NASSCAD 4.7.0

STEP import and assembly browsing

Current workflow - 26 October 2026

Import and browse assemblies

Use Import to open a STEP AP203, AP214 or AP242 file. When the reader exposes the source assembly structure, the Objects panel groups parts into assembly folders. Expand folders to browse the model; click a folder to select its parts. Part names, placements and available colours are retained. MEDUSA adds per-face colours and native processing for large assemblies; it is included in Windows Setup and Portable.

Surface quality and large files

The current import pipeline improves tessellation topology and keeps available OCCT surface normals on eligible bodies. This gives smoother curved faces while preserving sharp boundaries. Bodies that need repair or lack usable source normals use a fallback. Native STEP streaming and the Turbo path support large assemblies; runtime and memory use still depend on the file, its complexity and the machine. A faster cached import does not measure the first-import cost.

PMI and assembly history

Supported AP242 files can expose graphical annotations and semantic PMI / GD&T; in the PMI panel. The information must be present in the source and supported by the reader. The assembly tree describes parts and instances; it does not recover the original sketches, constraints, extrusions or modelling feature history. Imported PMI display is not a promise that all annotations will survive export.

NASSCAD 4.7.0

STEP export and source fidelity

Current workflow - 26 October 2026

Export STEP in three protocols

Use Export > STEP, check the export scope (the selected objects or the whole design), then choose AP203, AP214 or AP242. Export can write separate named bodies as components, with supported body and face colours. The exported component structure need not reproduce every level of the original assembly hierarchy. MEDUSA performs native export in the Windows edition; the browser has a JavaScript fallback when the native export service is unavailable.

Reuse an intact source B-Rep

For eligible STEP bodies imported through MEDUSA and kept geometrically unchanged, native export can reuse the referenced source B-Rep with its supported placement transform, instead of rebuilding the body from display triangles. If MEDUSA restarted and the source file remains available in the session, NASSCAD can reload the source B-Rep before export. Read the log to confirm which bodies used this path. If a reference or source cannot be recovered, export falls back to the mesh representation.

Export after editing a mesh

CSG results, edited meshes and bodies without a usable source B-Rep export from their current geometry. Supported analytic primitives can use analytic representations; connected coplanar triangles can become planar B-Rep faces when compact. Other geometry can use AP242 tessellation or AP203/AP214 faceted B-Rep. The Exact / Robust / Faceted option controls the writer strategy and declared accuracy: Exact does not reconstruct lost analytic surfaces or the original CAD history. Keep the original STEP, and reopen important exports in the receiving CAD tool to check body count, dimensions, placement and appearance.

NASSCAD 4.7.0

Updates and fixes - 26 October 2026

Current guidance for the browser and Windows editions. This supplement takes precedence over older descriptions.

Preview fillets and chamfers

Select one solid, then open Fillet / Chamfer. Choose Round or Chamfer and set the size. Choose All sharp edges for a broad finish, or Pick edges for selected edges and groups. The same Preview and Apply buttons act on the chosen target. Preview opens a separate 3D view without replacing the source; choose Apply to commit or Back to adjust. Presets, special profiles, corners, edge filters, groups and segments are under Advanced options. If the requested finish is reduced or fails, read the status before retrying.

Finished objects and surface display

A committed fillet or chamfer remains selectable for further work and Undo. Fillet / Chamfer keeps flat faces visually flat and preserves smooth surface normals on curved faces. STEP import and native MEDUSA booleans also preserve available surface normals; repaired or unsupported geometry uses a fallback. These are display improvements, not a guarantee that an imported model has been healed.

Coplanar through-cuts

Boolean operands are evaluated in one shared local frame. This prevents tiny transform-rounding residues from leaving a membrane when a cutting tool ends on the same plane as the solid. The change is shared by Union, Subtract, Intersect and CSG-tree evaluation; it is not tied to one model. A Union action that includes objects marked Hole still subtracts those objects.

NASSCAD 4.7.0

Updates and fixes - 26 October 2026

Current guidance for the browser and Windows editions. This supplement takes precedence over older descriptions.

Recalculate an older result

Updating NASSCAD does not rewrite geometry already saved in a project. Keep a copy of the project, select the old CSG result and use Re-run to recalculate its operation, or Deep to evaluate its construction tree. If the source operands are no longer available, return to an earlier project or re-import the source. Previously baked fillets need their source solid and edge selection again.

Check the actual solid

For a through-hole, inspect both sides and use another view or export to confirm that it is open. A manifold result alone does not prove the intended shape: an unintended thin membrane can still be manifold. Intentional blind holes and thin floors are retained; this correction does not automatically extend cutters or erase thin details.

Gear dialog and desktop update

Gear.Gen / Pulley.Gen opens within the workspace and keeps its expanded mating-gear controls accessible. Use the dialog scroll area on a smaller screen. Windows users should install the refreshed Setup or replace the Portable executable; updating the website alone does not update an installed application. Setup and Portable include MEDUSA and its dependencies.

The earlier tools update and the complete illustrated manual follow.

NASSCAD 4.7.0

Latest tools - 21 October 2026

This update supplements the original manual. For the commands below, follow these current instructions if an older description differs.

Start menu

Click Start in the top menu bar to open the welcome panel when needed. Click Start again, use the close button or press Escape to dismiss it. Opening this panel does not clear your scene or start a new project.

Clear STEP import cache

Open Tools > Files / Utils and choose Clear STEP import cache. Confirm to delete the persistent NSTP parsing and NSPG geometry caches. Your current scene, project and source files remain unchanged. The next STEP import can take longer while its cache is rebuilt. Native BRep data already held in memory is unaffected.

Integrated MEDUSA logs

In the Windows desktop edition, click the MEDUSA status button to view its logs. Progress bars adapt to the panel width and show the percentage. Hover over shortened details to read them. Resize or maximize the panel, or use A- and A+ to adjust the text. The standalone engine keeps its own console.

Feedback

Use the online Feedback link to send a comment or describe a problem. No account or email address is required, and no project is attached automatically. Internet access is needed to open the form.

The complete original manual follows on the next page.

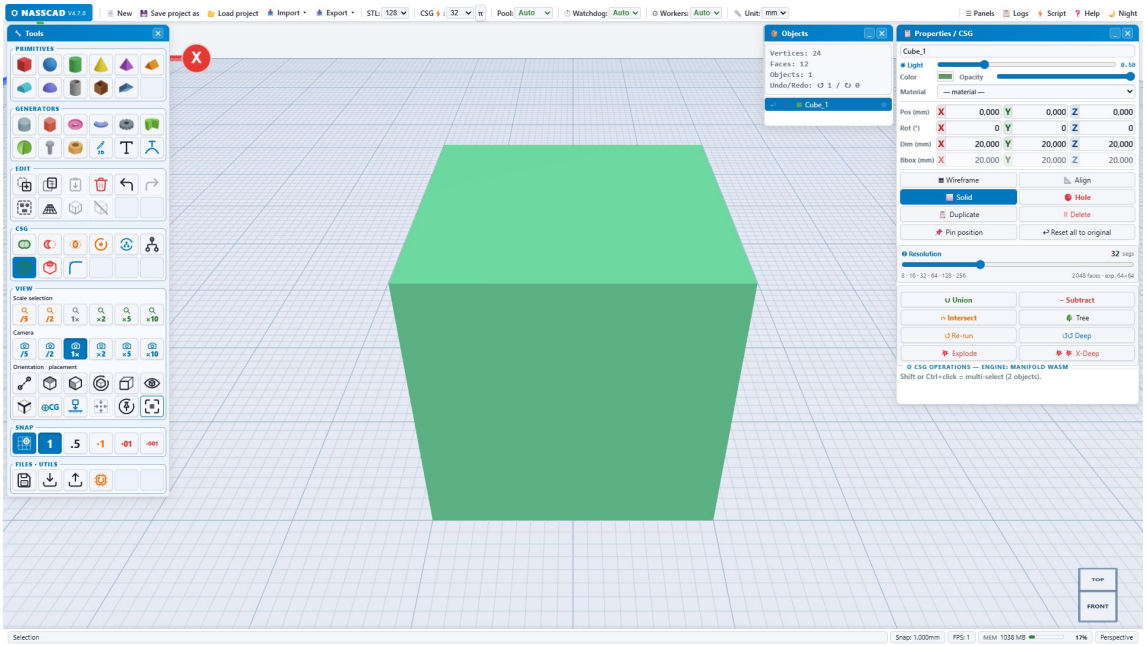
NASSCAD

User manual

3D CAD on your computer and in your browser

Complete illustrated guide to the graphical interface

Version 4.7.0 - Windows Electron All-in-One and browser edition reviewed on 8 October 2026



NASSCAD workspace with a selected part; quality and memory controls are now grouped in Performances

Create mechanical parts, assemble geometry, import CAD models and prepare files for fabrication. This manual covers the visible application, its generators, the sketcher and its file workflows.

NassScript has its own reference. Its API and programming language are deliberately outside this manual; the console, demonstrations and documentation entry points are covered here.

NassLab | nasscad.com

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01 | Start NASSCAD

Windows x64: Setup or Portable

The **Electron All-in-One** desktop edition includes NASSCAD, MEDUSA, its DLLs, WebAssembly engines, fonts and supporting assets. The core CAD workflows operate offline; no separate runtime installation or BAT launcher is needed.

Run **NASSCAD-4.7.0-Setup-x64.exe** for an installed application. **All users** is selected by default; Windows may request administrator permission. You can choose the installation folder. Open NASSCAD through its desktop or Start menu shortcut after installation.

Run **NASSCAD-4.7.0-Portable-x64.exe** to use the bundled application without installing it. Keep the official executable and use its included resources. Portable describes the launch method; project files still need to be saved to a folder you choose.

Opening the desktop app starts its own MEDUSA process. Closing NASSCAD also stops that process. Communication uses an **internal process pipe**, without a local HTTP server. You do not need to start MEDUSA, a Python server or another launcher yourself.

Online edition

Open nasscad.com and launch the browser application. The workspace does not require an account. Use a current desktop browser with WebGL and WebAssembly support. Some engines load only when their tools are first used, so the first operation can take longer.

Separate offline browser files

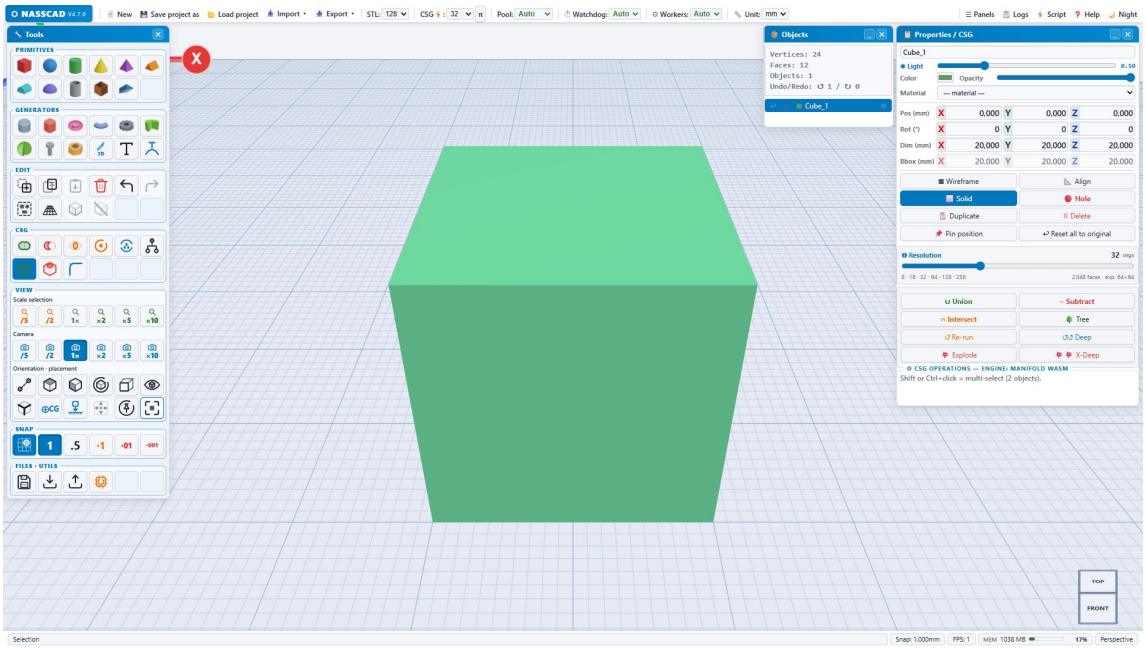
If you use the separate HTM/JavaScript distribution instead of Electron, keep its complete folder together. Moving only the HTM can leave tools visible while engines fail to load. When file-URL restrictions block loading, serve that folder locally; for example, with Python already installed, use `python -m http.server 8080` and open `http://127.0.0.1:8080/NASSCAD_V4_7_0.htm`. This optional browser arrangement is separate from the Electron desktop edition.

Display and compatibility

A **1920 x 1080** display gives the workspace plenty of room. **1024 x 768** is a practical smaller-screen starting point; **1280 x 720 or larger** is more comfortable for regular work. Move, resize or hide panels using **Panels** or **H**, and use the compact **Performances** menu. Tests cover that menu down to a 960 x 640 window; space for modelling depends on which panels remain open. Browser and renderer memory limits still apply on machines with abundant RAM.

Save an important scene as a JSON project before refreshing, closing, loading another project or changing a setting that requires a reload.

