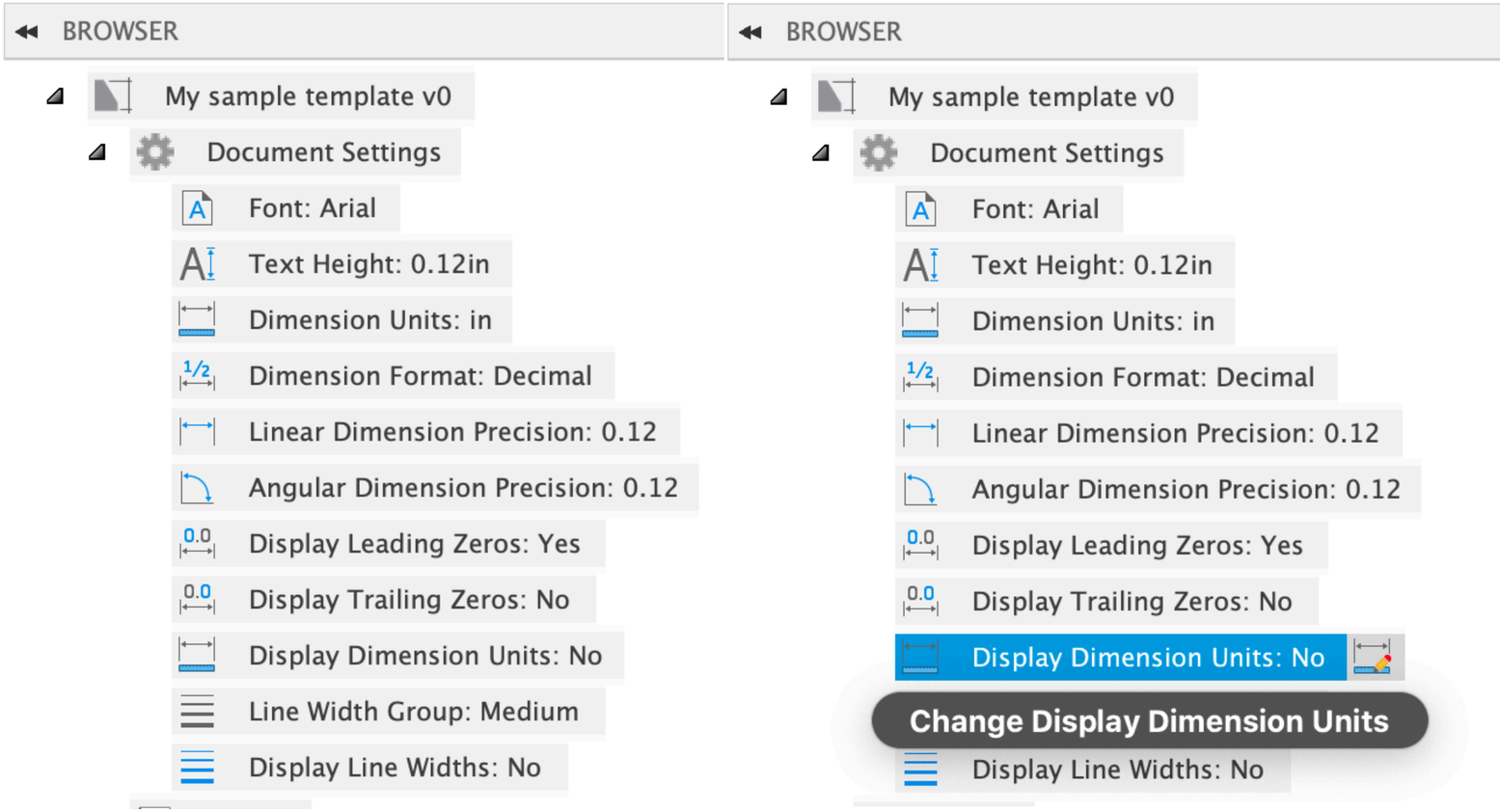
Template From Drawing

- **Access from File menu or Save As**
- **Template will inherit from drawing:**
  - Document settings
  - Sheets, including sheet sizes and names
  - Title blocks
  - Non-associative objects (text, tables, images)
- **Objects removed from drawing:**
  - Model views
  - Annotation including dimensions, mechanical engineering symbols, hole and thread notes
  - Parts lists and bend tables
  - Sketches



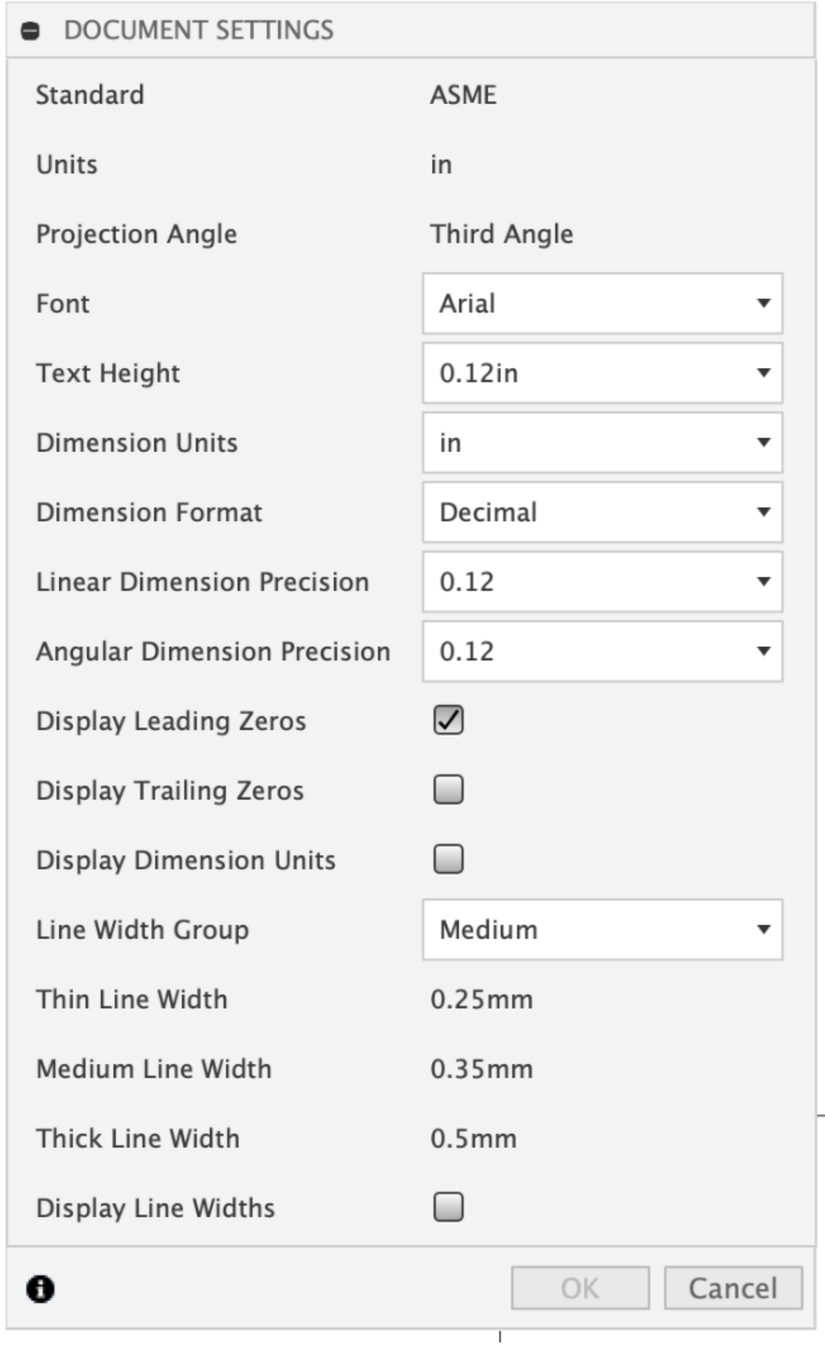
Template Document Settings

- Access Document Settings though the component browser
- All current settings displayed
- Might need to widen the browser
- Hover over any node, click on the button that appears to edit settings



Template Document Settings

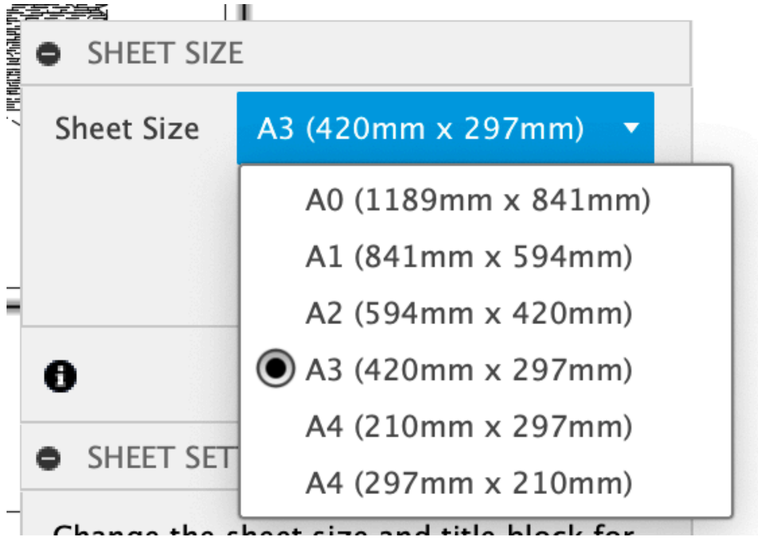
- **Same settings as seen in preferences**
- **Font controls all text except for title blocks**
- **Line widths applied by geometry type**
  - Thick for outside edges of geometry
  - Thin for all other parts of geometry, and for all annotation
  - Medium is default for title block and sketch geometry
- **Line widths are controlled through five groups**
  - Very Thin, Thin, Medium, Thick, and Very Thick
  - Line widths range from 0.13 mm to 1.0 mm
- **Line width display is “what you see is what you get”**
- **Can control line width on/off in PDF independently**