02 | Understand the workspace



Workspace overview; the current compact Performances menu is shown in chapter 43

Five working areas

- **Top bar:** projects, import/export, the compact Performances menu, units, panels, logs, script, help and theme. Performances contains STL, CSG, Pool, Watchdog and Workers.
- **Tools panel, left:** primitives, generators, editing, CSG, views, snap and file utilities. Hover an icon to read its tooltip.
- **Viewport, centre:** the model, work grid, axes, selection controls and navigation cube.
- **Objects panel:** scene objects, imported file groups, selection, per-object reset, pin and framing controls, plus geometry and history counters.
- **Properties / CSG panel:** name, appearance, numerical transforms, generator editing, alignment and boolean tools.

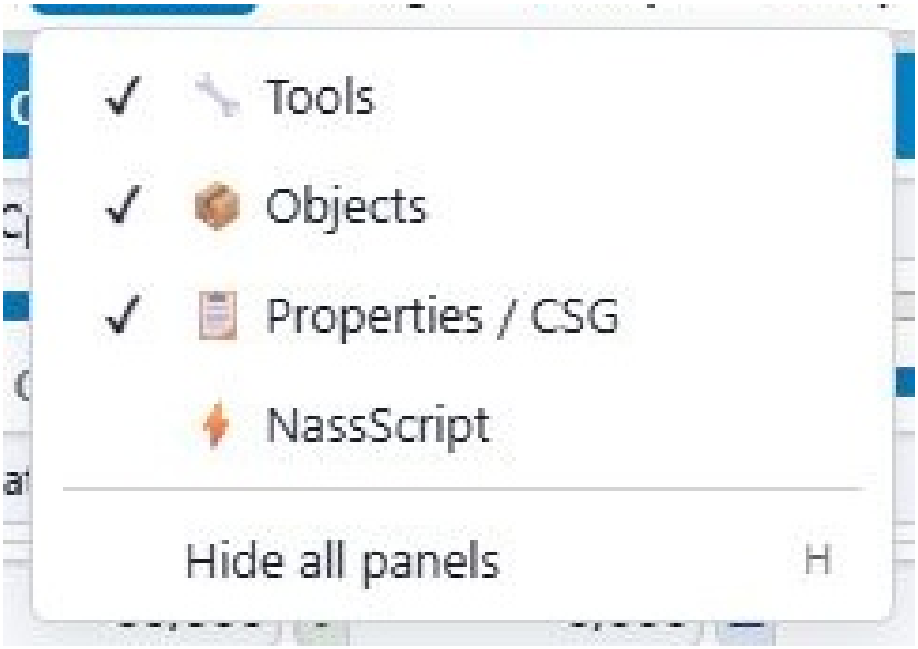
Status bar

Read the active tool, snap step, FPS and memory indication at the bottom. The memory indicator concerns browser-managed memory and the geometry pool; it is not a complete measurement of system RAM or GPU memory. Hover it for the available breakdown.

Welcome card

The empty-scene welcome card offers **Interactive tutorial**, **Import a model**, **Open project** and **NassScript demo**. Close the card with its cross when you want an unobstructed viewport. The tutorial provides guided actions; this manual provides the broader reference.

03 | Panels, themes and help



Panel visibility menu

Arrange your workspace

Drag a floating panel by its title bar. Use its minimize control where provided. The title-bar cross hides the panel; it does not delete the model or terminate the application. Restore Tools, Objects, Properties / CSG or NassScript from **Panels**.

H toggles the panel visibility arrangement. Use this when inspecting a large model or presenting a finished part. Closing a panel and clearing a model are separate actions.

Day and Night

Use the theme command at the top right, or press **N** in the main workspace. The geometry remains the same. The sketcher has its own theme button and shortcut. Translucent UI cards can show the grid behind them; grid lines are scene guides, not edges in an exported part.

Integrated help and tutorial

Open **Help** for the built-in explanation, controls, manual access and licensing information. This illustrated manual is available as HTML or PDF; the HTML edition has chapter search, Day / Night and Print controls. Start the interactive tutorial from the welcome card or its available help entry. Read each tutorial instruction, perform the action, then continue. Keep the tutorial and property panel from covering the part you need to click.

Tooltips remain useful for identifying small icons. This manual uses their names rather than relying on icon colour alone. A few older help descriptions differ from the current implementation; the behaviour explained here follows the reviewed application files and interface.

04 | Navigate and select

Camera gestures

Gesture	Result
Right mouse drag	Orbit around the camera target
Middle mouse drag	Pan the camera view
Mouse wheel	Move the camera closer or farther
Navigation cube	Switch to the indicated orientation
Frame selection	Centre and size the view around selected objects

Important: Alt-drag is reserved for moving the grid and scene in this edition. Alt + left drag moves the grid and objects in camera-relative horizontal directions and Y; Alt + right drag moves them in XZ. Use middle drag for ordinary camera panning. The grid-reset tool restores a displaced scene reference.

Object selection

Click a part once to select it. Click empty space to deselect. Click a row in Objects to select a part that is hidden behind another one. Shift + click or Ctrl + click adds or removes an object from a multiple selection.

Drag a rectangle from empty space to select objects by their projected screen bounds. Hold Shift to add the rectangle selection to an existing selection. Box selection works on projected object bounds, not on individual faces or vertices.

Dragging a selected part moves it on the XZ work plane. With several objects selected, the group moves together. Keep the pointer away from an active handle or rotation ring when you intend to translate.

Recover your view

Select the relevant object in Objects and use **Frame selection**. Use **Reset camera**, **Top view** or **Front view** if the orientation becomes confusing. The Scale selection controls change geometry; the Camera controls change wheel sensitivity. They are different tools.

05 | Object controls on double-click

Handles	Dimensions	Rotation
Resize and lift	Read or enter size	Orient the selection

One double-click, three controls

Double-click the selected part to show resize handles, editable dimensions and rotation arrows together. Double-click again to hide the controls.

Handles: drag to resize. The green Y arrow lifts the part. **Dimensions:** click a size label to enter a value and press Enter.

Rotate around the global axes

Hover over a rotation arrow to open its protractor. Drag to rotate around global X, Y or Z. The orange sector shows the angle. On release the arrows return and you can type an exact angle.

The two upper arrows sit above the rear top edges of the enclosing box. The horizontal-rotation arrow sits beside a front bottom edge. The vertical protractors lie on the rear faces and the horizontal protractor lies under the selection. These visual offsets do not move the rotation pivot.

The pivot is the centre of the world-aligned bounding box of the entire selection, including a fused part. The protractor zero aligns with a world direction in its plane.

Drag inside the ring for 22.5° steps, outside for 1° steps. Hold Shift for 45° steps. Press Esc or click elsewhere to close the protractor.

Select and edit

Click a different part to select it, or click empty space to clear the selection. When several parts are selected, double-click a member to show the controls for the group.

For a generated part, select it and choose **Edit .gen params**. For an extruded sketch, use **Edit 2D Sketch**.

06 | Position, rotation, dimensions and units

Selected part properties

Numerical editing

Select a part, enter a number in the appropriate field and press Enter or leave the field to commit it. A typed value that has not been committed may not yet affect the geometry. In a multiple selection, the numerical transform fields describe the active, last-selected object. Use group dragging, rotation or alignment when you intend to affect the group.

Field	Meaning
Pos X / Z	Horizontal object placement
Pos Y	Bottom of the world bounding box relative to the work plane
Rot X / Y / Z	Orientation in degrees
Dim X / Y / Z	Intrinsic dimensions along the part's local axes
Light	Light intensity for the selected part; does not change geometry

Dim reports the selected part's local-axis size. Rotating a part can change its world-space footprint without changing its intrinsic size. For example, a square plate rotated about Y keeps the same side lengths. Negative Pos Y lets cutters extend below the work plane.

Display units

Choose **mm**, **in** or **ft** in the top bar. Position and dimension input converts between the displayed unit and internal millimetres; changing the unit does not rescale the model. Generator and section dialogs that explicitly say **mm** still expect millimetres. Read the unit beside the field.

The main positional precision reaches 0.001 mm in this interface. This is input precision, not a guarantee of manufacturing accuracy or of a tessellated surface's deviation from an ideal curve.

07 | Snap and object sizing

Grid snap

The snap control cycles through **1, 0.5, 0.1, 0.01, 0.001 mm and OFF**. The five direct step buttons select a value immediately. The status-bar snap indication shows the current state; click it to cycle, or use its context menu to choose precision.

Use a large step for rough placement and a smaller step for finishing. Snap controls interactive movement; it is not an assembly mate or a permanent relationship between parts. The sketcher's grid and geometry snaps are configured separately.

Scale selection

The first VIEW row contains **/5, /2, 1x, x2, x5 and x10**. These controls proportionally change the selected geometry. With a group, the arrangement scales around the group centre. **1x** restores the original size reference; it is not a fit-to-screen command and should not be treated as a universal undo.

Camera sensitivity

The second VIEW row has the same numerical factors but camera icons. It changes the size of wheel zoom steps. Use /5 or /2 for close inspection, x5 or x10 for large scenes. Clicking an active non-normal setting returns to normal. This changes neither dimensions nor export scale.

Resolution controls

The Properties resolution slider selects **8, 16, 32, 64, 128 or 256** segments for spherical-aspect primitive creation. It also rebuilds a selected sphere or half-sphere. Generator-specific quality, top-bar CSG quality and top-bar STL export quality serve other stages. Increasing one setting does not restore curvature already lost in an imported mesh.

08 | Appearance and inspection

Name and appearance

Rename the selected object in Properties. Clear names make assembly rows, CSG trees and exported parts easier to identify. Use Color, Opacity and Material for appearance. The palette combines colour, shininess, specular colour and opacity, with metals, plastics, elastomers, composites, glass, wood, ceramics and stone.

Material is a visual preset. Projects and Undo/Redo retain the material identity, specular colour, shininess and supported appearance settings. Choosing Steel or Aluminium does not assign density, strength, a manufacturing material specification or a simulation model. Per-face colour imported from STEP can coexist with object-level appearance; applying a uniform material can change the appearance you imported.

Lighting

The Light slider controls scene illumination. It is not a property of the selected material and does not alter the solid. Use it to make a silhouette or recessed feature readable before changing geometry unnecessarily.

Three inspection modes

Tool	Use
Wireframe	Show the selected object's mesh structure
X-Ray	Make bodies translucent and reveal edges through them
Feature edges	Emphasize creases rather than every triangle

Wireframe reveals tessellation, which may contain many triangles on a smooth-looking surface. Feature edges provide a cleaner engineering view. X-Ray is useful for overlapping parts and internal cutters but can make depth ambiguous. Turn it off before judging the final silhouette.

Appearance settings are not a substitute for geometry checks. A transparent body can still be a Solid; a **Hole** body is a boolean role, shown in translucent slate gray with fine contours and a very subtle diagonal texture.

09 | Copy, reset and placement

Duplicate, Copy and Paste

Duplicate / Ctrl + D creates independent copies of the selection and offsets them in X so they do not coincide. **Copy / Ctrl + C** stores the selection in the application clipboard; **Paste / Ctrl + V** creates independent copies with an offset. This is object copying, not copying a screenshot or text to another program.

Copies retain shape parameters such as hollow-box outer size and wall thickness, tube dimensions, supported generator data, CSG history and appearance. Copy/Paste also retains supported face-colour palettes. Copies are independent: editing one does not parametrically update the other. After duplication, type the exact desired position instead of relying on the initial visual offset.

Pins and resets

Use **Pin position** to record the selected objects' current position reference. The pin control in an Objects row provides the corresponding per-object reference. **Reset all pinned objects** recalls their recorded positions. **Reset all to original** restores the import/creation reference for all objects, a broader action than resetting the selection. The reset arrow in an Objects row acts on that object.

Read the tooltip before choosing a reset: pinned position, original position, original size and camera reset are different references. Save a project before resetting a carefully assembled scene.

Ground and origin

Drop to ground places the selection on Y = 0 using its world bounds. **Recenter origin on real center of gravity** changes the pivot reference using the geometry's volume calculation while retaining the part's placement. It does not assign material density or calculate a multi-material physical mass model.

Use the Objects row's framing control or **Frame selection** to inspect a specific part without moving it.

10 | Align and measure

Alignment

Select at least two parts, then choose **Align** or press **L**. The markers provide minimum, centre and maximum references along world X/Y/Z. Hover to preview and click a marker to apply the alignment. Toggle Align again to leave this mode.

Alignment uses world-axis bounding boxes. On a rotated or irregular part, the enclosing box may differ from the face you intend to align. Inspect the result from another view.

Measure in successive pairs

Turn on Measure. Click a face, edge or snap point to choose A. Click a second element to choose B and display the distance or angle. The next click starts a new A, followed by another click for B. Continue in pairs without holding Shift. Press Esc to exit Measure.

Inspect faces, edges and points

Hover to inspect the highlighted element before clicking. A single element can report its radius, diameter, length or area. Two elements can report minimum distance, angle, distances between parallel planes or axes, or centre-to-centre spacing.

Keep a result

Click a result value to keep it as a dimension, saved with the project. Starting the next pair replaces the current temporary measurement and preserves kept dimensions. Exact STEP B-Rep measurements use MEDUSA when available; mesh-derived results can be marked approximate.

For quick placement checks, multiple selected objects can also show origin-to-origin distances and bounding-box gaps before an element is picked. Bounding-box gaps are distinct from minimum distances between the selected surfaces.

11 | Primitive catalogue

Create a starting shape

Click a PRIMITIVES icon to add its basic shape. Most ordinary primitives start around a 20 mm reference size and are selected on creation. Set Dim, Pos and Rot numerically for the finished dimensions. Creation places successive parts apart to reduce overlap; always confirm their positions before a boolean.

Primitive	Typical use
Cube	Blocks, plates, bosses and rectangular cutters
Sphere	Balls and spherical features; uniform X/Y/Z gives a sphere
Cylinder	Pins, bores, shafts and round cutters
Cone	Tapers; use Cylind.Gen for independently controlled end radii
Pyramid	Four-sided taper or cutter
Triangular pyramid (tetrahedron)	Isosceles triangular base and three triangular sides
Triangular roof	Roof-shaped prism
Rounded roof	Curved roof-shaped profile
Half-sphere	Dome or hemispherical feature
Tube	Hollow cylindrical part with configurable inner/outer diameter
Hollow box	Rectangular hollow section with configurable wall thickness
Bevel / wedge	Wedge-shaped solid or cutting tool

Shape and scaling

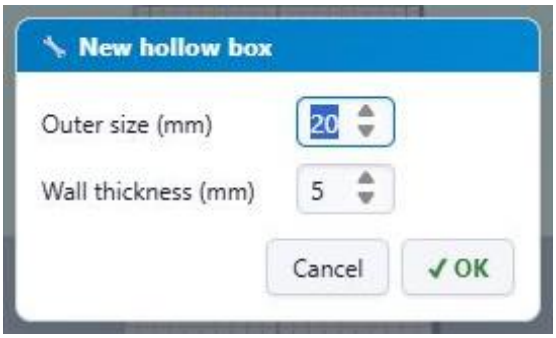
The **triangular pyramid** starts at 20 x 20 x 20 mm. **Dim X** sets its base width, **Dim Z** its base depth, and **Dim Y** its height. The apex sits vertically above the base centroid. It has four flat faces and is a closed solid for booleans and export. These default dimensions do not make a regular tetrahedron. For a regular tetrahedron with 20 mm edges, use X = 20, Y = 16.3299 and Z = 17.3205 mm.

Nonuniformly scaling a sphere creates an ellipsoid; scaling a cylinder differently in X and Z creates an elliptical section. Use a generator when a dimension has engineering meaning such as wall thickness, thread pitch or gear module. Ordinary scale fields stretch geometry; they do not independently maintain those design parameters.

Set **Solid** for retained material and **Hole** for a subtractive cutter. Newly created objects can inherit the current role. Verify the role after creation, especially when your previous operation used a Hole.

12 | Tubes and hollow boxes

Tube diameter dialog



Hollow-box wall parameters

Tube

Enter **Outer diameter** and **Inner diameter**, in millimetres. The inner diameter must be smaller than the outer diameter; both should describe a sensible positive geometry. Radial wall thickness is `(outer diameter - inner diameter) / 2`.

For a 20 mm outer diameter and a 10 mm bore, the wall is 5 mm. Create the tube, then set its height with Dim Y. Dim X and Dim Z can differ to form an elliptical section; supported mesh exports retain these independent dimensions. Use the tube edit command offered for a selected tube when you want to change bore and outer diameter as shape parameters. A general size change can scale both walls and bore together.

Hollow box

The creation dialog asks for an **Outer size** and **Wall thickness**. It initially creates a square hollow section with outer walls, inner walls and annular end faces. Its central passage is open at both ends. The wall must leave a positive inner opening: an excessive wall makes the requested geometry invalid or removes useful interior space.

Change the parameters through the selected object's edit command when wall thickness matters. Independently changing Dim X/Y/Z stretches the result and can make wall thickness different along different directions. For a tray with a bottom, add and union a base plate, or subtract a pocket from a solid block while retaining a bottom thickness.

For a print, verify wall dimensions in a section or slicer. Visual transparency alone does not prove that a part is hollow.

13 | Work with generators

Common workflow

1. Open the required GENERATORS tool.
2. Read the parameter labels and units. Use sliders for exploration and numeric fields for exact values.
3. Inspect the preview and the triangle/vertex indication where provided.
4. Choose an appropriate quality, then **Add to scene**. Cancel discards the pending generation.
5. Select the created part and use **Edit .gen params** to return to its parameters.

Generator editing differs from a general transform. Changing gear module rebuilds the gear design; changing Dim stretches the existing geometry. Choose parameter editing when preserving thread, tooth or wall geometry is important.

Quality and validity

Higher segment counts make curves smoother and create heavier geometry. They cannot correct self-intersections, a wall thicker than its cavity or an impossible edge radius. Begin with moderate quality, validate the proportions and increase only where needed.

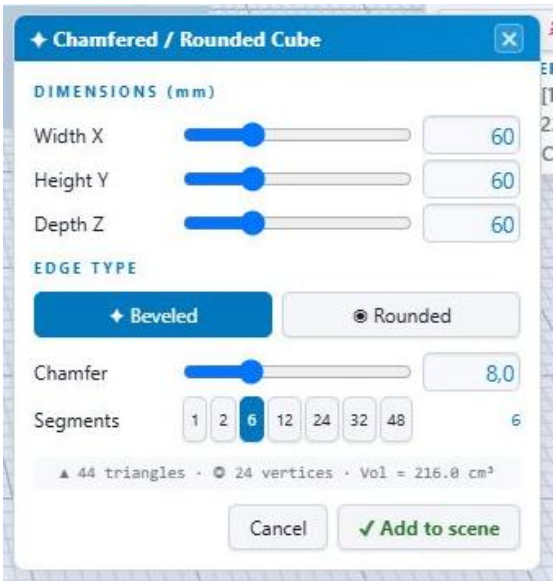
Generator parameters are retained in project data where supported. Save as JSON before performing a boolean if you want a simple independent design checkpoint. A boolean result has its own construction tree; it is not merely the original generator dialog with another name.

Role and placement

Check Solid/Hole and the created part's position after generation. Previews are modelling aids, not collision or manufacturing certification. Avoid forcing a higher quality solely because a surface is poorly lit.

The following chapters describe each generator exposed by the current GUI. They intentionally do not repeat the NassScript programming interface.

14 | Cubic.Gen



Cubic.Gen parameter panel

Dimensions and edge type

Set **Width X**, **Height Y** and **Depth Z**. Choose **Beveled** for flat chamfers or **Rounded** for curved edge transitions. The size field controls Chamfer or Radius according to the chosen mode.

The edge treatment is generated as part of the shape. Use a value compatible with the smallest dimension. An edge radius that consumes half the thickness can leave little or no flat surface; an excessive value does not express a sensible block.

Segments

The segment choices include **1, 2, 6, 12, 24, 32 and 48**. More segments improve a rounded transition's approximation. A planar bevel does not need many subdivisions to look flat. Read the preview's geometry count before increasing the setting.

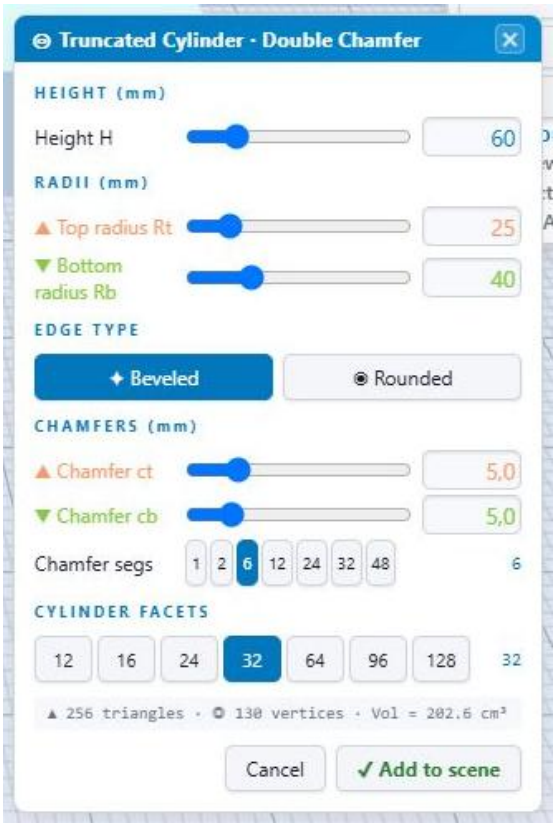
Example

For a rounded equipment block, enter X = 60 mm, Y = 20 mm, Z = 40 mm, choose Rounded and start with R = 2 mm. Inspect the narrowest faces. Add it to the scene and place it with Pos. Reopen **Edit .gen params** to change the dimensions while keeping the radius explicit.

When to use Fillet / Chamfer instead

Cubic.Gen treats the generated block's edge scheme. Fillet / Chamfer can select individual edges, combine different finishes and work on an existing boolean result. Choose it when you need only the top perimeter or different treatment on an inner pocket.

15 | Cylind.Gen



Cylind.Gen controls

Main dimensions

Height H, **Top radius Rt** and **Bottom radius Rb** define a cylinder or truncated cone. Radii are half diameters: Rt = Rb = 10 mm gives a 20 mm diameter body before edge treatment.

Choose Beveled or Rounded for the circular end transitions. Separate **top** and **bottom** treatment values allow different ends. Keep those values compatible with the height and end radii; two large treatments can collide or eliminate the straight body.

Two quality settings

- **Chamfer / edge segments:** subdivisions in the edge transition, especially useful for rounded ends.
- **Facets:** angular subdivisions around the body, from the available low-poly choices up to 128.

A low facet count deliberately produces a polygonal body. Increasing transition segments without increasing body facets does not make its circumference circular.

Example

For a tapered spacer, use H = 25 mm, Rt = 8 mm, Rb = 12 mm and a modest end chamfer. Add a concentric cylinder as a Hole and subtract it for a bore, or use Tube for a straight hollow cylinder.

General Dim scaling can change the taper or circularity. Reopen the generator when you need to preserve the relationship between height, radii and edge treatment. Save the resulting part as a project before downstream finishing.

16 | Tore.Gen

Torus ring and tube parameters

Ring radius and tube radius

Ring R is the radius from the torus centre to the tube's centreline. **Tube r** is the circular cross-section radius. For an ordinary ring, keep R greater than r.

The outside diameter is `2 x (R + r)`, and the clear inside diameter is `2 x (R - r)`. For R = 34 mm and r = 5 mm, the outside diameter is 78 mm and the inside opening is 58 mm.

Resolution

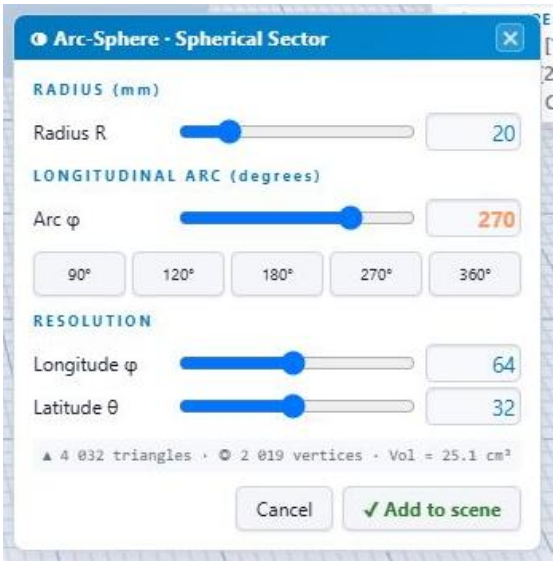
Ring N divides the large circular path. **Tube M** divides the small circular section. These multiply together: raising both can rapidly increase the mesh size. A large ring needs sufficient N to avoid a polygonal silhouette; a thick tube needs sufficient M to render its section smoothly.

Uses

Use a torus for a ring, rounded bead, sealing-ring visualisation or cutting shape. Its geometry does not define an elastomer material specification or guarantee that a seal will fit a groove.

Add the result, position it and rotate it if its default plane is not the required plane. Reopen its generator to change radii. Nonuniform scaling can produce an oval ring or an elliptical tube section, which no longer has the original circular design dimensions.

17 | ArcSphere and RevSolid



ArcSphere radius, arc and sampling

RevSolid arc controls

ArcSphere.Gen

Set the sphere **Radius R**, the longitudinal **Arc** in degrees and the longitude/latitude subdivisions. The arc ranges from 1 to 360 degrees, with shortcut presets including 90, 120, 180, 270 and 360. A partial arc is a closed spherical sector with end caps, not merely a visually clipped sphere.

Increase longitudinal and latitudinal sampling together when both silhouette directions require it. A tiny arc with a very large segment count can be unnecessarily heavy. Reopen the generator to retain the sector angle while changing its radius.

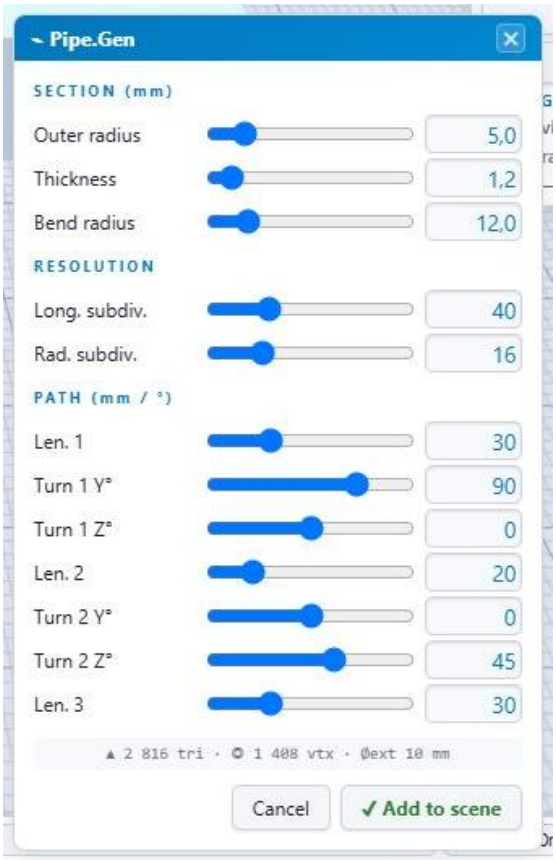
RevSolid.Gen

The current dialog exposes **Radius R**, **Height H**, **Arc** and **Radial facets**. It generates a closed cylindrical sector through the selected angle, up to a complete body at 360 degrees. End caps close a partial sweep.