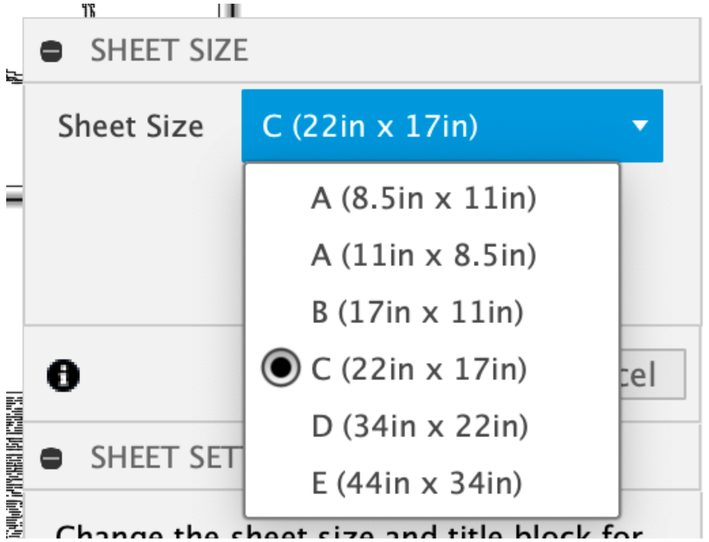


Template Sheet Settings

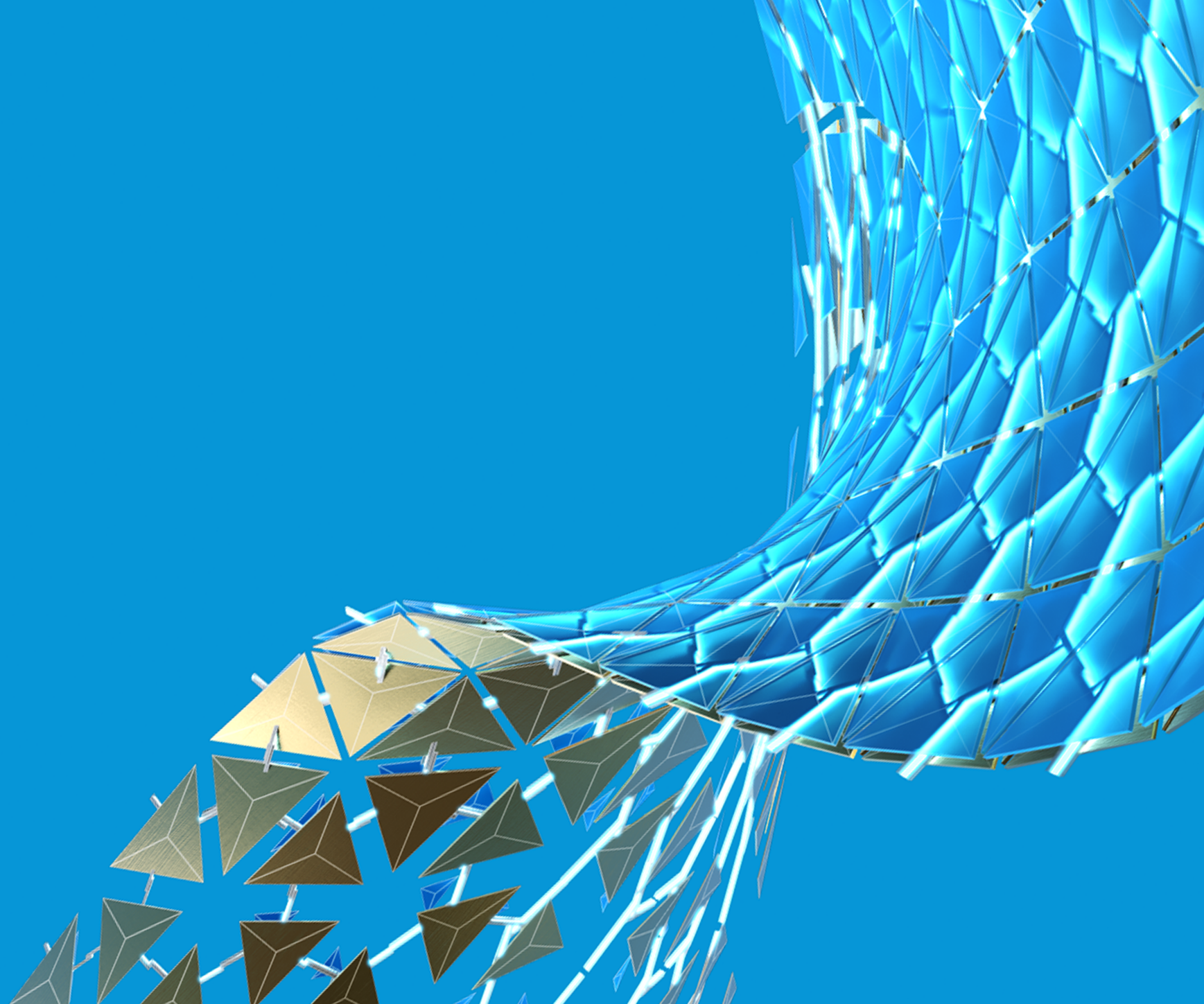
- **Available sheet sizes determined by current standard**
  - ISO sheet sizes A0 – A4
  - ASME sheet sizes A – E

- **Other ways to customize your template**
  - Editing Border
  - Create multiple sheets, including a title sheet
  - Add typical (boilerplate) blocks of text
  - Add project-specific information, including in the title block
  - Add a revision table



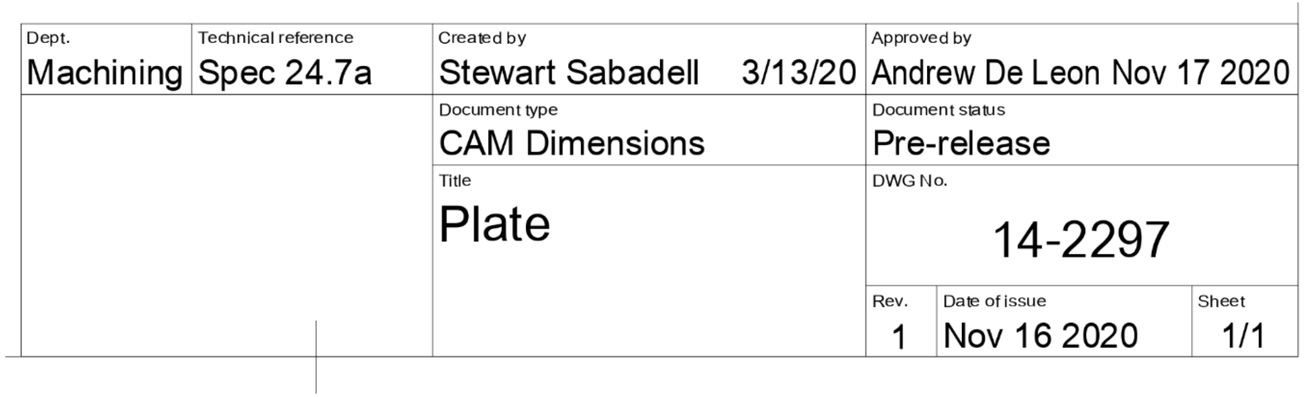


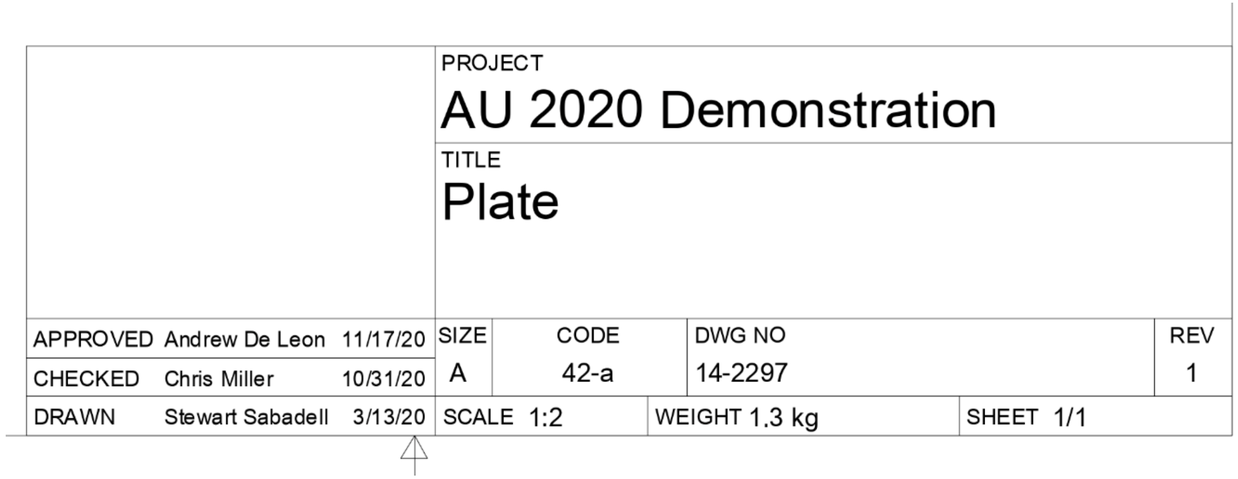
Title Blocks



Title Blocks

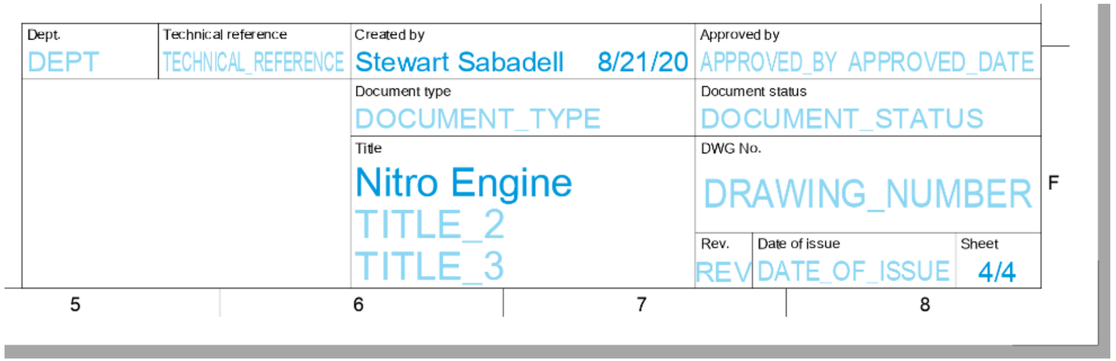
- Many companies have custom title blocks – their "brand"
- Two title blocks provided with Fusion – ISO and ASME
- Two primary ways to "customize" a title block:
  - Edit properties
  - Edit title block definition

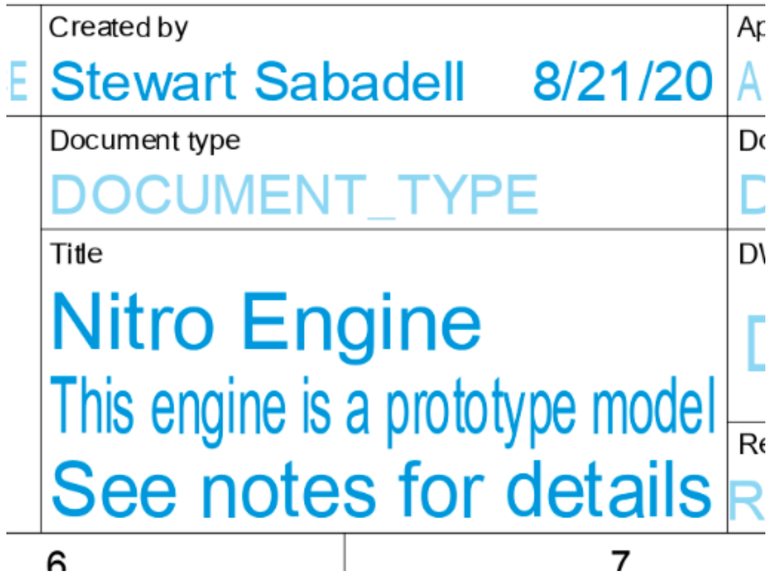




Edit Title Block Properties

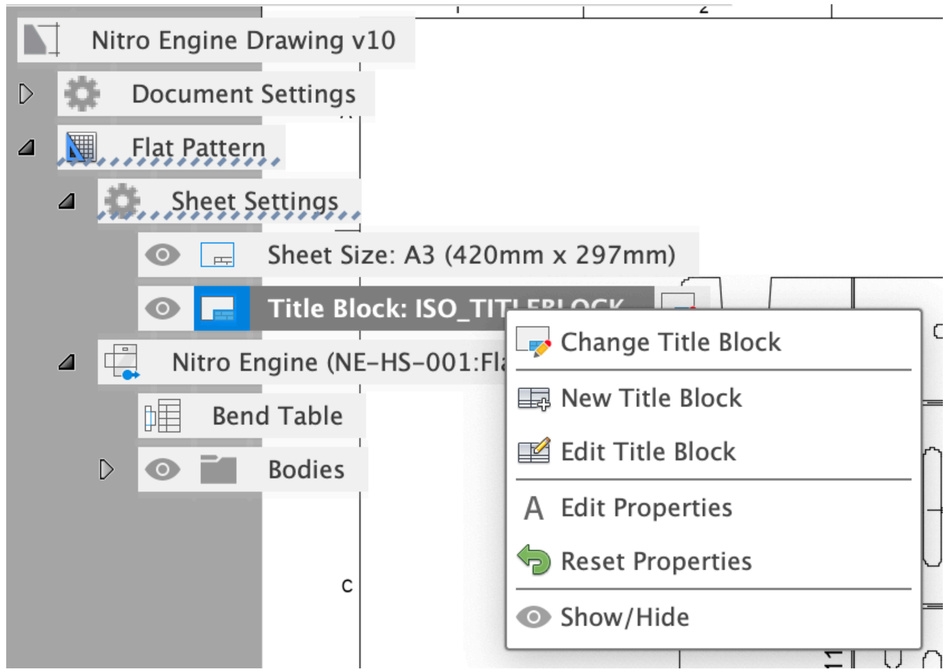
- Change the text you see, or add text to empty “cells” in the title block
- Dark blue text – current value
- Light blue text – a property with no current value
- Some values are filled in for you when a new sheet is created
- If text is too long to fit in the available space it will get narrower automatically
- Changes only impact the current sheet