This GUI does not provide a custom drawn profile editor for revolution. Use Sketch.Gen for arbitrary planar contours and extrusion; do not expect a sketch profile to be automatically revolved by this dialog. Radial facets control the angular approximation. R is a radius, not an outside diameter.

Use a sector as a retained solid or a Hole cutter. Check its placement and orientation before combining it with other parts.

18 | Pipe.Gen



Pipe.Gen path and wall parameters

Section and bends

Outer radius and **Thickness** define the tube section. The inner radius is outer radius minus thickness. Keep it positive for a hollow pipe. **Bend radius** controls the curved transitions between path segments; a tight bend relative to the section can create problematic geometry.

Three-segment path

The GUI describes three lengths separated by two turns:

- **Len 1**, **Len 2**, **Len 3:** straight portions of the path.
- **Turn 1 Y / Z** and **Turn 2 Y / Z:** angular changes controlling the two bends in space.

Change one turn at a time while watching the preview. Several strong turns can bring different portions of the tube into contact. The preview does not enforce a pipe-routing clearance specification.

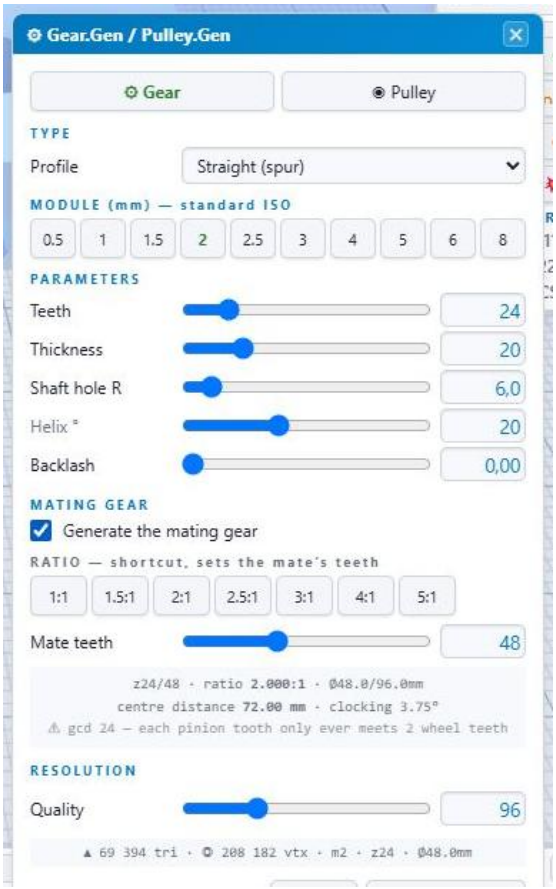
Subdivisions

Longitudinal subdivisions sample the path and bends. **Radial subdivisions** sample the circular section. The implementation maintains a continuous frame along the path to avoid arbitrary section twisting. These controls improve tessellation, not wall-thickness tolerances in a manufactured bend.

Workflow

First set a plausible wall and path, then adjust bend angles, then increase quality. Add the result and position it with the main properties. Use Edit .gen params for a new wall thickness or bend radius; ordinary nonuniform scaling can distort the section and wall.

19 | Gear.Gen and mating gears



Gear parameters with mating-gear options

Tooth geometry

Choose **Straight (spur)**, **Helical** or **Herringbone**. Select module in millimetres, teeth count, thickness, shaft-hole radius and helix angle when relevant. Shaft hole R is a radius: 6 mm means a 12 mm diameter bore.

For a straight gear, pitch diameter is `module x teeth`. A module-2 gear with 24 teeth has a 48 mm pitch diameter. Pitch diameter is not its outside diameter. The generated involute profile is intended for the module-based gear system; this dialog is not a catalogue of every industrial tooth standard.

Backlash

Backlash is tooth-space clearance at the pitch circle. Zero is the theoretical CAD configuration. The GUI suggests approximately 0.05 to 0.20 mm for a practical pair, but the right allowance depends on process, size and material. Inspect and test a physical pair rather than treating a default as a fit certificate.

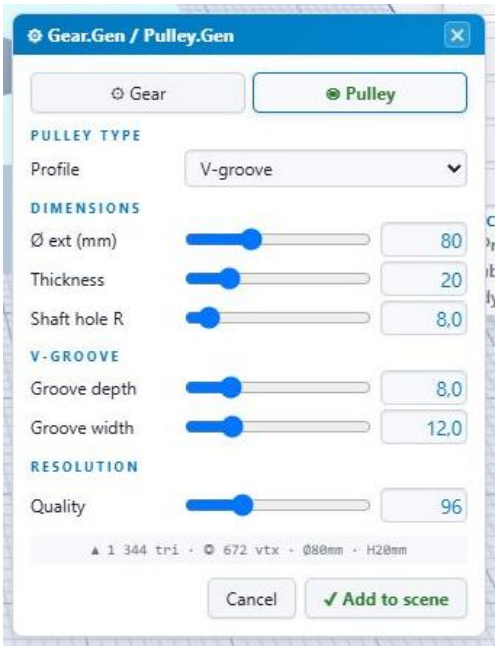
Generate the mating gear

Check **Generate the mating gear**. Choose a ratio preset or set the mate teeth count. The application places the mate at the corresponding centre distance and clocking. For straight gears with module 2, z1 = 24 and z2 = 48 give pitch diameters 48/96 mm and centre distance 72 mm.

Keep mating module and profile compatible. A generated pair is geometry and placement, not a kinematic assembly with a live driving motor or permanent mate constraint. To animate it, use the separately documented NassScript workflow.

Quality controls radial/involute sampling. High teeth counts and helical sampling can produce large meshes; review the count before adding.

20 | Pulley.Gen



V-groove pulley settings

Timing mode's actual exposed controls

Enter the pulley mode

Open Gear.Gen and switch to the **Pulley** tab. Choose **V-groove** or **Timing belt**. Both modes expose outside diameter, thickness and shaft-hole radius.

V-groove

Set the groove's depth and width. Keep enough material between the groove root and the bore. A groove deeper than the remaining radial wall is not a usable design. The thickness must accommodate the requested groove and its side faces.

Timing belt

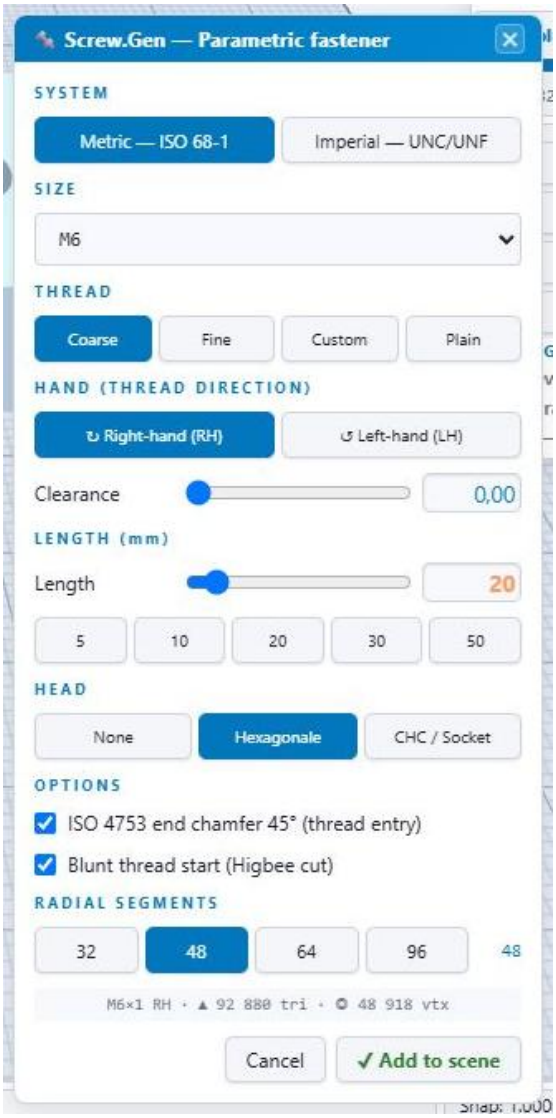
The current timing mode produces its built-in toothed outline from the exposed dimensions. It does not expose a separate tooth-count, pitch or named belt-profile selector. Do not infer GT2, HTD or another commercial belt standard merely from the Timing belt label. Verify profile compatibility before manufacturing a mating transmission.

Finish the part

Choose quality, inspect the preview and add it to the scene. The shaft field is R, not diameter. A 5 mm shaft bore needs R = 2.5 mm. Reopen the generator to change the groove or bore; general scale changes stretch the tooth or groove profile as well as the body.

There is no belt-tension calculation, belt-length solver or belt animation in this dialog. A belt and assembly animation can be modelled separately.

21 | Screw.Gen



Screw.Gen thread, head and end settings

Match the thread specification

Choose **Metric ISO 68-1** or the imperial **UNC / UNF** system, then a size. Metric choices extend from M2 to M24 in the offered series. Choose Coarse, Fine, Custom or Plain. Custom exposes pitch; Plain removes the threaded form. Imperial pitch follows the selected thread series.

Set thread **right-hand / left-hand** and length. Use the matching system, size, pitch and hand for the nut. A nominal diameter alone does not ensure compatibility.

Head and ends

Head options include **None**, **Hexagonal** and **socket-head CHC**. Select the end-chamfer option for the ISO 4753 style termination. The **Higbee / blunt-start** option modifies the start of the thread. These are generated shape choices; they do not certify a strength class or an industrial fastener specification.

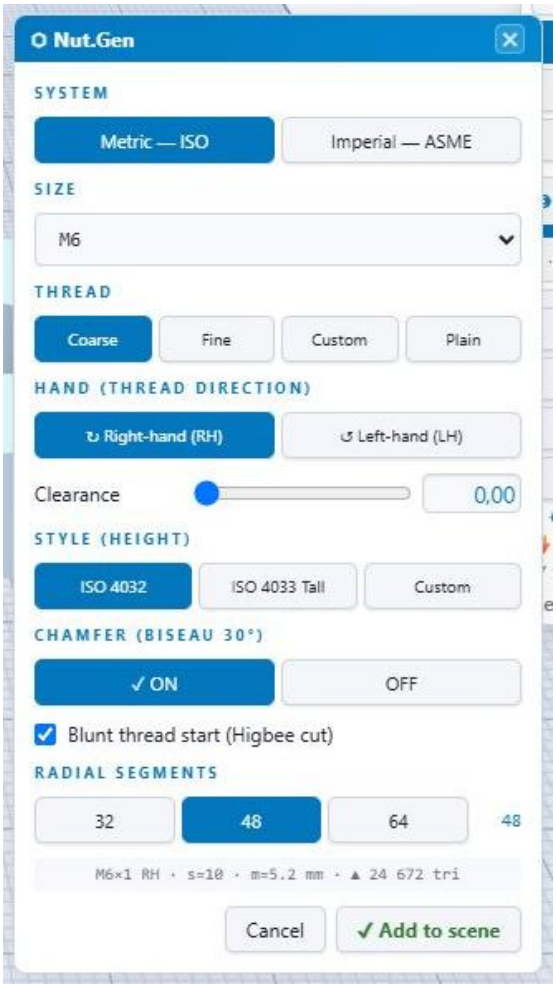
Clearance

Screw clearance is **radial** and reduces the external thread. Zero gives the theoretical CAD dimensions. The UI offers typical FDM starting allowances, but fit depends on printer calibration, orientation, material and size. Increasing radial clearance by 0.10 mm reduces a diameter by approximately 0.20 mm.

Resolution and editing

Radial choices include **32, 48, 64 and 96**. Long fine-pitch screws can be heavy because the thread has many turns. Start with moderate quality. Add the screw, then use Edit .gen params to change pitch or length. Stretching Dim Y stretches pitch as well as length, so use the generator for thread-correct changes.

22 | Nut.Gen and thread fit



Nut.Gen parameters

Specification and body

Choose Metric ISO or the offered imperial system, a size, coarse/fine/custom pitch and thread hand. Choose **ISO 4032**, **ISO 4033 Tall** or **Custom** body height. Use the chamfer switch for the 30-degree body treatment and the blunt-start option when wanted.

The size determines the nominal thread; body style determines the exterior and height. Do not change the thread diameter by scaling the entire nut if you need to retain a standard across-flats dimension.

Internal clearance

Nut clearance is radial and **enlarges** the internal thread. A screw's clearance reduces its external thread. If you add clearance to both, their contributions combine. Avoid applying the same desired final gap independently to each side without accounting for that sum.

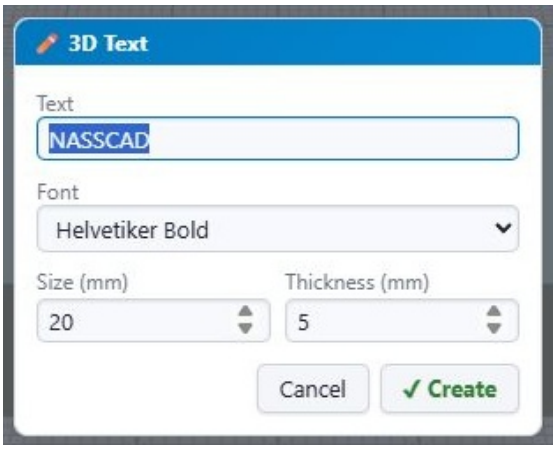
For a trial M6 pair, start with matching metric size, coarse pitch and right-hand threads. Choose an allowance based on your actual manufacturing process. Print or machine a short test pair before committing to a complex assembly. The visual mesh and nominal thread standard cannot predict an uncalibrated printer's fit.