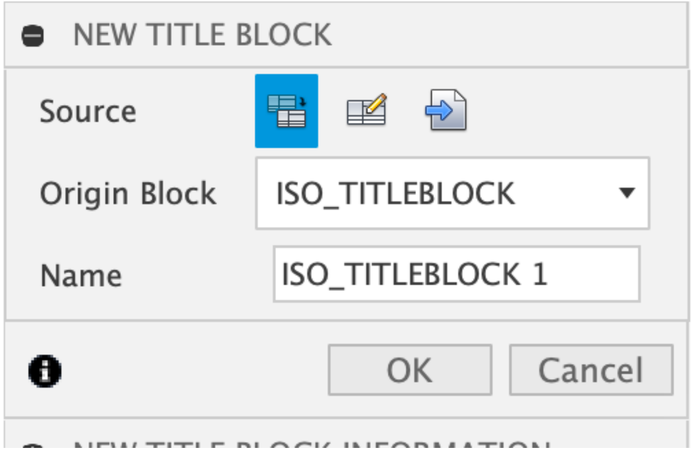




Add or Edit Title Block

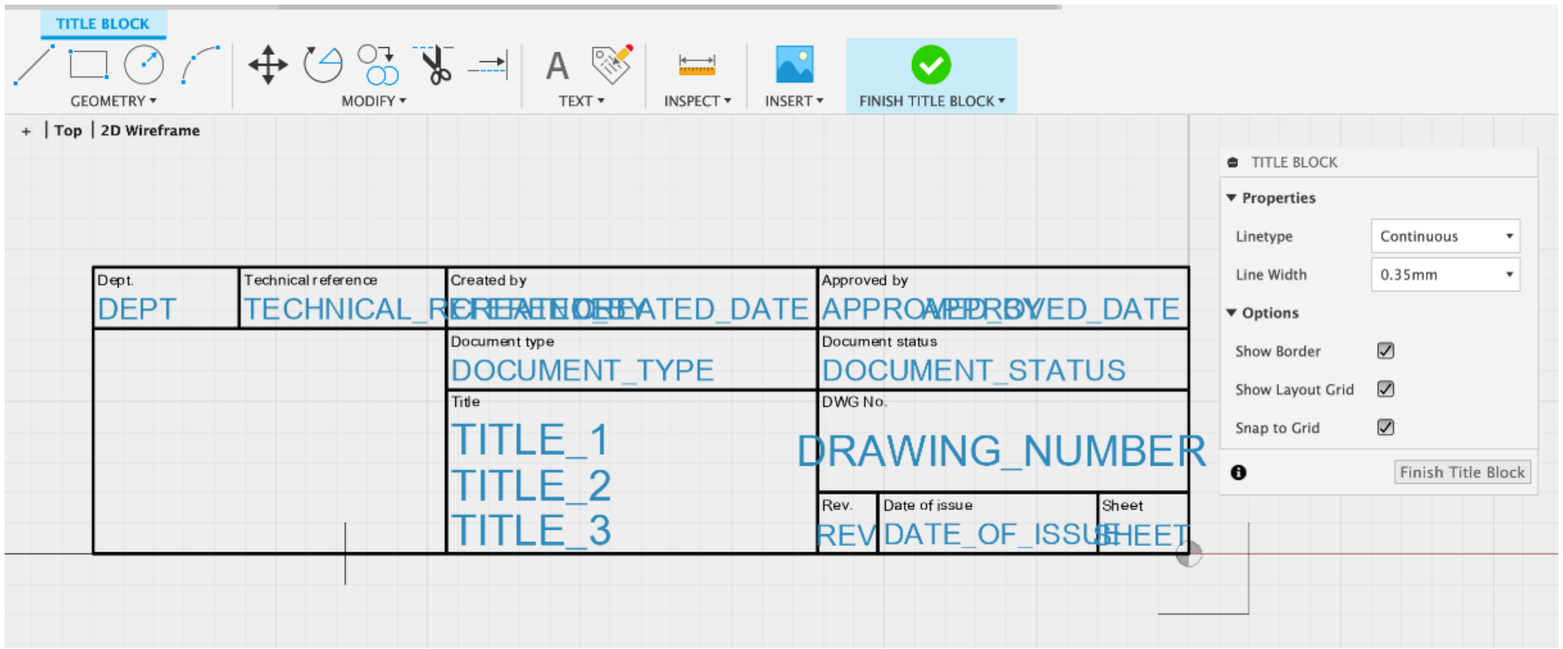
- This changes the definition of the title block for the entire drawing or template
- Change the layout and design
- Change the information that is contained
- Add a company logo and address
- Add client or project information
- Three options for adding a title block:
  - Start with an existing title block
  - Start from scratch
  - Insert a DWG file





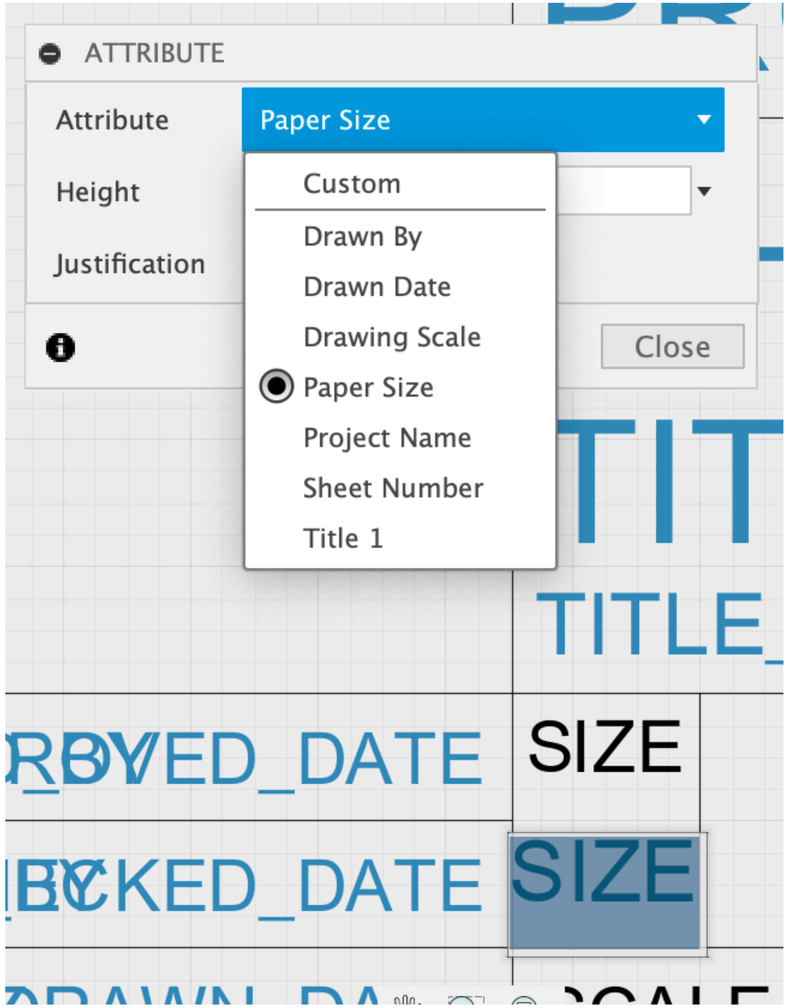
Start with Existing Title Block

- **Drawing environment changes**
  - Gray background, new toolbar
  - Component browser removed
- **Draw lines, add text and attributes, insert images**
- **ISO standard → mm units**
  - Snap grid is 1 mm
- **ASME standard → inch units**
  - Snap grid is 1/16”
- **Text you add is the same on all sheets**
- **Attributes you add allows for different values per sheet**



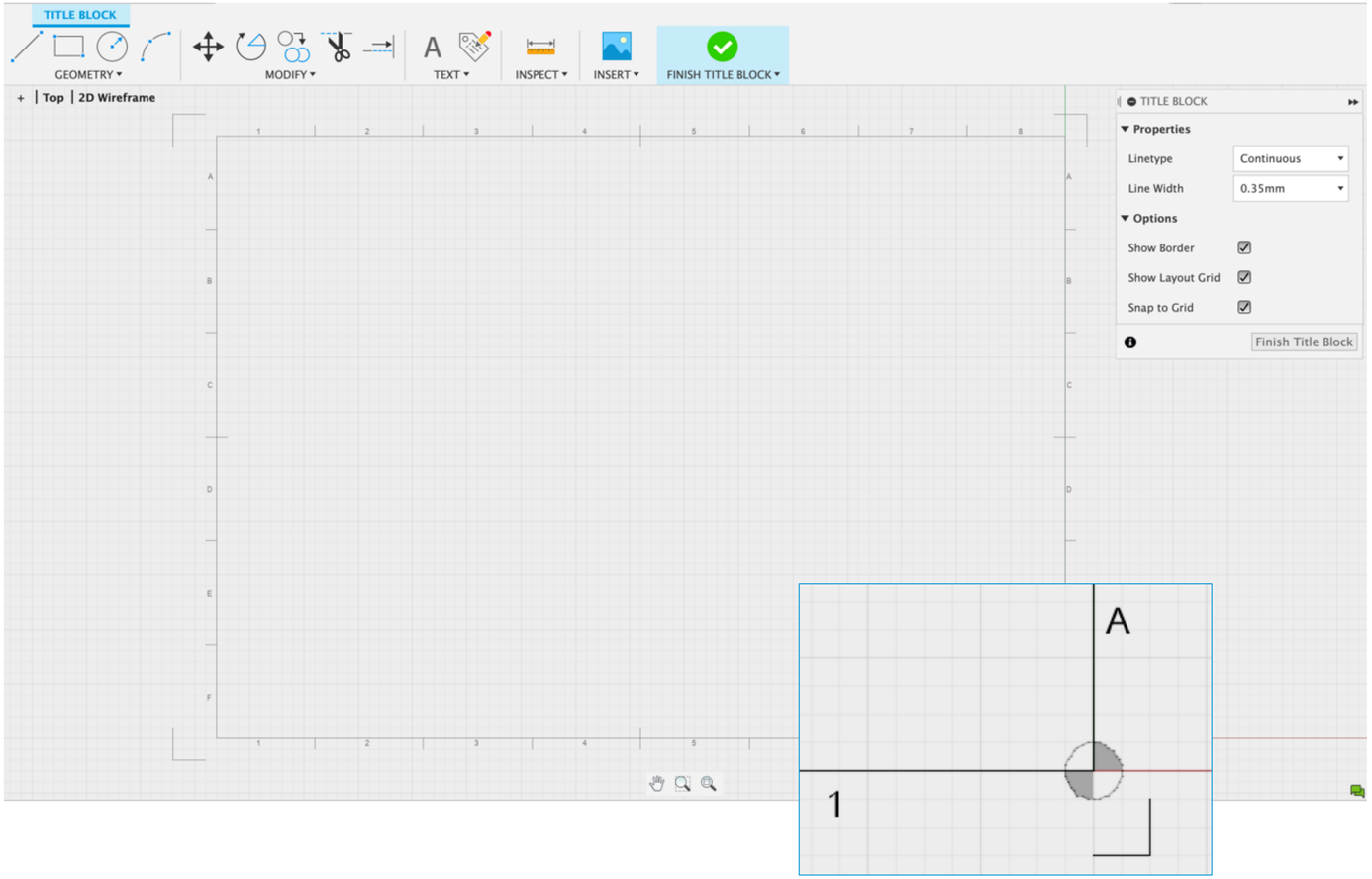
Special Attributes in Title Blocks

- **Seven attribute types will be automatically filled in on new sheets**
  - Drawn By: the person who created the drawing
  - Drawn Date: the date when the drawing was created
  - Drawing Scale: the scale of the first view that is placed on the sheet
  - Paper Size: the letter-code size of the sheet
  - Project Name: the name of the project where your drawing resides
  - Sheet Number: displayed as x/y (sheet x of y)
  - Title 1: the name of the design you are documenting
- **Paper Size updated if sheet size is changed**
- **Sheet Number updated if sheets rearranged**
- **Text and attributes in provided title blocks not affected by change to Document Font**



Create Title Block From Scratch

- **Completely blank**
- **Border shown from current sheet size for reference**
- **Anchor point in lower right-hand corner**
  - This allows the title block to be used on different sheet sizes
- **If you want to exit without adding anything, use Undo**

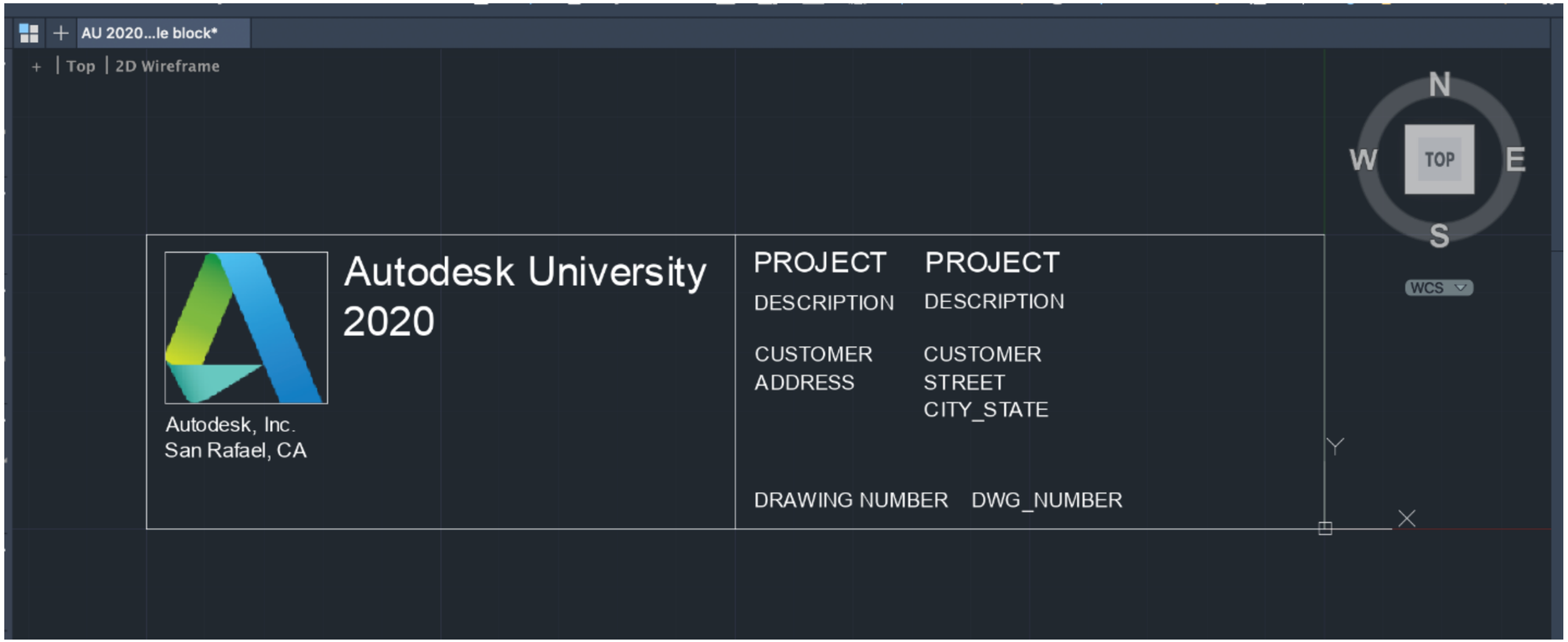


Insert a DWG File for New Title Block

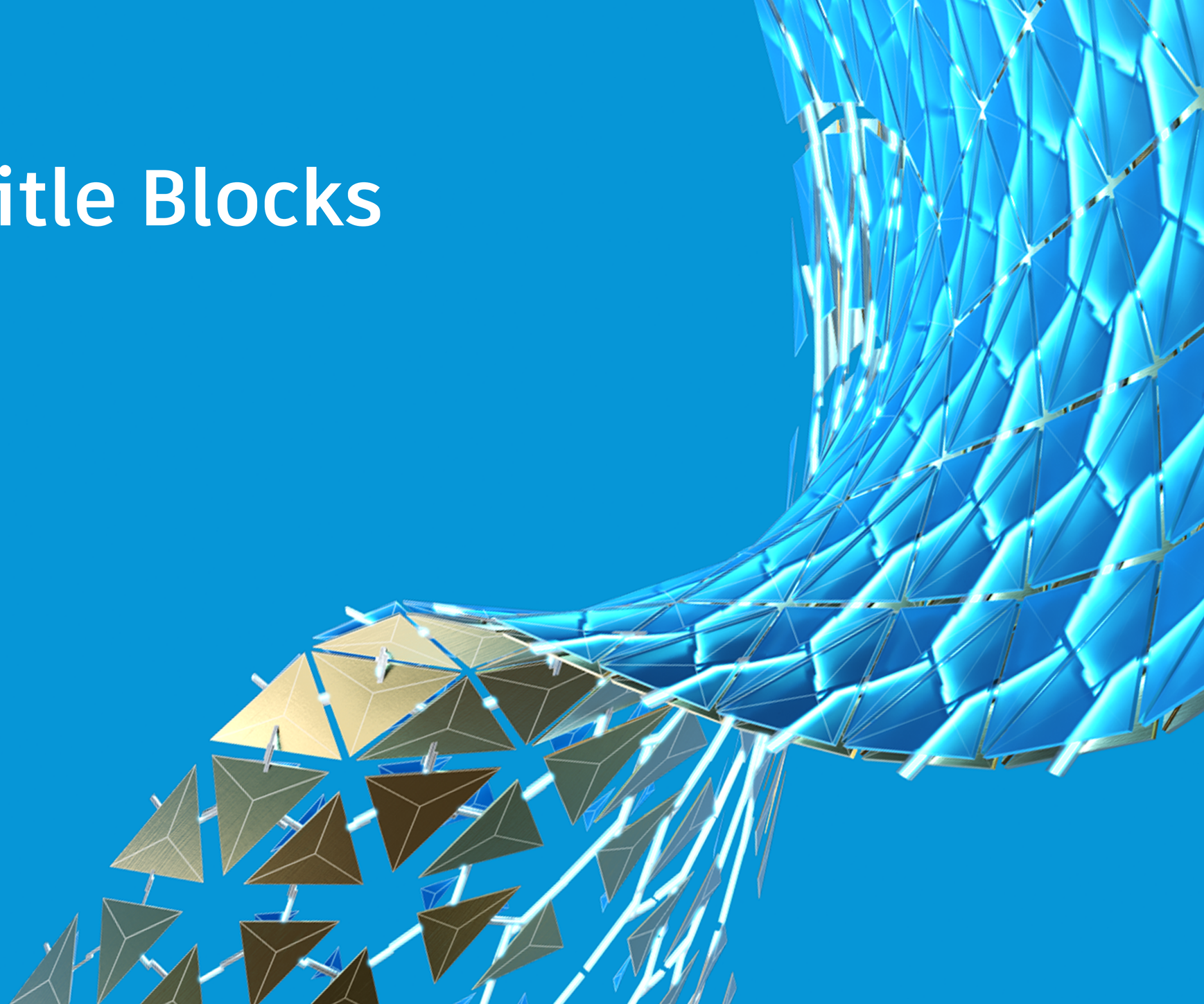
- **You can use AutoCAD or AutoCAD LT to create a custom title block**
- **Guidelines:**
  - All objects in model space
  - No named block definitions
  - Insert point (0,0) at lower right-hand of title block
  - Recommend objects on layer 0
  - Specify default values for attributes when applicable
  - Do not use the “Standard” Text Style for text and attributes
- **Attribute tag names that will automatically be filled in when used**
  - TITLE_1
  - PROJECT
  - DRAWN_BY
  - DRAWN_DATE
  - CREATED_BY
  - CREATED_DATE
  - SIZE
  - SCALE
  - SHEET
- **Use a different name if you do not want this behavior**

New Title Block in AutoCAD - Example

- All objects in model space
- Note location of coordinate system origin (UCS)
- Why isn't my drawing allowed to be used?
  - No named block definitions allowed
- I have a 3D Solid in my title block
  - This is removed
- I used a Field in my title block
  - This is converted to text

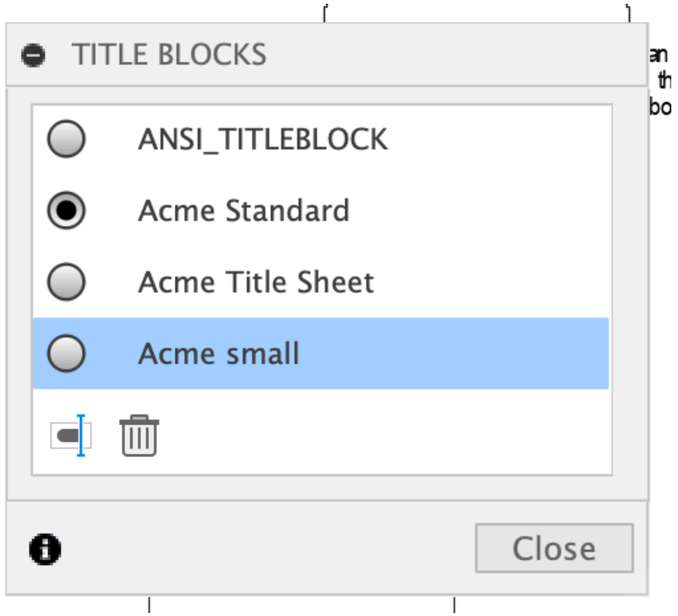


Managing Title Blocks

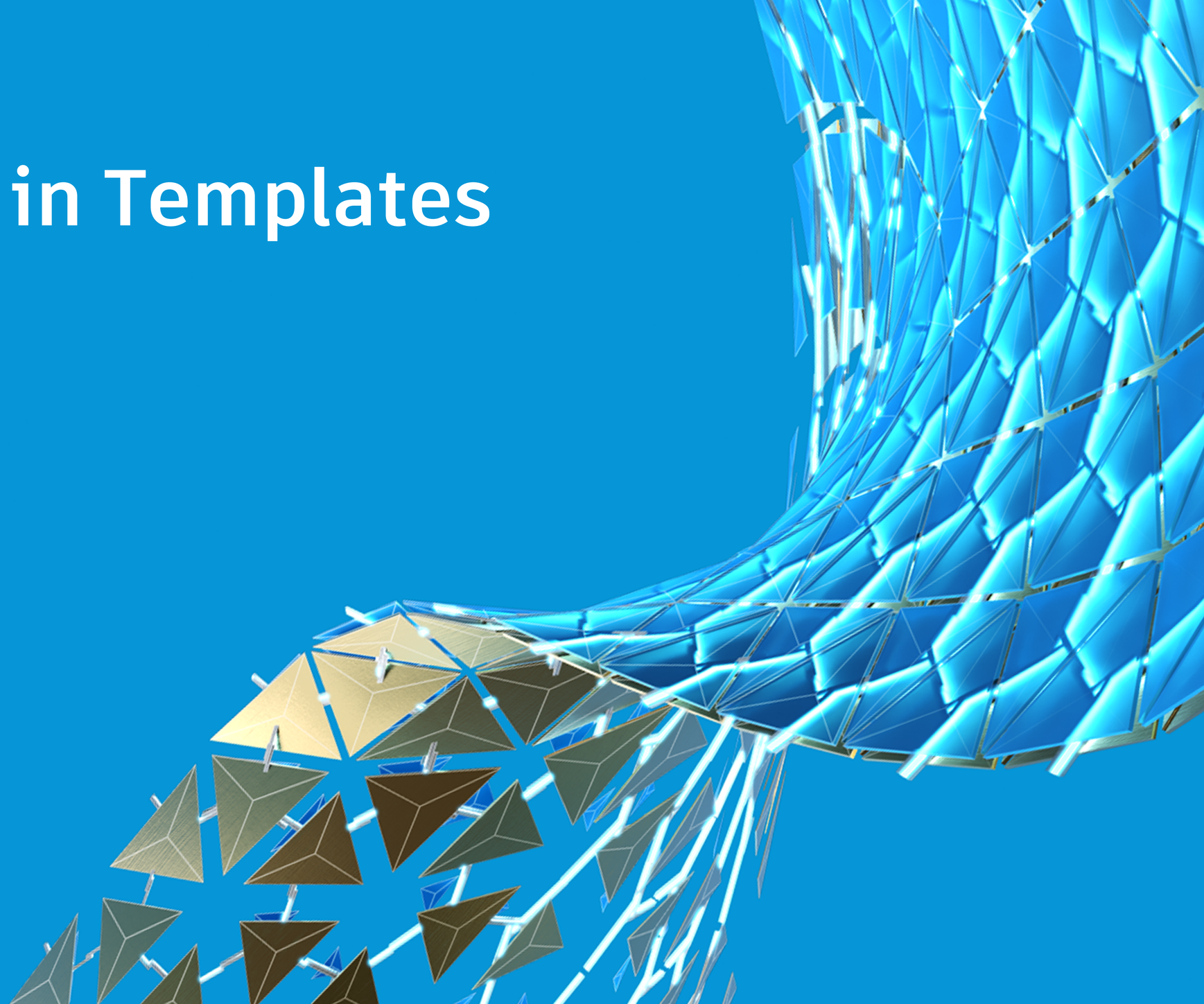


Managing Title Block

- New feature released in September
- Access through Sheet Settings in component browser
- Choose title block for current sheet
- Rename and Delete title blocks
- Impacts current drawings or template only