Quality and checks

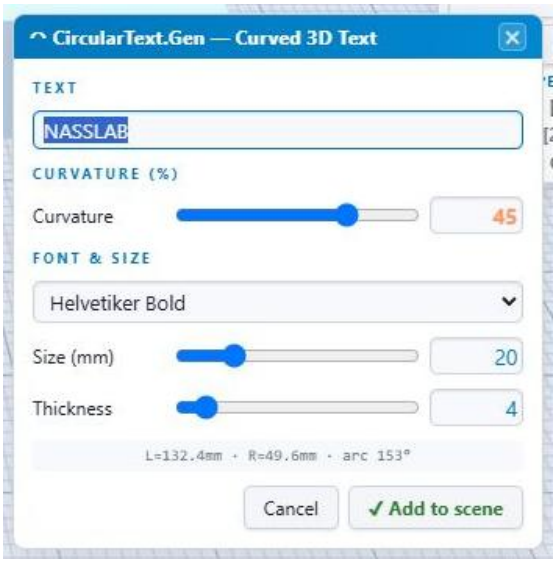
Choose 32, 48, 64 or 96 radial subdivisions. Inspect the bore with X-Ray or a section, then inspect the exported mesh in the receiving program. Save both parts as a JSON project so their exact generator settings remain accessible.

NASSCAD generates the geometry; it does not perform fastener strength, fatigue or torque calculations.

23 | Straight and curved 3D text



Straight text creation



Curved text settings

3D Text

Enter the text, select a supplied font and set Size and Thickness in millimetres. Choose **Create**. The current GUI provides these controls; it does not expose a separate bevel setting. Supplied families include Helvetiker, Optimer and Gentilis in their available regular/bold variants.

Font availability and character coverage determine which glyphs can be generated. If a character is missing, test a supported Latin character or another supplied font before assuming the solid failed.

CircularText.Gen

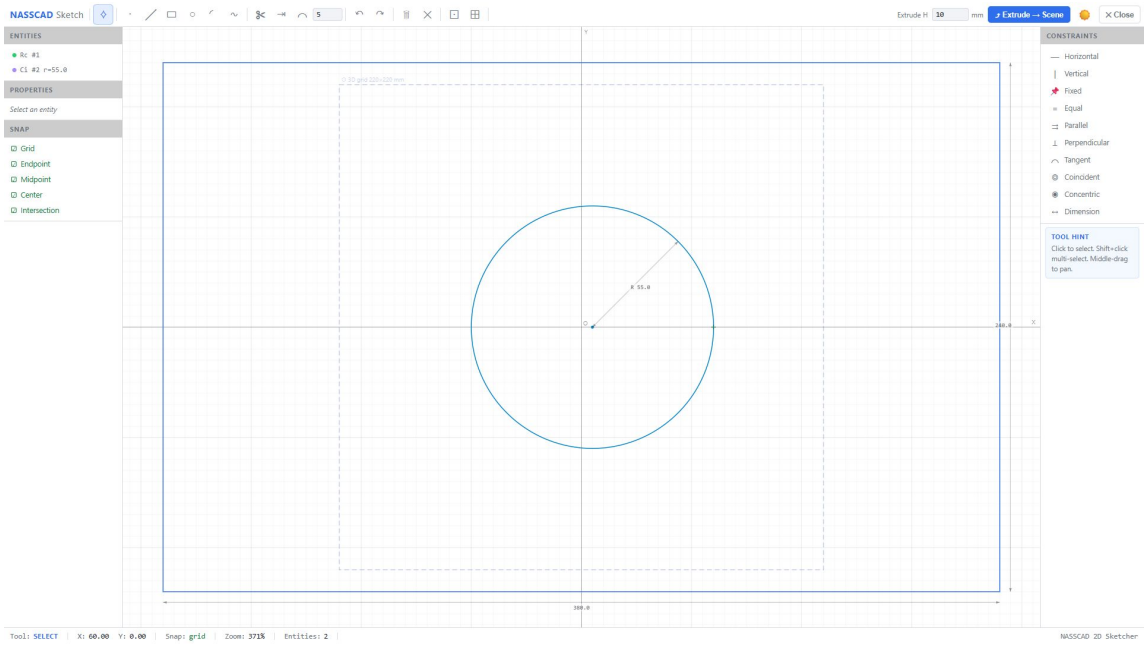
Set text, font, size, thickness and **Curvature**. Curvature changes the arch/smile arrangement of the letters. Use zero for a straight arrangement and inspect the preview as the curvature increases. This is a curved letter arrangement, not automatic wrapping onto an arbitrary imported surface.

Emboss or engrave

Place the text so it overlaps the base by a deliberate amount. Keep it Solid and Union for raised lettering. Set it Hole and combine with the base for engraved lettering. A text body merely touching a surface can create fragile or ambiguous geometry; overlap it sufficiently for the intended operation.

Verify thin strokes and internal letter holes at the final scale. Increasing tessellation cannot thicken an unprintably narrow letter stroke. Save a checkpoint before merging the lettering into its support.

24 | Sketch.Gen workspace



Sketch.Gen with a rectangle and an inner circular contour

Enter and navigate

Open the 2D Sketcher tool. It provides a drawing canvas, entity list and properties on the left, drawing/edit tools along the top, constraint actions on the right and a status bar. The main 3D workspace stays behind it.

Use the mouse wheel to zoom and middle drag to pan. **Fit / F** frames the drawing. Select an entity on the canvas or in the entity list. Shift + click selects several entities. Drag selection grips to move points or edit a shape, unless the entity is Fixed.

Snaps

Toggle **Grid, Endpoint, Midpoint, Center and Intersection** according to the task. Endpoint snap is particularly useful when closing line and arc chains. A visually near endpoint can still leave a topological gap, so inspect the snap indication.

Properties and history

The left properties describe the selected entity. Use them for exact coordinates, radius or other displayed shape values. The sketcher has its own Undo/Redo operations and shortcuts while it is open. **Clear** removes the drawing; it is not the same as returning to the 3D scene.

The sketcher's theme and grid are separate controls. **Close** returns to 3D without being an extrusion command. Use **Extrude to scene** when you want to create solid geometry from the drawing.

25 | Sketch drawing tools and numerical entry

Tool	Mouse sequence
Point	Click to place a point
Line	Click start, click end; continue the chain
Rectangle	Click two opposite corners
Circle	Click centre, then click a radius point
Arc	Click start, end, then a point on the desired arc
Bezier	Click start, end, then the two control points

The current circle, arc and Bezier tools use clicks, not the drag sequences described in some older help text. An arc requires three non-collinear points. The third point selects the curvature and which sweep passes through it. Bezier controls determine the curve rather than being extra points on the curve.

Typed dimensions during drawing

After the initial point of a supported tool, type a number and press Enter:

- **Circle:** a radius, for example `5` for a 10 mm diameter hole.
- **Rectangle:** width,height, for example `40,30`; a single number produces equal dimensions.
- **Line:** length,angle in degrees, for example `25,90`. A length alone uses the current pointer direction.

Use a decimal point inside numbers; the comma separates paired values. Rectangle numerical entry extends in the positive sketch directions from its first corner. Numeric completion is implemented for these three tools; do not assume that an arc or Bezier accepts the same command format.

Press Escape to cancel the current drawing sequence. Finish a closed chain by snapping its end to the starting point. Switch back to Select before editing entities or their properties.

26 | Sketch editing and constraint actions

Trim, Extend and Fillet

Trim removes the clicked portion between intersections. A rectangle can be broken into separate lines during trimming. Recheck closure afterward. **Extend** lengthens the selected end of a line or arc to a relevant intersection; it is not a general Bezier extension tool.

For a 2D **Fillet**, set R, choose the tool and pick two suitable lines. A valid corner and enough line length are needed. Parallel/collinear lines, fixed geometry or a radius too large for the corner can prevent completion. This edits the sketch; Fillet / Chamfer edits edges of a 3D body.

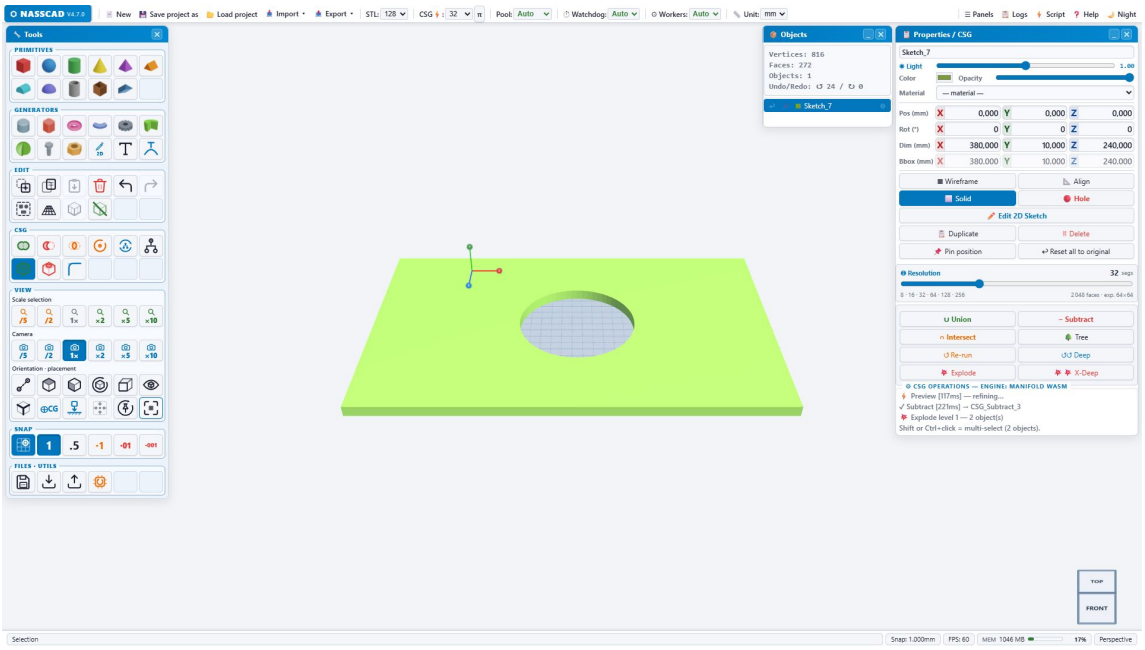
What the constraint buttons currently do

Action	Current behaviour
Horizontal / Vertical	Adjust a selected line's endpoints to the orientation
Fixed	Mark an entity fixed and prevent interactive movement
Equal	Match supported line lengths or circle/arc radii to the first reference
Parallel / Perpendicular	Orient selected lines relative to the first reference
Tangent	Position a supported line tangentially to a circle/arc
Coincident	Snap compatible selected geometry together
Concentric / Dimension	Record a constraint tag in this edition; no geometric solving action

Most of these are applied adjustments, not a persistent network of solved parametric relationships. Editing one entity later does not automatically propagate every tagged relationship to other geometry.

Use the entity property fields for controlling numerical dimensions. Do not rely on Concentric or Dimension to solve a sketch in this build. Select the intended reference first when an action uses multiple entities, then inspect the resulting geometry before extrusion.

27 | Extrude a sketch



The closed profile becomes a 3D plate with a hole

Closed profiles become solids

Draw a closed outer contour. A closed circle, rectangle or joined line/arc/Bezier chain can form a boundary. Nested closed contours create inner openings; separate closed outer contours can create several objects. An isolated point or an open chain is not an area to extrude.

Set **Extrude H** in millimetres, then use **Extrude to scene**. The 2D contour maps to the horizontal XZ plane and the extrusion extends in Y. After creation, use main Pos and Rot to place the part. Confirm its Solid/Hole role because the creation mode can be inherited.

Example: 40 x 30 mm mounting plate

1. Start Rectangle, click the first corner and enter `40,30`.
2. Start Circle, place its centre inside the rectangle and enter radius `5`.
3. Use the entity properties to set the circle's exact centre if needed.
4. Set H = 6 mm and extrude. Inspect the through-hole from Top and an oblique view.

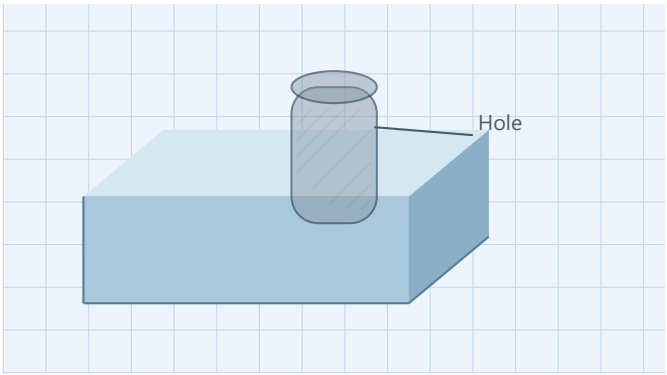
Re-editing

Select the extruded sketch object and choose **Edit 2D Sketch**. Update the contour and extrude through the editing workflow. Keep a saved JSON checkpoint before a substantial contour change.