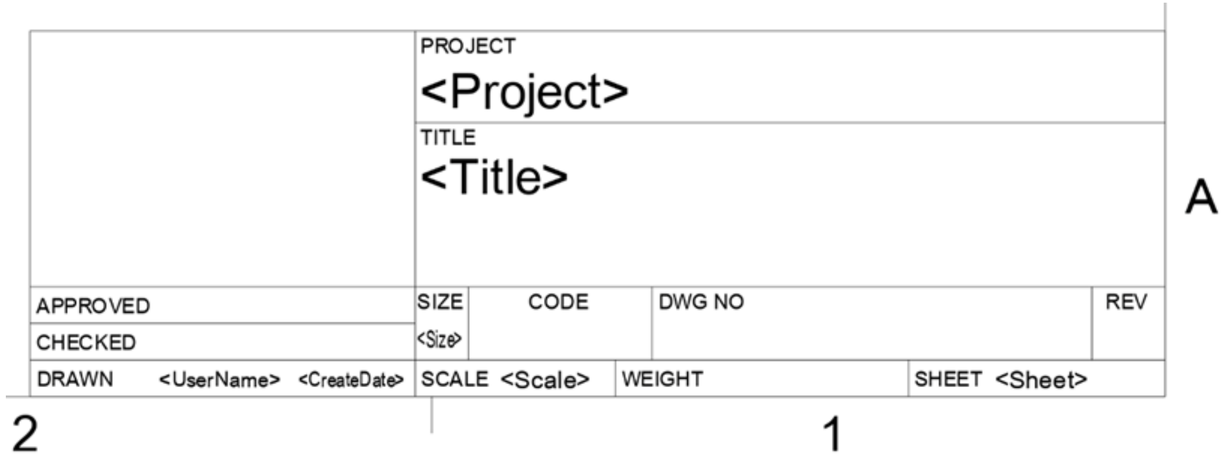


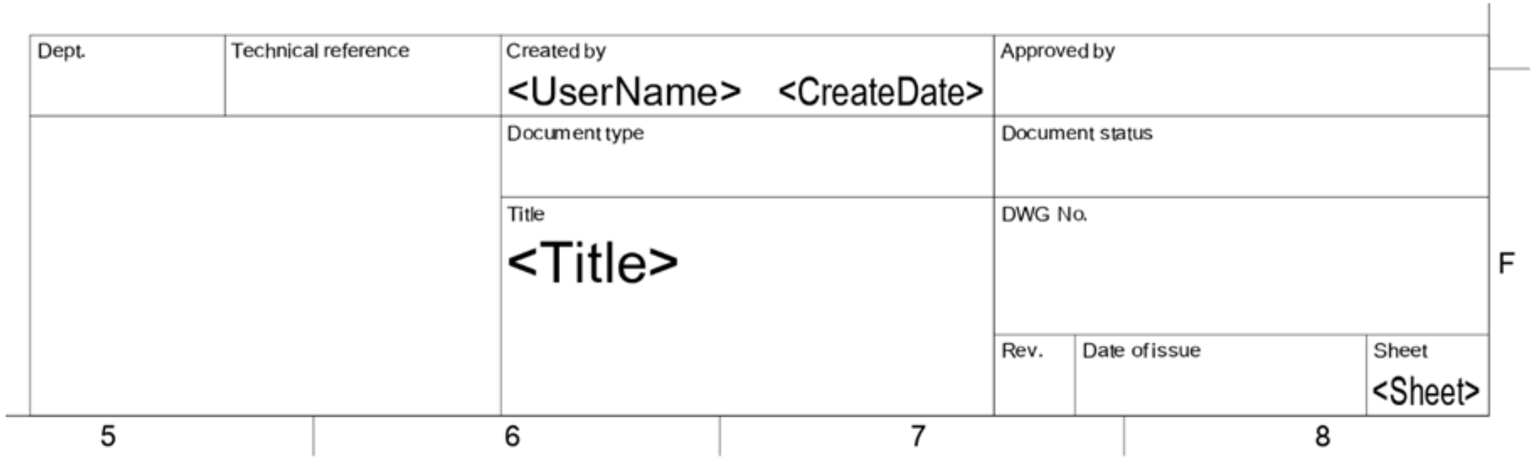
Title Blocks in Templates



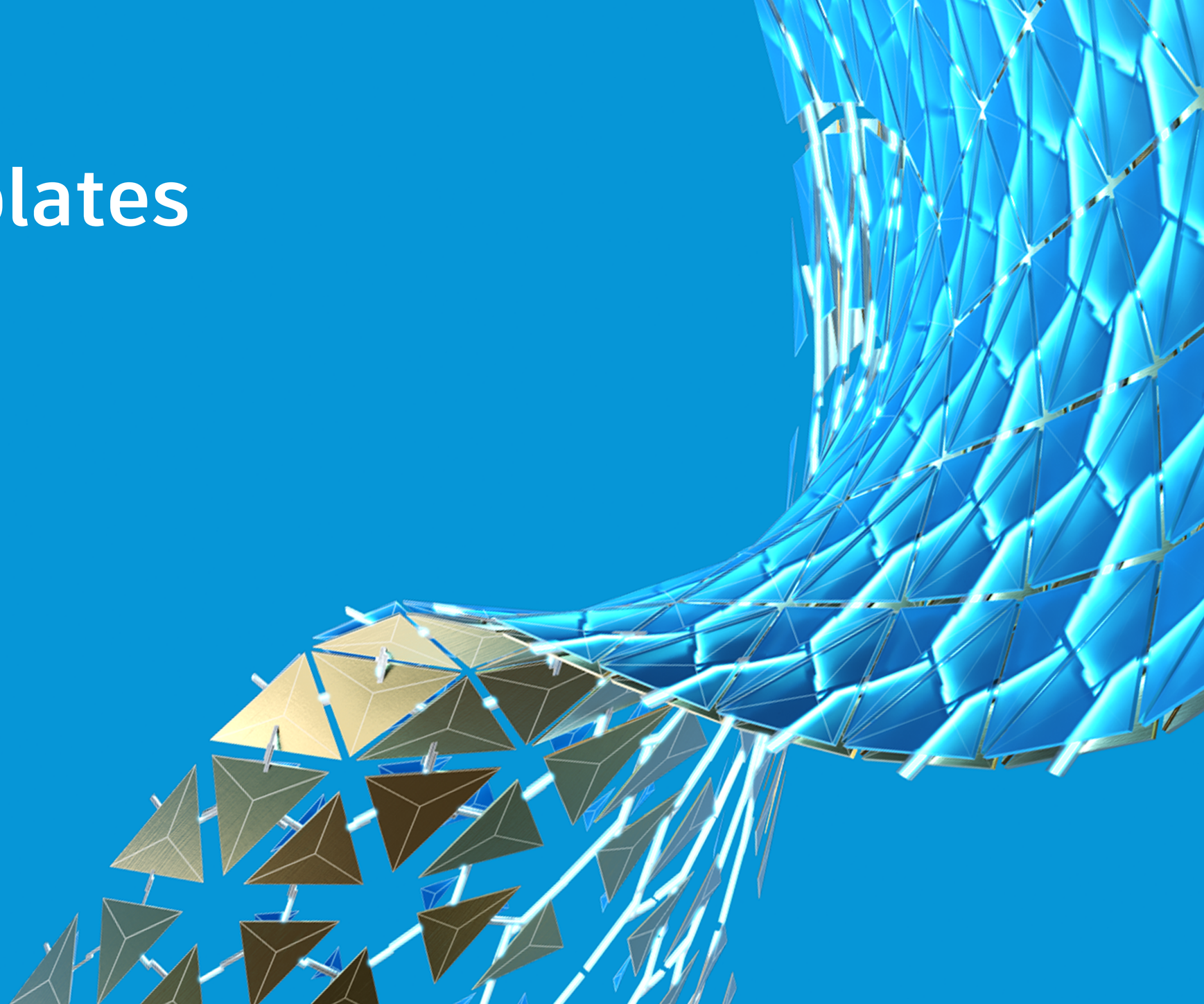
Title Blocks in Templates

- Best place to define your title blocks(s)
- Can then apply them to multiple drawings
- Attributes that will be automatically filled in for you display the information that will be added in <> angle brackets
- Add or edit title block experience is the same as in a drawing
- Edit Properties on a title block in a template:
  - If you edit any attribute with <> angle brackets, the attribute will no longer be automatically filled in



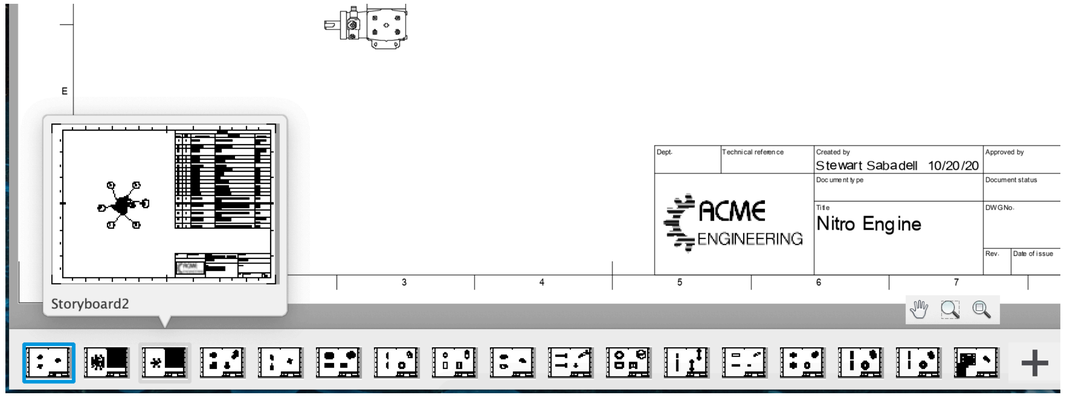


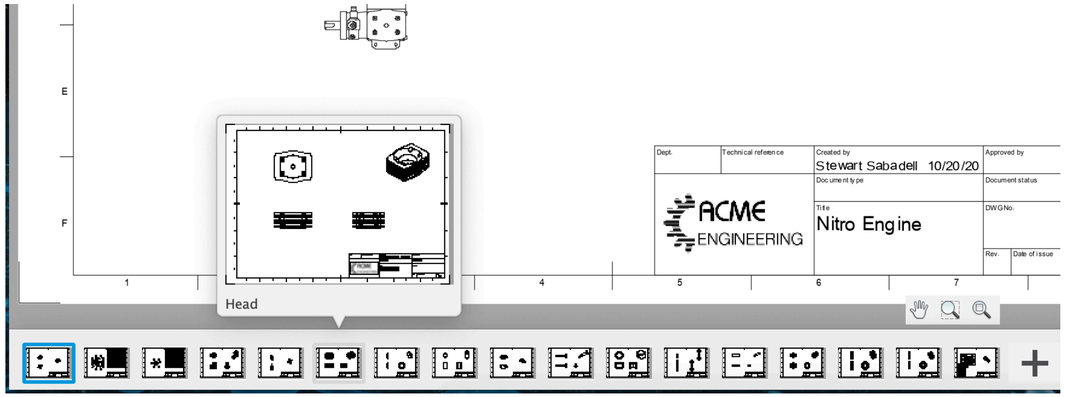
Smart Templates

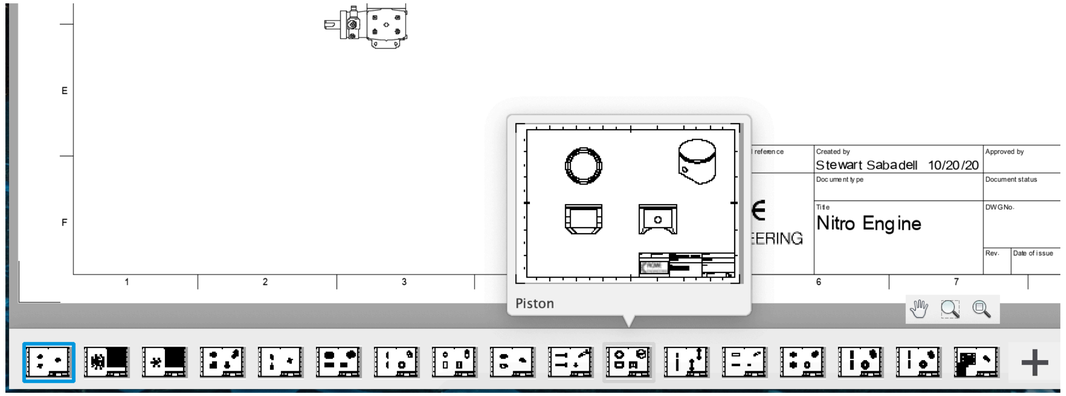


Smart Templates

- **This goes beyond customization, and starts to lay out your drawing for you**
- **Using a smart template at drawing creation time can create sheets that include:**
  - Multiple views of your full assembly
  - All storyboards you have in your design
  - A sheet for each top-level component
  - Views of sheet metal parts can be automatically added in both folded and flat pattern
  - Parts lists, balloon notes, bend tables, and bend IDs
- **All added to your drawing, automatically, when your drawing is created!**

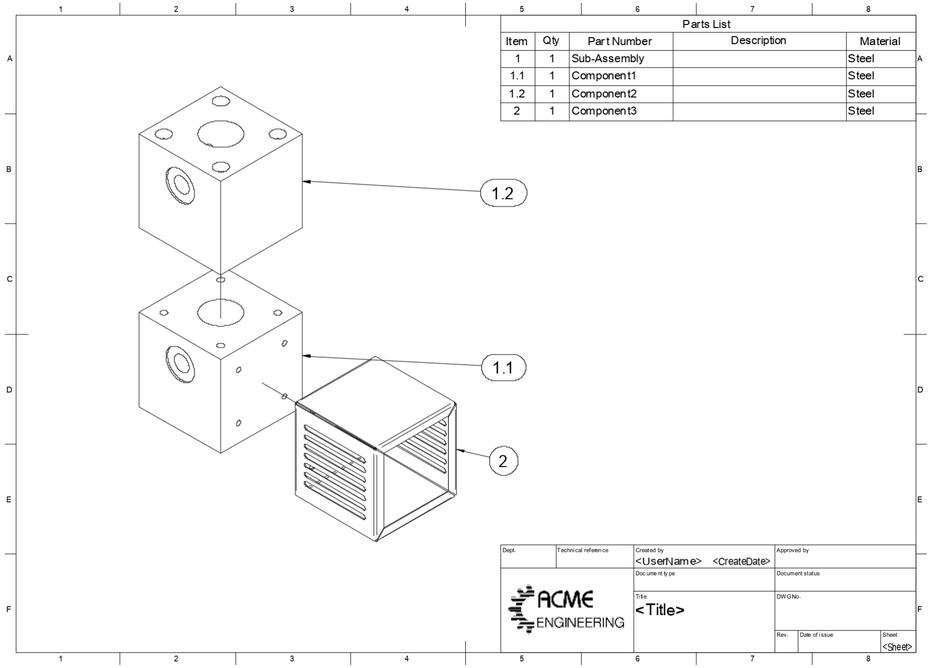


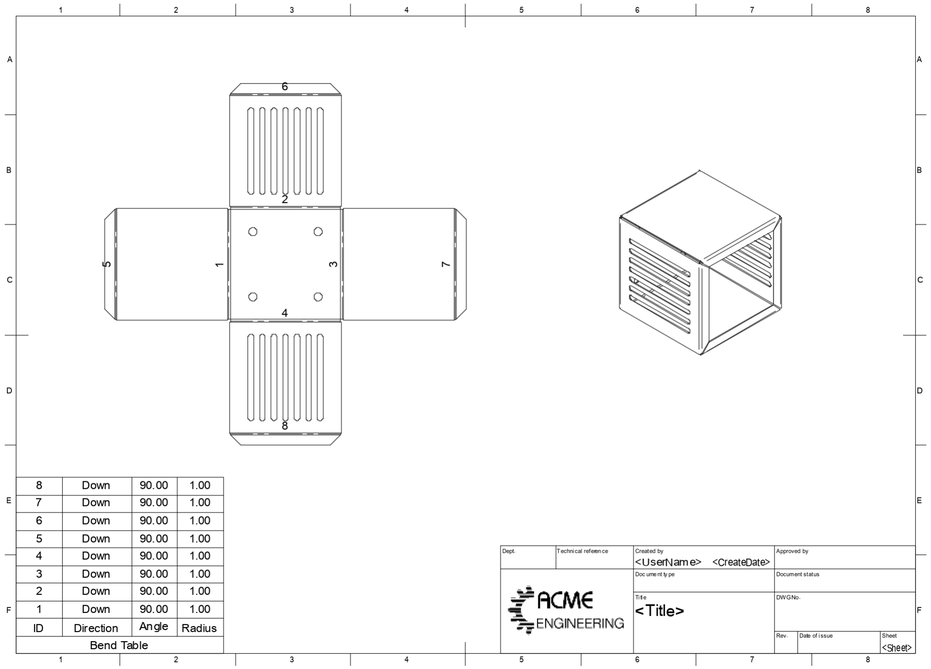




Smart Templates

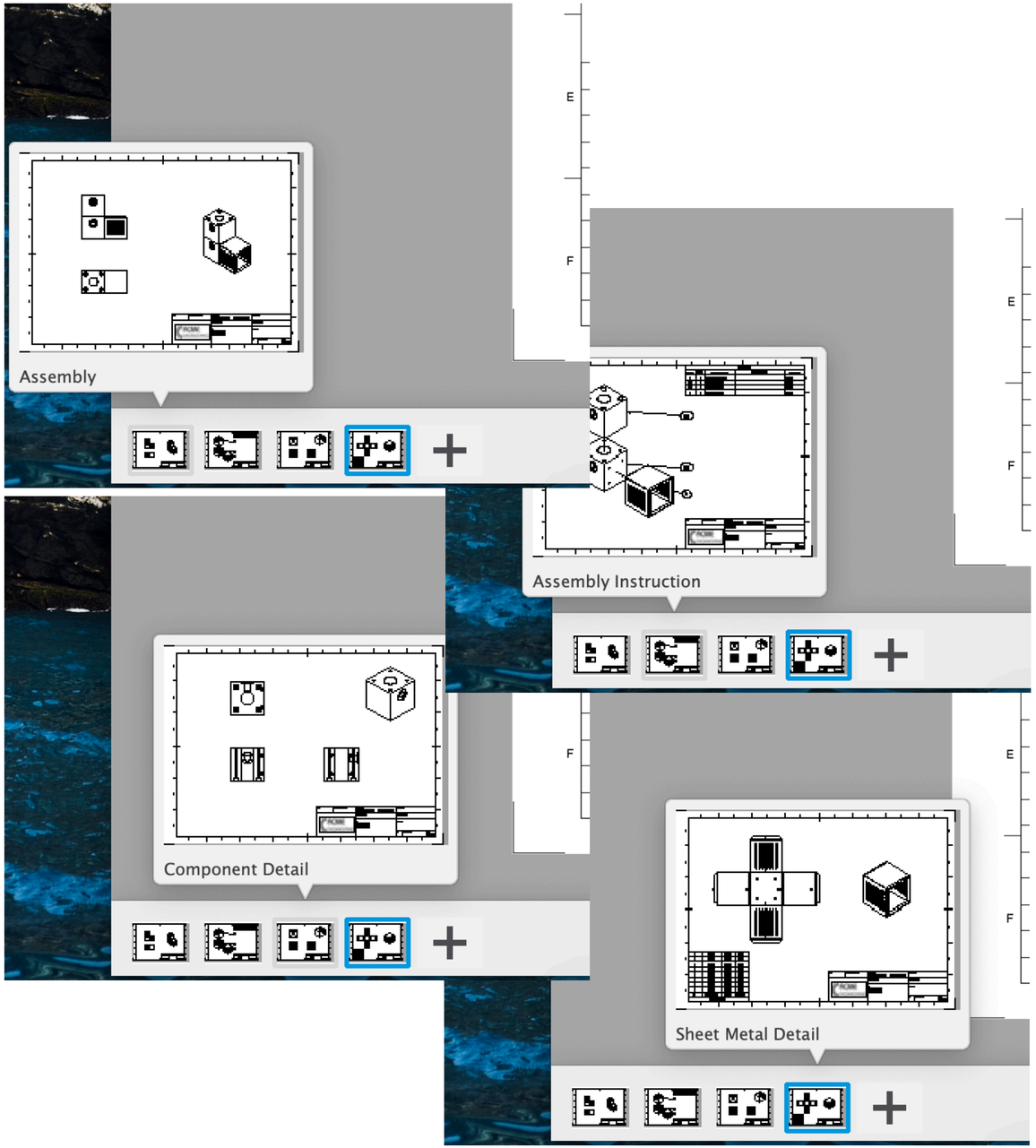
- **Placeholders speed up creation of multi-sheet drawings**
- **There are placeholders for Base and Projected views**
  - Full assembly
  - Storyboard views, such as exploded views with trace lines
  - Single component and sub-assembly views
  - Folded and flat pattern views for sheet metal
- **There are also placeholders for parts lists and bend tables**





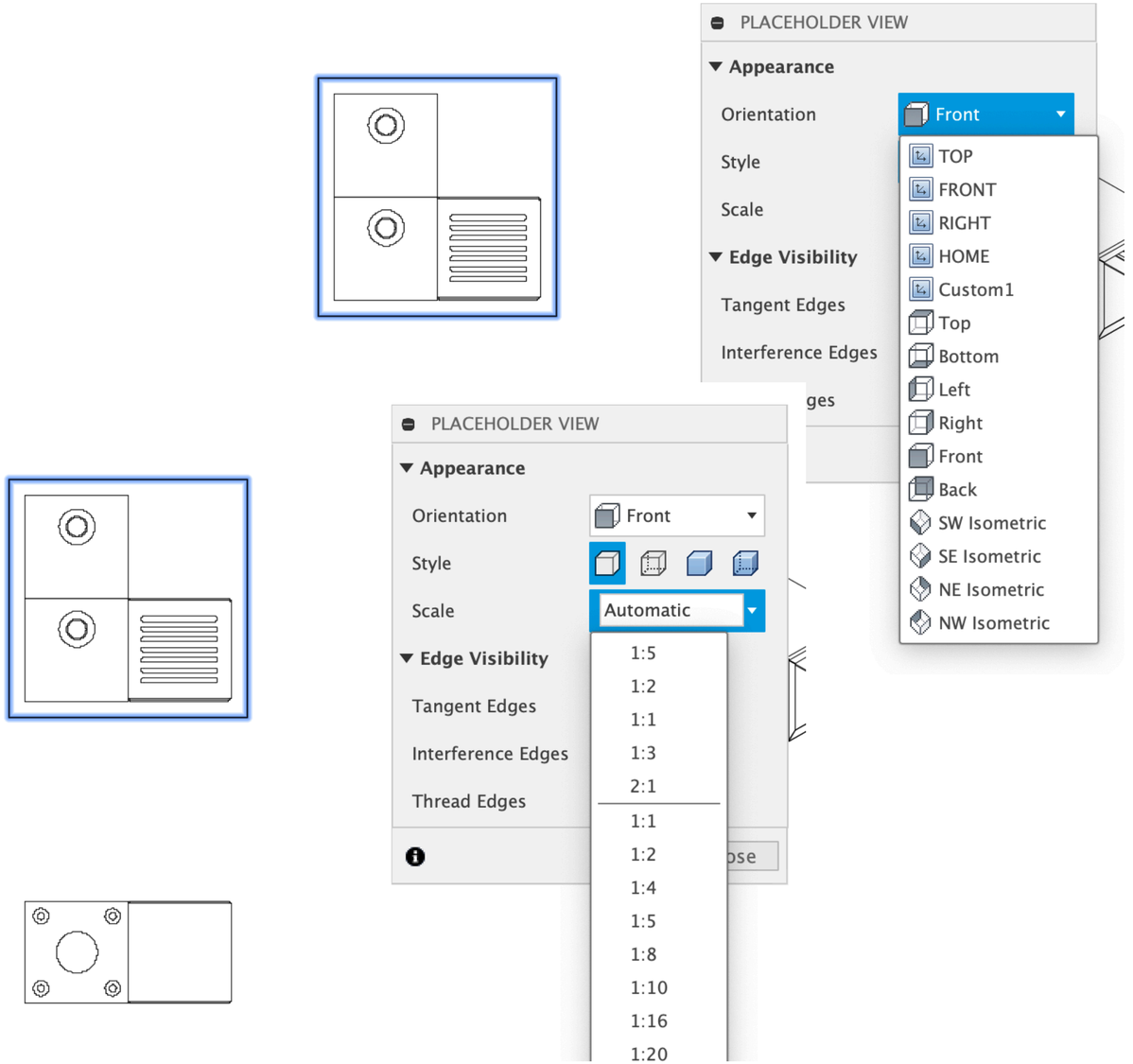
Smart Template Sheet Types

- Sheet types are determined by the placeholder view type(s) on the sheet
- Once sheet type is set, you are limited in the placeholder view types you can then add
- You can only combine these view types on a single sheet:
  - Assembly and Storyboard
  - Sheet Metal Folded Component and Flat Pattern
- When your drawing is created, sheet types determine sheet names