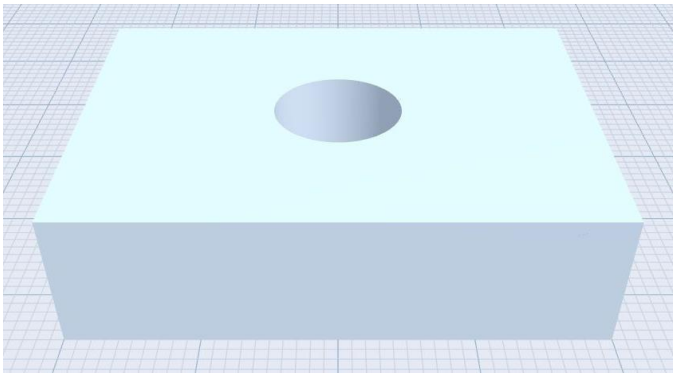
If extrusion fails

Look for unjoined ends, overlapping duplicate segments, self-intersections, a hole outside its outer boundary, or touching nested contours. Trim can open a formerly closed loop. Use endpoint snap and numerical properties to repair the profile. A dense curve sample cannot repair an open contour.

28 | Boolean CSG operations



Solid target with a translucent slate-gray Hole cutter



Finished through-hole

Select the operands

For Union or Intersect, select the intended objects with Shift/Ctrl or the Objects list; avoid including nearby spare parts. Retained bodies are **Solid**. Objects marked **Hole** are subtractive cutters shown in translucent slate gray with fine contours.

Command	Result
Union	Combine selected Solid bodies
Subtract	Choose target Solid; then click the cutter
Intersect	Retain the selected Solid bodies' shared volume

Subtract: select the Solid to keep, click Subtract, then hover over the cutting object in the scene or Objects list. The hover shows a temporary slate-gray Hole preview. Click that object to apply the subtraction immediately; Esc cancels before the click. No dialog is required.

Mixed Solid/Hole selection: Union and Intersect with both roles evaluate Solid minus Hole. To perform an ordinary intersection, make every selected operand Solid first.

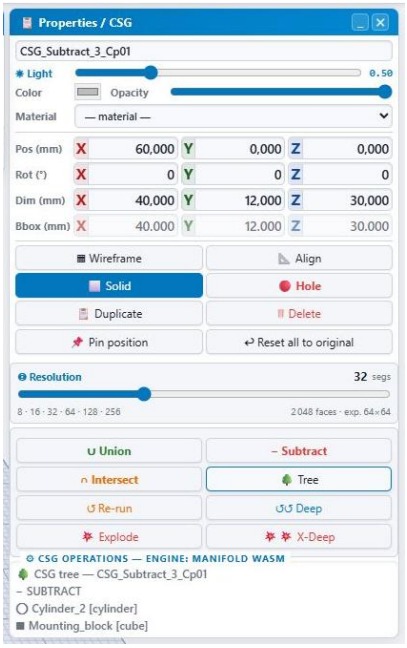
Browser and native engines

The Electron edition uses its bundled MEDUSA for native multicore booleans. In the browser edition, Manifold WASM runs booleans when no compatible MEDUSA companion is available; its first operation may load the engine. The CSG panel identifies the route used.

Wait until refinement finishes. A coarse progressive preview is not the final result. Imported non-manifold geometry is warned about but can still be attempted; success is not guaranteed. Repair open or self-intersecting geometry upstream when required.

Union can retain disconnected components as one scene object; it does not necessarily bridge them. Intersect can be empty when there is no shared volume. For a through-cut, extend the cutter beyond the target faces so its overlap is unambiguous.

29 | CSG trees, replay and ungrouping



CSG information and construction tree area

Construction tree

Select a CSG result and use **Tree**. Its stored operation and operands are shown in the CSG information area. Nested operations retain a construction history. This is specific to CSG and differs from the application's chronological Undo journal.

Replay commands

- **Re-run:** replay one level of the selected result's construction.
- **Deep Re-run:** evaluate the full stored construction from its leaves.

Use these for rebuilding a construction, including when quality or source geometry warrants a new calculation. A replay is not a manual promise that every imported tessellated source regains exact analytic surfaces. Wait for the engine to finish and inspect the result.

Ungroup commands

- **Explode / Ungroup:** restore the immediate operands without merging them again.
- **X-Deep / Recursive ungroup:** restore the construction recursively to its leaves.

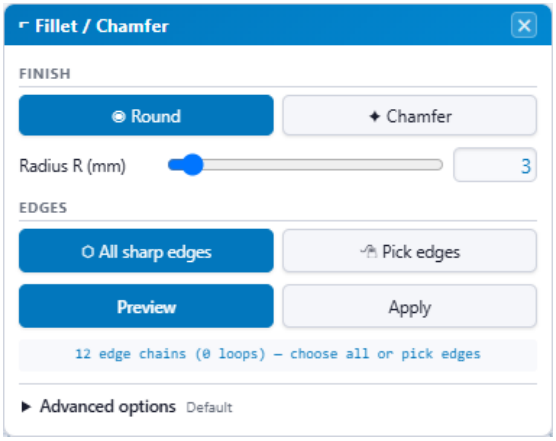
The original operands' placement is carried through the result's transforms. Ungrouping does not automatically spread the parts apart for a presentation view. Translate them yourself if you want an exploded assembly illustration.

Edit an intermediate design

Save a JSON checkpoint. Ungroup the appropriate level, modify the restored operand, select the intended solids/cutters and calculate the desired operation again. Check each operand's role rather than assuming that every restored child is a retained solid.

Undo can restore a construction stage while its journal remains available. Keep a saved file when you need a durable earlier version across New, Load or browser storage changes.

30 | Rounded edges



Current Fillet / Chamfer panel - Round mode

Open and choose edges

Select a solid and open **Fillet / Chamfer**. Choose **Round** and set the radius. **All sharp edges** selects the broad target; **Pick edges** lets you choose a subset.

Click an edge to pick it; click again to remove it. Drag across edges to paint a selection. The same **Preview** and **Apply** buttons act on the chosen target.

Advanced options

Open **Advanced options** for variable radius, corners, selection shortcuts, groups, presets and segments. A variable fillet changes from R1 to R2; the clicked end gets R1. Swap reverses that direction.

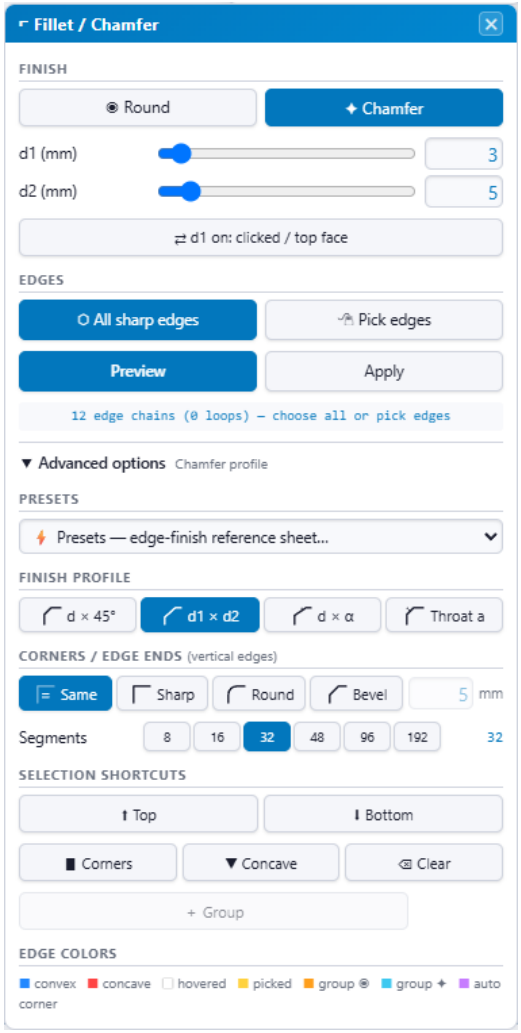
Top, Bottom, Corners and Concave add matching edge sets. Corner modes Same, Sharp, Round and Bevel control vertical edge ends. Sharp-edge detection concerns geometric creases, not every display triangle.

Preview and apply

Preview opens a separate 3D view without replacing the source. Choose **Back** to adjust or **Apply** to commit. In Pick edges mode, unpicked edges stay sharp.

Segments control display tessellation, not the largest feasible radius. If a finish is reduced or fails, read the status, try a smaller size or select fewer edges. Curved display meshes do not automatically recover original analytic surfaces.

31 | Chamfers, groups and presets



Current Fillet / Chamfer panel - Chamfer mode

Chamfer types

Choose **Chamfer** and set its size. Open **Advanced options** for the profiles below.

Type	Parameters
d x 45 degrees	Equal-distance bevel
d1 x d2	Two distances on neighbouring faces
d x angle	Distance plus angle to reference face
Throat a	Constant throat; optional penetration

For asymmetric finishes, the clicked face defines the reference. Top or Bottom supplies a horizontal reference. Use Swap to apply the distances or angle to the other face.

Several finishes in one run

Pick the first edges and set their finish. Use **+ Group** to freeze them, then change the finish and pick more. With Pick edges active, the single **Preview** or **Apply** action processes the stored groups and current picks together. Clear removes both.

Presets and feedback

Presets under Advanced options offer starting recipes for top edges, corners, variable fillets, inner chamfers and multiple radii. Inspect the selected edges and status before applying. The colour legend explains hovered, picked and grouped edges.

Save before an elaborate finish. Close the panel with its title-bar button; use Undo after an unwanted commit. Tight inner corners or open imported meshes may need geometry repair.

32 | Import meshes

Import formats

Import workflow

Open Import, choose a format or All, and choose a local file. Import adds model geometry to the scene. If you want a clean workspace, save your current scene and use New first. After import, select the object or file group, frame it, check orientation and check a known dimension.

Format	Practical characteristics
STL	Binary/ASCII triangle geometry; no reliable unit declaration or standard colours
OBJ	Wavefront geometry; do not assume that a separate MTL/texture package is reproduced
3MF	Manufacturing container, useful for slicer-oriented models
GLB / glTF	glTF 2.0 geometry, including supported Draco-compressed input
PLY	Mesh and scan-oriented vertex/face geometry

Prefer a self-contained GLB when a glTF model otherwise needs companion resources. Keep such resources together and verify the imported appearance. An unsupported texture or external reference is not necessarily an absent geometric part.

Units and mesh quality

STL coordinates have no inherent engineering unit. Changing Unit to inches changes display, not the imported object's physical scale. If a known 25.4 mm feature appears as 1 mm, scale the geometry deliberately and recheck it.

Mesh imports can contain open edges, non-manifold topology or self-intersections. View the part with Feature edges or Wireframe, inspect the log and test the required downstream operation. Importing a mesh does not convert every triangle into an original parametric feature or restore cylinders, thread specifications and sketch history.

33 | STEP files and assemblies

Formats and representations

The import accepts common STEP AP203, AP214 and AP242 files, including the offered `.step`, `.stp`, `.p21`, compressed `.stpz` and supported XML/container variants. Actual content and implementation support matter as well as the extension.

STEP is used for CAD solids and assemblies. The browser displays tessellated geometry produced from the imported representation. A smooth-looking screen surface and the underlying exact CAD representation are different things.

Assembly workflow

1. Import the file and wait for body processing to finish.
2. Expand its file group in Objects. Select a body by its row when the exterior hides it.
3. Frame the body or several selected bodies.
4. Inspect names, colours, dimensions and placement before changing them.
5. Save a JSON scene checkpoint and keep the original STEP source alongside it.

MEDUSA and fallback

The Electron edition starts its bundled MEDUSA automatically for native STEP processing, colour data and available native representation references. The browser edition can use a compatible separately started MEDUSA companion. Without it, the in-browser import path remains available, with limits that can differ in speed, file size and colour/assembly interpretation.

There is no universal maximum STEP size that guarantees success: body count, surface complexity, tessellation and browser memory all contribute. Cache hits can make repeated imports faster. The cache is a performance aid, not a durable archive.

Viewer scope and source data

Imported STEP is supported primarily for **viewing and inspection**. Import is not a promise that every body is a closed editable solid or that the source can be repaired. Automatic processing cannot guarantee watertight geometry.

Keep the original STEP file when an exact downstream native export matters. A JSON scene stores the working model but does not guarantee preservation of every original CAD/PMI entity or a live native-engine reference after a restart. Nonuniform or mirrored transformations and missing native references can force tessellated export fallback.

34 | STEP PMI and engineering annotations

Find the PMI panel

When supported PMI is discovered, the application shows a **PMI** indication/count. Use that control to open its panel. Importing PMI does not automatically mean the panel is already open. Select relevant entries to inspect available annotations and their association with the displayed parts.

PMI can contain dimensions, datums, tolerances and presentation geometry. Semantic data and purely graphical presentation are not interchangeable. Some files provide a drawable annotation but lack a complete semantic value the importer can expose.

Read annotations in context

Frame the associated part, orient the view and inspect the overlay with the model. Part transforms are accounted for by the available presentation workflow. Distinguish an imported design annotation from the main workspace's temporary dimension labels or pair-distance overlay.

Current limits

Not every authoring system's PMI convention is decoded. Missing values, unsupported entities or annotations that have only presentation data can limit the result. The current source skips its PMI scan above a 64 MB file threshold; an absent PMI button on such a file does not prove the original contains no annotations.

This interface is a viewer for supported imported PMI. It is not a full PMI authoring or certification system, and a JSON/project round trip is not a guarantee that every annotation survives a subsequent CAD export.

For manufacturing acceptance, compare the displayed information with the original controlled drawing or authoritative CAD source. The temporary screen measurement tools do not establish tolerances.