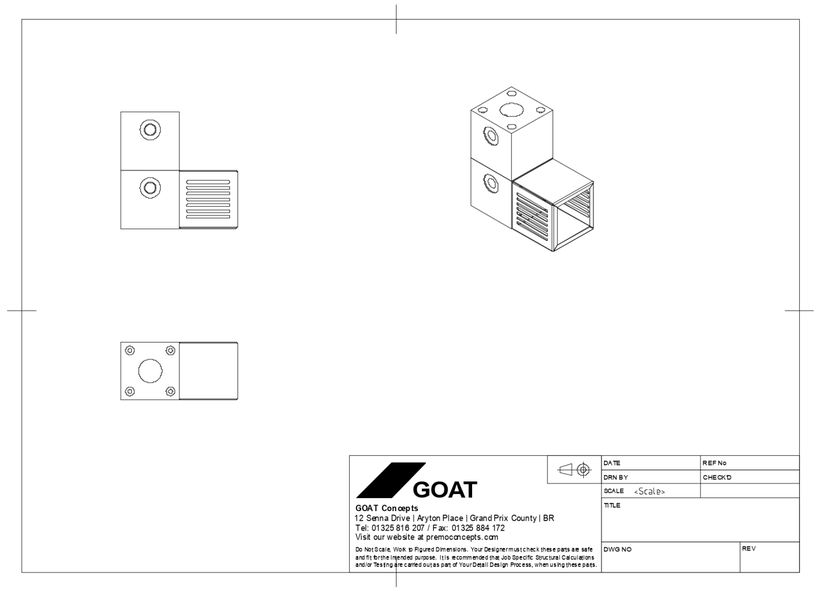
Smart Template Placeholder View Specifics

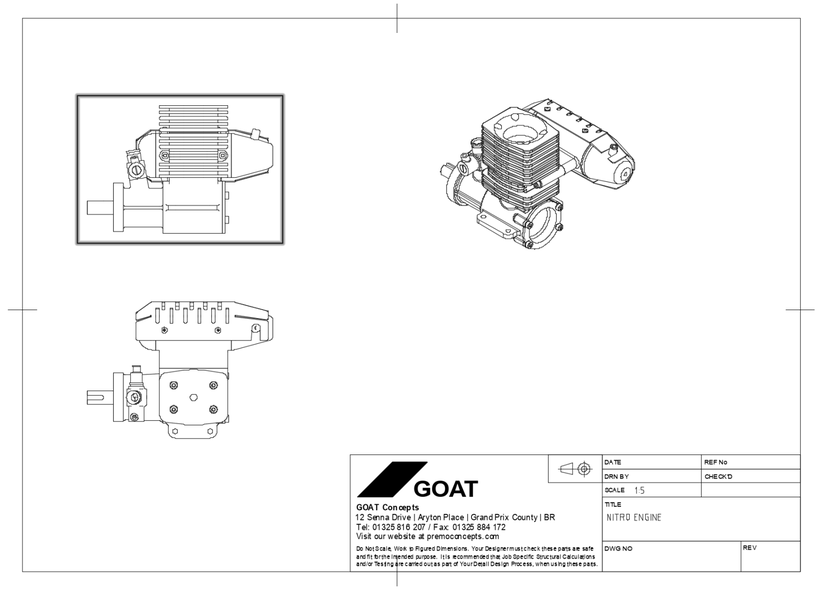
- The orientation of your placeholder views (Front, Right, Top, NW Isometric) will be used from your model
- If base view orientation is not optimal for a given component or assembly, you can change the orientation – no need to delete the views on that sheet
  - Projected views will update accordingly
- Other view parameters used (shaded views, tangent edges, etc.)
- Views can be automatically scaled, as they are now when adding a base view manually
- Two view types not supported: section and detail



Smart Template Assembly Views

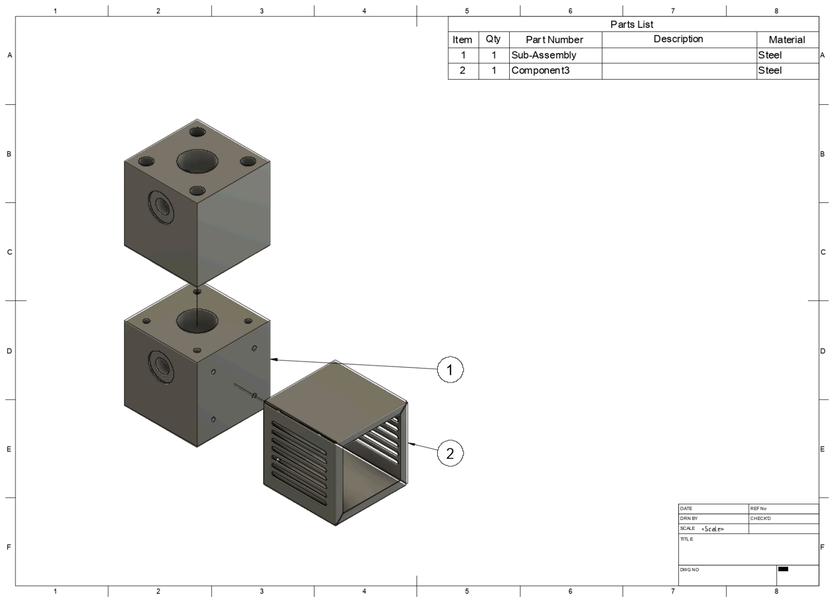
- **Use an Assembly view to view all components in their modeling position**
- **If a parts list is added, your view(s) will also get automatic balloon notes**
  - Some parts may not get a balloon note if they are not seen in this view
- **Parts list supports first-level and all-level, if you have sub-assemblies**
- **If you add a Storyboard placeholder view to your assembly sheet, it becomes an Assembly Instructions sheet type**

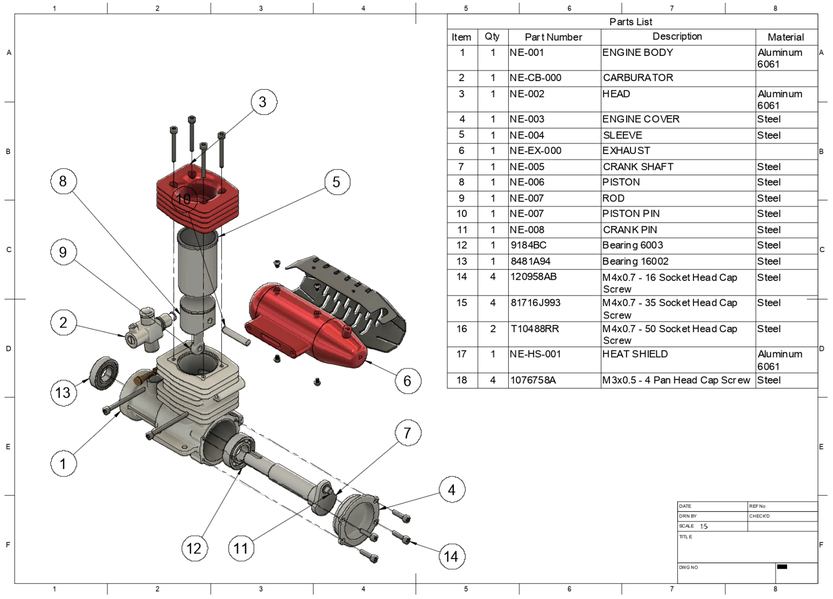




Smart Template Storyboard Views

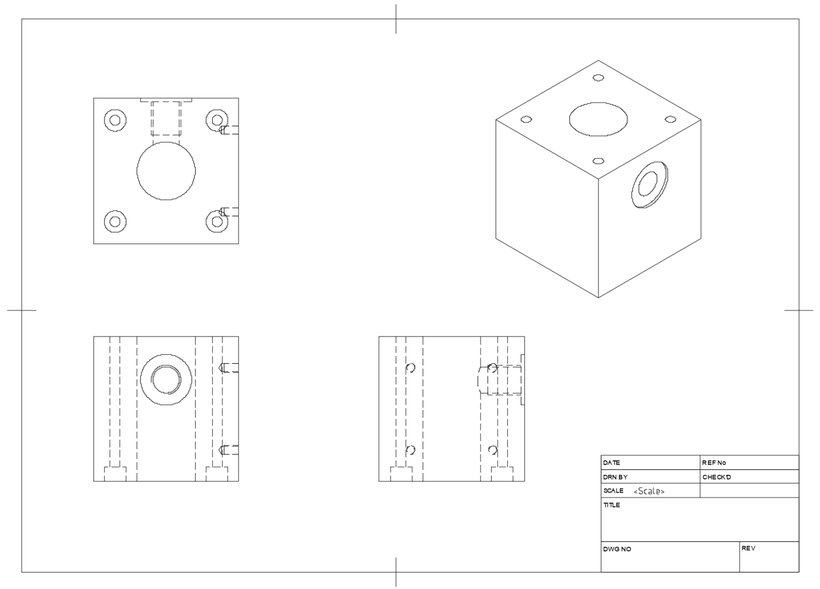
- When you have any sheet with a Storyboard placeholder view, that sheet is an Assembly Instructions sheet type
- When you create your drawing you will get one sheet per Storyboard in your model
- If you turn on trace lines for parts in the storyboard, those trace lines will appear in your drawing view
- It can be useful to add your parts list to a storyboard (exploded) view, as it will be possible to add balloon notes to all of your parts