35 | IFC and BIM geometry

Import

Choose IFC from Import. The application uses **web-ifc** for the offered IFC2x3, IFC4 and IFC4x3 geometry workflows. Imported elements become named scene objects under their file grouping. Geometry placement, colours and opacity are interpreted for display; model lengths are converted to the internal millimetre scale.

Use Objects to select a specific element. For a large building, frame a small selection instead of continually increasing camera sensitivity. Check a known dimension and the model's placement before combining it with mechanical parts.

What is retained

Imported IFC is supported primarily for **viewing and inspection** in a geometry-oriented working scene. It is not a complete BIM authoring or repair workflow. Do not assume a complete round trip of IFC property sets, type relationships, material associations, spaces, zones, systems or the original spatial hierarchy. A renamed object in NASSCAD is not necessarily an edited authoritative BIM element with all relationships retained.

Export

IFC export writes IFC4 with a Project > Site > Building > Storey organisation and scene objects as building elements. It uses millimetres. Eligible primitives can use analytic representations; other generated, boolean or imported mesh geometry uses tessellation. Colours can be represented, including available face colours.

The menu's Tessellated wording does not mean every eligible primitive is always triangulated, but it also does not promise that an arbitrary mesh becomes an analytic building component.

Verification

Open the exported IFC in the intended BIM viewer. Check scale, orientation, element count and the attributes you actually need. Keep the original IFC if its semantic building information is important. MEDUSA is not required for this IFC workflow.

36 | Save projects and manage history

Save project as

Use **Save project as** in the top bar or the save icon to write a JSON project. It is the editable NASSCAD scene format, retaining supported geometry, object and generator parameters, CSG construction history, material appearance and face colours. JSON saves the CAD scene, not a running NassScript animation or the complete original STEP/IFC source package.

In Electron, **Save As** opens the native Windows destination dialog. Choose a folder and filename; cancelling keeps the current scene open. Browser support determines whether you get a file picker or a download.

Use meaningful names such as `bracket-01.json`, `bracket-02-holes.json` and `bracket-03-finished.json`. Verify the destination and the saved file before depending on it as a checkpoint.

Load project, New and closing

Load project replaces the working scene; it is separate from importing a mesh into the scene. **New** clears the project. With unsaved changes, choose **Save As/Save**, **Discard** or **Cancel**. Cancel keeps the scene. Successful replacement clears the current Undo journal. The desktop app also checks for unsaved work when you close it; browsers can display their own leave-page warning.

When a browser starts a project **download**, keep the current project open until you have confirmed that the file is saved. Starting a download cannot confirm that the browser wrote the file successfully. After verifying it, choose Discard if you still want to continue to New or Load; that choice explicitly permits replacement of the current scene.

Undo and Redo

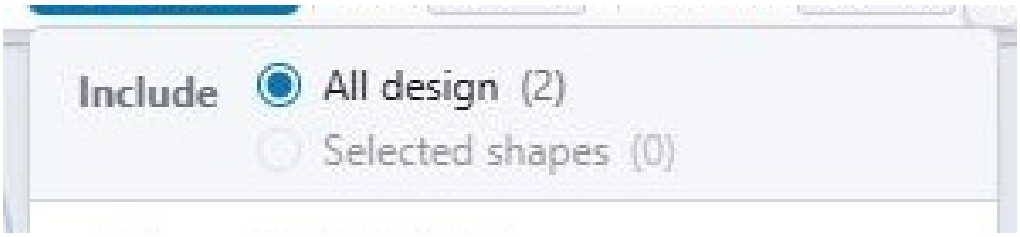
Use **Ctrl + Z / Ctrl + Y** or the EDIT buttons. The journal retains up to **200 operations**. A new edit after Undo clears the old redo continuation. The Objects counters show the available history. Sketch editing has its own history while the sketcher is active; camera navigation and visual settings do not always count as model edits.

Recovery and browser storage

The desktop edition stores an automatic recovery snapshot while the project has unsaved changes and can offer to recover it on a later launch. It is a recovery aid, not a replacement for deliberate JSON checkpoints.

IndexedDB supports settings, journal data, logs and import caching. Quotas, private browsing and clearing site data can remove or limit stored data. Do not rely on the browser cache, history or an old mention of a separate project-library button as your project archive.

37 | Export scope and format choice



Check the Include scope before choosing a format

Check Include every time

Choose **All design** or **Selected shapes** at the top of Export. The menu defaults to Selected shapes when objects are selected and to All design otherwise. The object counts show the scope. This applies to project JSON as well as geometry formats.

Save project as is the straightforward full-scene checkpoint. **Export > JSON** can save only the selected subset when that scope is active. Do not accidentally archive one selected part as if it were the complete assembly.

Output	Choose it for
STL Binary	Compact triangle geometry for slicers
STL ASCII	Human-readable STL, usually substantially larger
OBJ	General mesh interchange
3MF	Manufacturing/slicer interchange with supported object colours
GLB	Compact glTF 2.0 scene/model geometry
GLB Draco	Compressed GLB where the receiver supports Draco
PLY Binary	Mesh/scan interchange
STEP	CAD interchange with the available native/browser representations
IFC	BIM-oriented geometry exchange
Section SVG / DXF	Horizontal 2D cut contours
JSON	Editable NASSCAD scene or selected subset

Keep a JSON source and export a separate fabrication/delivery file. Mesh formats do not retain the original generator parameters and CSG edit workflow. Verify colour and material expectations in the receiving program rather than assuming all formats preserve the same appearance.

38 | Mesh export quality and fabrication

Quality at export

Performances > STL offers 128, 256 or 512 subdivisions for supported curved primitive reconstruction during high-definition export. The export path can rebuild eligible primitives; existing imported or completed CSG meshes retain their available geometry unless rebuilt through a supported workflow.

Performances > CSG controls boolean input sampling, not the same stage as final STL sampling. Generator quality is another input. A high export value cannot restore an analytic surface from a coarse fixed triangle mesh.

Slicer workflow

1. Save the editable JSON project.
2. Set the intended export scope.
3. Export STL Binary or 3MF.
4. Open it in the actual slicer.
5. Check a known dimension, orientation, walls, bores, disconnected components and the layer preview.

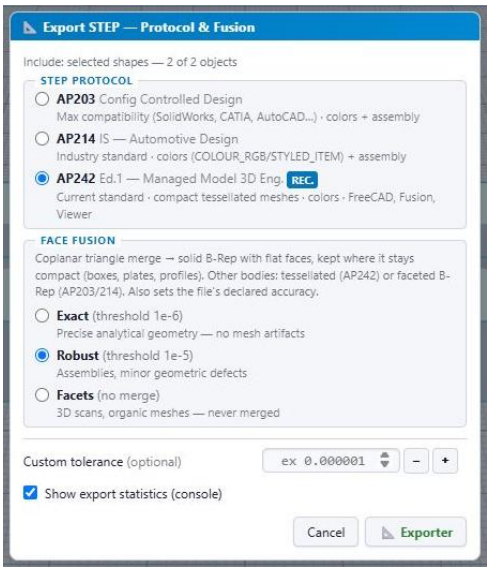
STL does not provide a reliable embedded unit declaration. NASSCAD's coordinates use millimetres; confirm the slicer's import assumption. Where the export format maps axes for a receiving convention, inspect the result instead of assuming the screen orientation is the printing orientation.

Physical fit

Thread and gear allowances are design choices, not automatic compensation for a specific printer. Thin walls, small letter strokes, unsupported overhangs and tight bores need manufacturing judgment. The build-volume preview checks a geometric envelope; it is not a slicer and does not generate toolpaths, supports or a process plan.

For CNC or laser use, inspect the exported section in the target CAD/CAM tool and apply the process-specific kerf, tool diameter and machining allowances there or in your design.

39 | STEP export options



STEP protocol and face-fusion dialog

Exchange scope

Imported STEP remains a viewer/inspection workflow. The export options do not guarantee repair of open bodies, full preservation of source CAD semantics or a watertight editable solid. Keep the source file and verify the output in the receiving CAD tool.

Protocol

Select AP203, AP214 or AP242 according to the receiving software. AP242 can use compact tessellated representation where appropriate; AP203/AP214 use the available faceted B-Rep route for meshes. The chosen protocol does not convert every polygonal input into its original analytic surface.

Face fusion

Exact and **Robust** use their configured small tolerances for coplanar merging. **Facets** leaves individual triangles without that merge. A custom positive tolerance changes the merge/representation settings; it is not a machining accuracy certificate. Coordinates and declared uncertainty do not replace a geometric inspection.

Engine selection

The Electron edition uses its bundled MEDUSA; the browser edition can use a compatible local companion with native STEP export capability. If it is absent or cannot accept the request before streaming, the in-browser writer is used. A native stream interrupted partway through is reported as an error rather than silently starting another heavy export. Inspect Logs when no file appears.

Exact data and fallback

Native export can preserve available referenced imported B-Rep. Missing references, unavailable source data or unsupported transforms can force a tessellated route. Non-watertight geometry can be written as an open shell rather than a closed solid. Read warnings and keep the original source STEP for exact continuity.

After export, open the file in the intended CAD system. Check body count, dimensions, colours and whether the receiver recognises a closed solid. A `.step` extension alone does not prove that all surfaces are analytic or every body is watertight.

40 | Export 2D sections: SVG and DXF

Section export plane and output controls

Horizontal cut plane

Choose Export > Section cut. Check Include and enter **Y in millimetres**. Y = 0 is the work plane; positive Y is above it. The plane intersects the selected scope's geometry horizontally and projects the contours into the XZ plane.

For a 12 mm-high plate starting at Y = 0, a section at Y = 6 passes through its interior. A section exactly coincident with a bottom/top face can be less useful than a cut through the solid.

Choose **SVG** or **DXF**. SVG includes physical millimetre dimensions; the receiving program must respect them. DXF contours should also be checked for units and size in the intended CAD/CAM program.

Troubleshooting

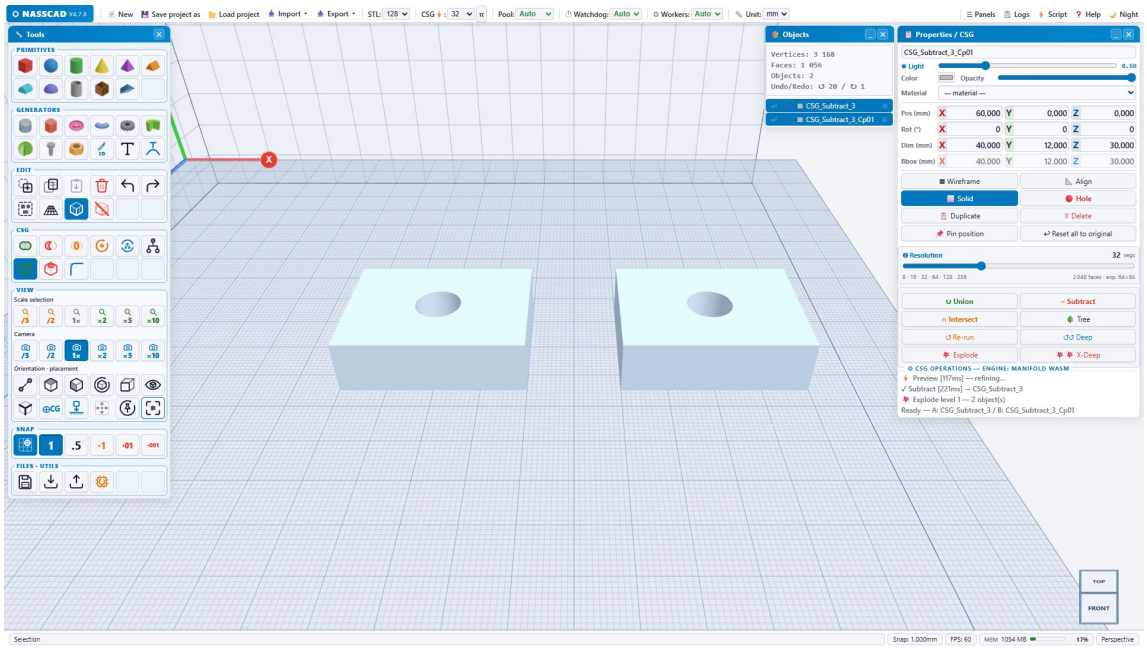
If the plane does not intersect any selected object, no useful contour can be produced. Check scope, Pos Y, height and rotation. A rotated part's useful cutting height may differ from its local height midpoint.

The section follows available geometry. Tessellated curved surfaces produce sampled contours. The exported section is not a silhouette of the complete scene, an arbitrary oriented clipping plane, or automatic nesting/kerf compensation.

Fabrication check

Open the output in the target program, measure a known edge or bore, inspect closed paths and remove unwanted contours. Apply laser kerf or milling-tool compensation in the appropriate process workflow. Preserve a JSON copy of the 3D model that produced the section.

41 | Build volume and grids



Build volume with the working scene

Printer envelope

Open the build-volume menu from EDIT. Choose a printer preset from the offered Bambu Lab, Creality, Prusa, Elegoo, Anycubic or open-source printer families. The menu displays each preset's envelope. Verify it against the actual printer configuration, particularly nozzles, restricted areas or modified machines.

The preview shows the bed and relevant walls; their visibility adapts to the view. **Show ceiling** adds the height boundary. **Hide build volume** removes the envelope without deleting parts. Out-of-bounds indications identify geometry outside the configured envelope.

Grids

The work grid is the modelling plane. The optional **World grid** provides a larger floor/wall/ceiling reference with an automatically chosen scale. Neither grid is exported as part geometry.

The combined hide tool removes build volume and world grid while retaining the work grid. The ordinary grid toggle changes work-grid visibility. Read the different tooltips so that hiding a large room grid is not confused with removing the modelling reference.