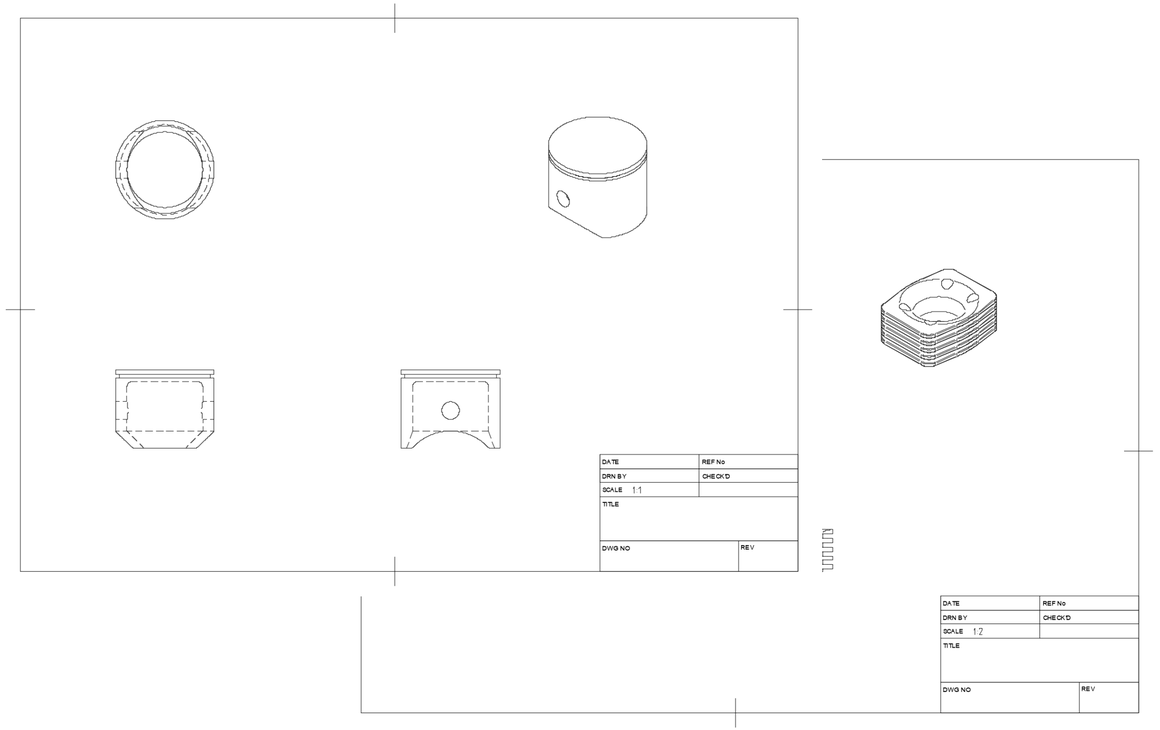




Smart Template Component Views

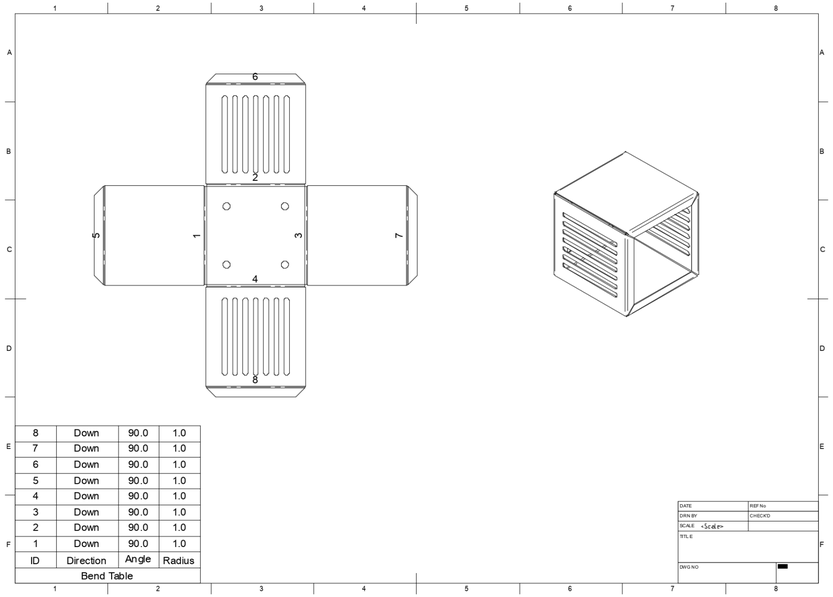
- Use Component placeholders on a sheet, and when used it will generate one sheet per top-level component
- Top-level components that are actually sub-assemblies will use the Assembly sheet type, not the Component sheet type
- Components within sub-assemblies do not get sheets added during drawing creation, only top-level components

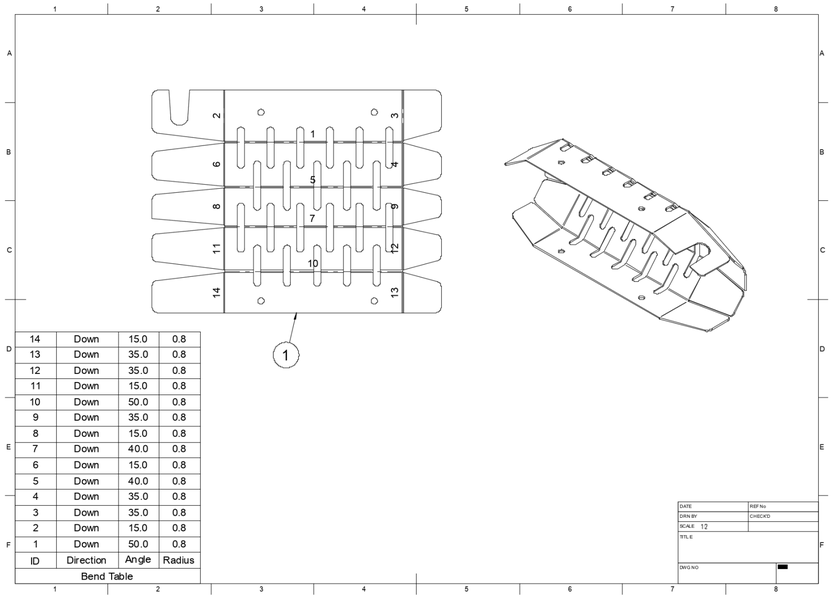




Smart Template Sheet Metal Views

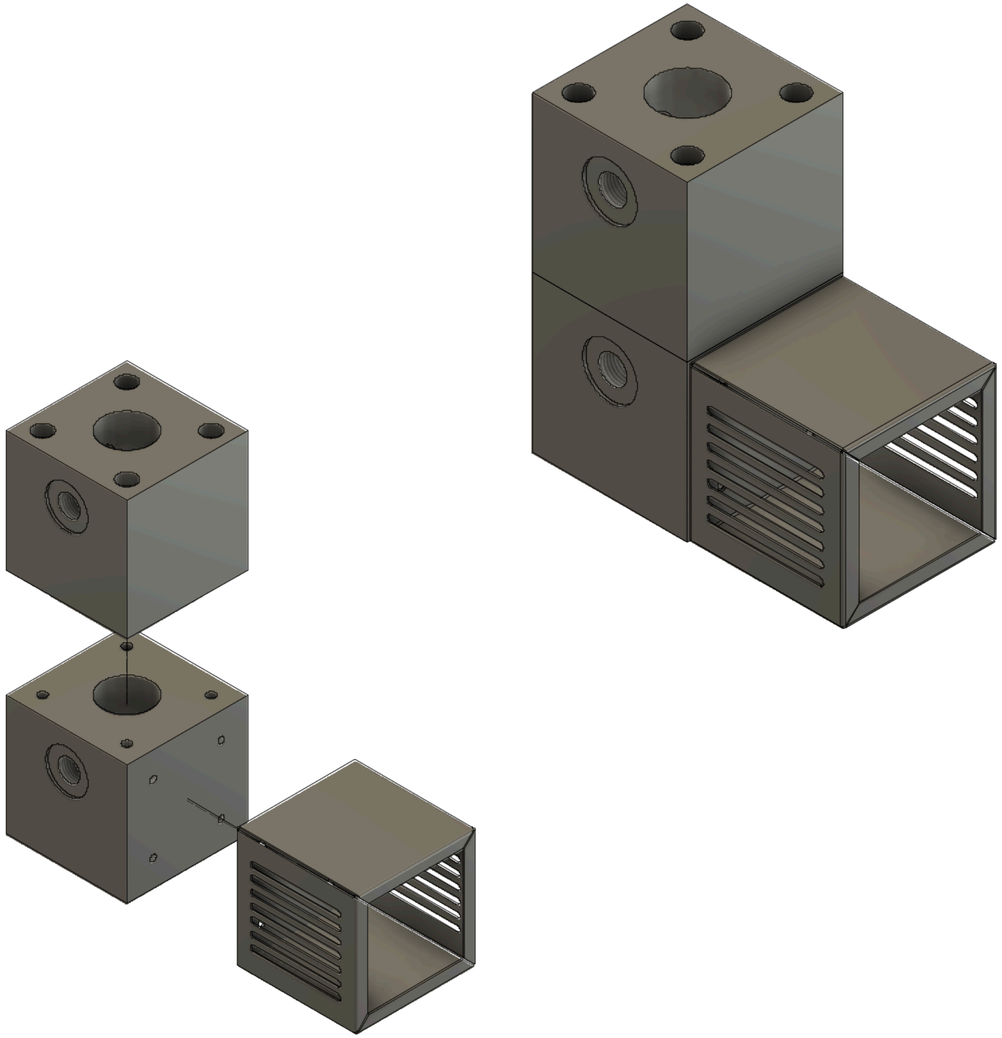
- When representing sheet metal parts you can create both folded and flat pattern views
- In a smart template, just as in a drawing, they can be on the same sheet or on different sheets
- A bend table placeholder can be added, and you will get bend IDs added to your flat pattern view



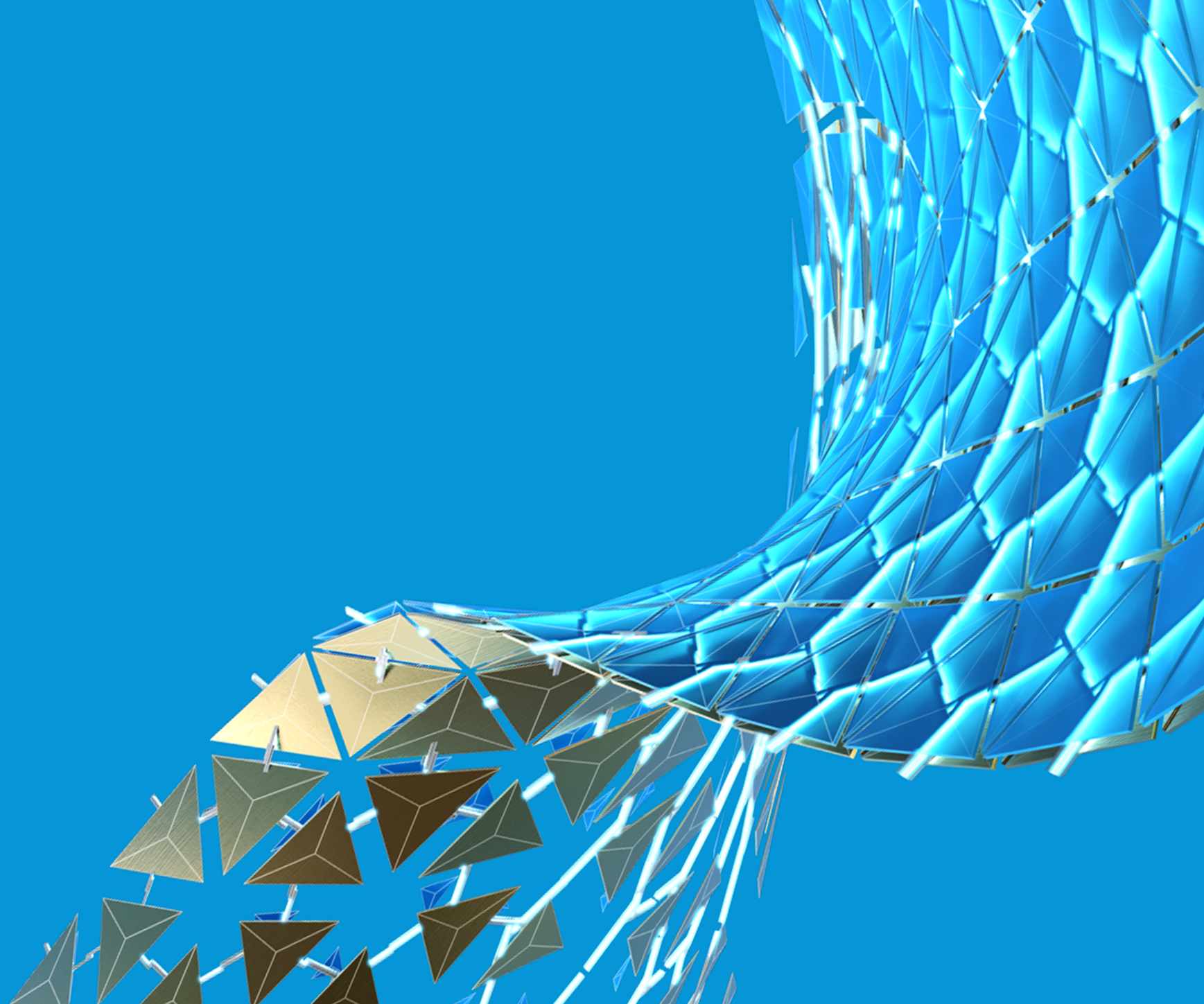


Smart Template Placeholder Model

- The model you see when adding your placeholder views is one that is very simply but includes all aspects needed to support the power of smart templates
- It includes a sub-assembly, sheet metal, and a storyboard



Conclusion



Customize and Automate New Drawings

LEVERAGE PREFERENCES AND TEMPLATES TO CREATE DRAWINGS TO YOUR STANDARDS

Your company and your projects have to be documented in very specific ways: drawing units, sheet sizes, even line weights. Set these up once for your corporate and project standards.

CUSTOMIZE TITLE BLOCKS IN TEMPLATES FOR YOUR COMPANY NEEDS

Ensure your title blocks carry all the information you need, whether the documents stay in house or get sent out for manufacturing. And define your company brand through your title block.

SMART TEMPLATES HELP ELIMINATE SOME OF THE REPETITION OF DRAWING CREATION

Let a smart template create most of the sheets and views you need, right up front. Let it create parts lists with balloon notes automatically added and placed. Let it create a sheet metal flat pattern view, with bend IDs and a bend table, any time it is needed.

CREATE PROJECT-SPECIFIC SMART TEMPLATES

Save time by filling in title block properties for each project. When you use your smart template, every sheet will have your project-specific information already there.

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