Placement check

Drop a print part to ground, then rotate it to the proposed build orientation. Check its size against the printer volume. A fitting envelope does not prove that overhangs are printable or that multiple parts have enough clearance for the slicer.

Build-volume presets are convenient visual references, not a machine connection or printer-control interface. NASSCAD does not send a print job through this tool.

42 | MEDUSA and the calculation architecture

What runs where

Component	Main role in this edition
Electron / browser renderer / Three.js	Workspace, display and interaction
Manifold WASM	Browser boolean geometry when the native engine is unavailable
MEDUSA native engine	Multicore native booleans and additional STEP capabilities
OpenCASCADE	CAD/B-Rep workflows, including Fillet / Chamfer and STEP processing
web-ifc	IFC geometry import/export workflows

Bundled desktop engine

The Windows x64 Electron All-in-One includes MEDUSA and its runtime dependencies. Starting NASSCAD starts its own MEDUSA process automatically; closing NASSCAD stops that process. The connection is an **internal process pipe**, without a local HTTP server. No BAT file or separate engine window is required.

Click the **MEDUSA** status button to view the engine log inside NASSCAD. **Refresh** retrieves the current log. Drag the log panel by its header, resize it, or use **Maximize/Restore**. **A- / A+** changes the console font size. Coloured console output is retained. The panel's **Close** button hides the log; it does not stop the engine. Exiting NASSCAD ends the owned engine process.

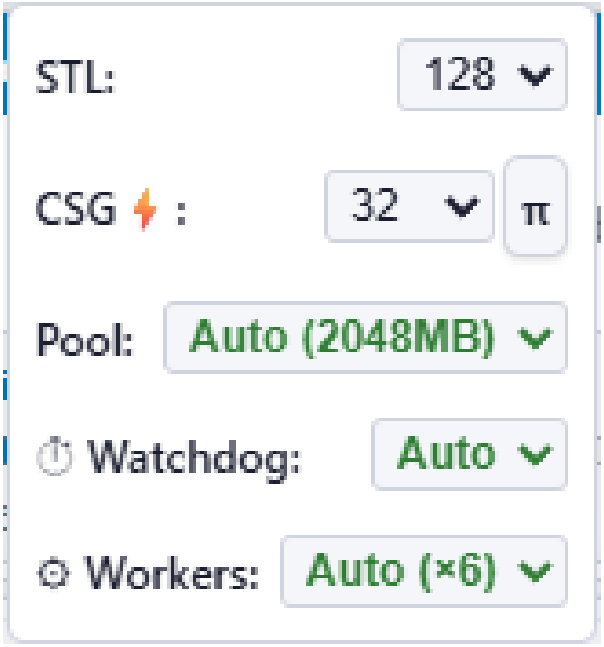
Native geometry calculations use the **CPU**, including MEDUSA/TBB parallelism. The graphics card renders the 3D viewport; this release does not expose NVIDIA CUDA acceleration for its CAD calculations.

Optional companion for the browser edition

The browser can use a separately started compatible MEDUSA Windows x64 companion. That arrangement uses a local loopback service, normally `127.0.0.1:8765`. Keep its complete official package together and read its startup log if it is not detected. This browser connection is different from the Electron app's internal pipe. Browser booleans remain available through Manifold WASM when no companion is connected.

Model files are read and processed locally in these workflows. Online use still loads application assets and can include optional site analytics. Save an editable JSON file yourself; local computation does not automatically create a project backup.

43 | Performance, quality and memory



The current compact Performances menu in the Day theme

One compact menu

Open **Performances** in the top bar for **STL**, **CSG**, **Pool**, **Watchdog** and **Workers**. The **pi** adaptive-display button remains beside CSG. The same controls are available in Day and Night. Selecting a value applies its corresponding setting; Pool can require a reload. Click outside the menu or press Escape to close it.

Choose the setting for the stage

Setting	Effect
CSG 32/64/128/256/512	Boolean sampling trade-off between curves and work
STL 128/256/512	Supported curved primitive export sampling
Properties Resolution	Primitive creation and supported live rebuilding
Generator quality	That generator's mesh subdivisions
pi adaptive display	Size-dependent display sampling for supported curved primitives

The pi option is off by default in the reviewed edition and concerns display. Booleans use uniform sampling per operation. Keep quality moderate while arranging a complex model, then rebuild the required final geometry deliberately.

Pool, Watchdog and Workers

Performances > Pool reserves geometry/history storage; choices are Auto, 512 MB, 1 GB, 1.5 GB or 2 GB. Auto uses RAM information reported by MEDUSA when available. Changing the pool setting requires a reload to apply the allocation. Save first. A failed large allocation can trigger a smaller fallback; read Logs.

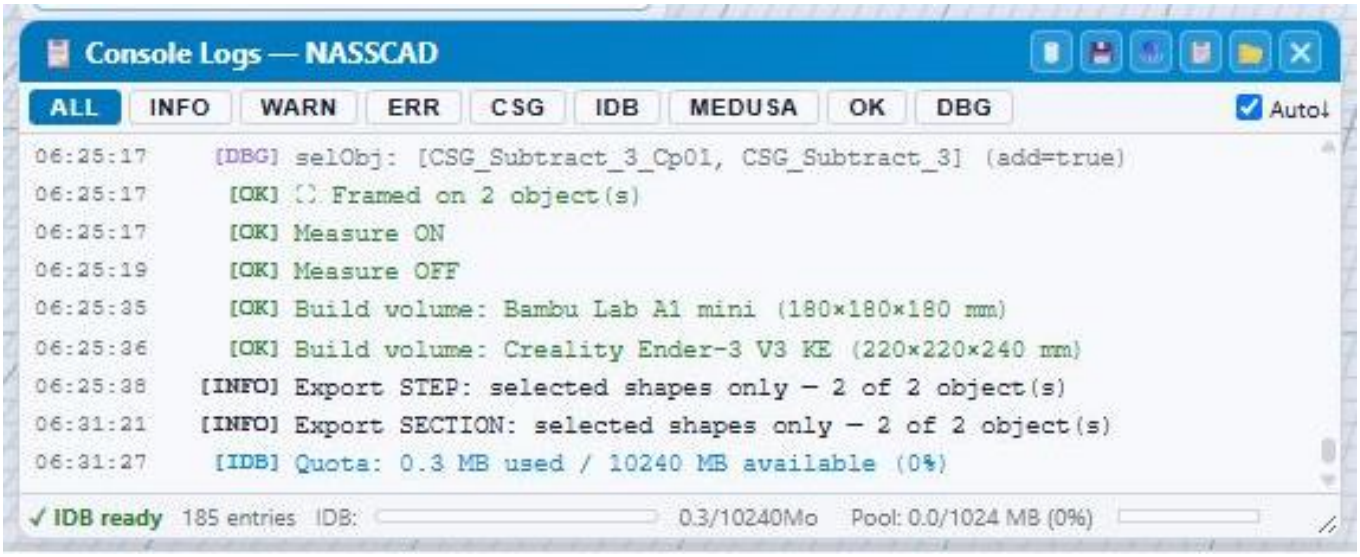
Performances > Watchdog provides Auto or 60/120/300 second base timing choices for guarded calculations. Auto adapts the allowance to the input size. A longer allowance permits a long operation to finish; it does not make the operation faster.

Performances > Workers offers Auto or x4/x6/x8. Auto uses CPU information reported by MEDUSA when available. In the current implementation, manual changes update client dispatch thresholds immediately. Native CSG parallelism is handled by MEDUSA/TBB. This selector does not make a single browser WASM boolean multithreaded. The older tooltip saying a worker reload is required does not describe that current implementation.

Practical recovery

Reduce unnecessary subdivisions and object count, save milestones and process a manageable selection. Flush GeometryPool frees eligible unused storage; it does not delete active parts or act as a guaranteed release of all browser/GPU memory. Close obsolete large scenes only after saving them. The Electron app already starts its included MEDUSA for workloads that benefit from native processing.

44 | Logs and diagnosis



Console Logs with filters and export controls

Open the journal

Use **Logs** in the top bar. Filters include All, Info, Warn, Err, CSG, IDB, MEDUSA, OK and detailed debug entries. Auto-scroll follows newly added events. The journal can show engine choice, processing times, memory fallback, imports, topology warnings and save/export errors.

Controls

- **Clear logs:** clear the displayed diagnostic list.
- **Export logs .txt:** save a readable diagnostic file.
- **Copy logs:** copy the current log text.
- **Restore:** recover the last stored entries available in IndexedDB.
- **Pull MEDUSA log:** retrieve it from the connected engine when supported, or select an existing medusa-logs-*.txt file through the fallback. In Electron, the MEDUSA status button also opens the integrated live log panel.

Use the first meaningful error

If a tool fails, read the error together with preceding warning and engine messages. A subsequent generic failure can be caused by an earlier missing module or allocation problem. Preserve a JSON model and the relevant log when requesting help.

Warning examples include a non-manifold operand, missing exact STEP references, an impossible fillet or an interrupted export. A warning is not always a failed operation: an export may continue through a documented fallback. Inspect the produced file and the final success/error message.

Logs can contain filenames, object names and other model context. Review them before sharing externally. They are diagnostic information, not an automatic upload to support.

45 | NassScript, demonstrations and resources

Open the console

Use **Script** or restore NassScript through Panels. The console is the programming entry point into NASSCAD. It can create geometry, automate operations and animate a scene, but its API belongs to the dedicated reference.

Use Run / Ctrl + Enter for the console workflow and **Stop** for a running script. Stop can end supported running work and registered animation resources; do not expect it to restore the scene to its pre-script state or make a blocking synchronous loop interruptible while it prevents browser events from running. Save before running a script that changes your model.

Demonstrations

From the welcome card, NassScript demo offers the **real-date Solar System** and the **original inline-four engine**. Let their script assets load and use the associated control to stop the demonstration before resuming ordinary modelling. They create and animate their own scenes; keep a project checkpoint first.

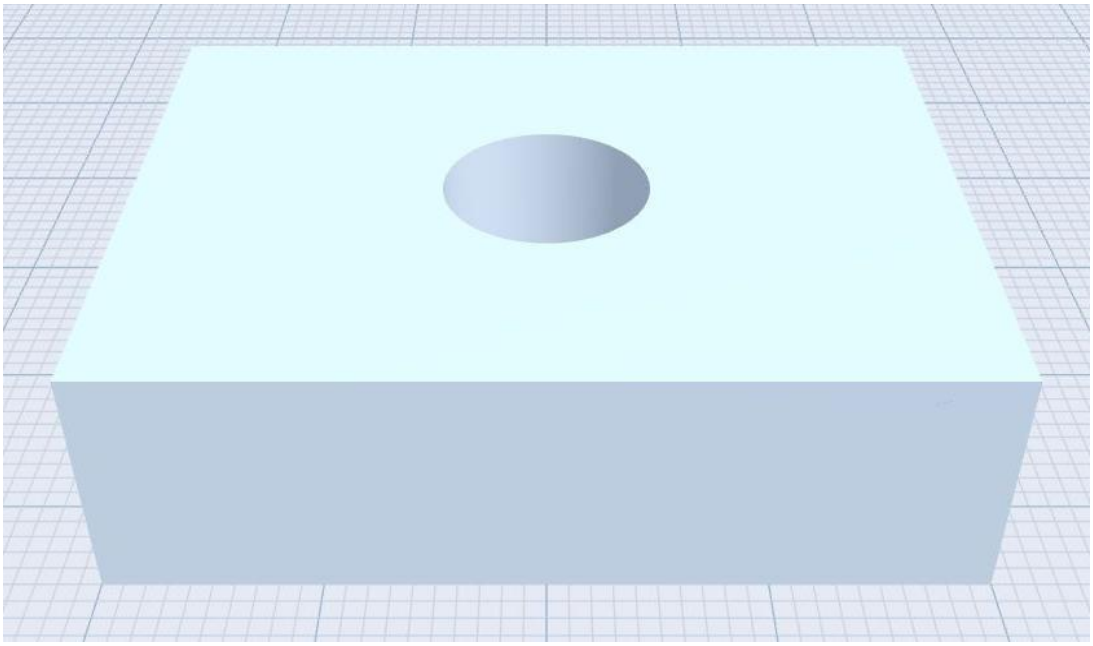
These demonstrations illustrate procedural modelling and animation. They do not imply a built-in physics simulation, engine durability calculation or full astronomical ephemeris certification.

Further reading

- NassScript reference and demonstrations
- Official NASSCAD site and downloads
- NASSCAD YouTube channel
- Manifold project

For use, redistribution and commercial permissions, consult the current integrated licence and the official site. Appearance or file export does not override those terms. Contact information is available on the official site.

46 | Worked example: a block with a through-hole



Completed mounting block

Dimensions

Use millimetres. The target block is **40 x 12 x 30 mm** along X/Y/Z, with a **10 mm diameter** vertical through-hole at X = 0, Z = 0.

1. Create a Cube and rename it Mounting_block.
2. Set Dim X = 40, Y = 12, Z = 30. Set Pos X/Z = 0 and Pos Y = 0. Keep Solid.
3. Create a Cylinder. Set Dim X = 10, Z = 10, Y = 30. Set Pos X/Z = 0 and Pos Y = -5.
4. Keep the cylinder as Solid for the direct Subtract workflow. Its length should extend below and above the block instead of merely touching the end faces.
5. Select the block only and click Subtract. Hover over the cylinder to see the temporary gray Hole appearance, then click it to cut the block immediately.
6. Frame the result and inspect the hole from Top and an oblique view. Check Dim before any rotation.
7. Save a JSON checkpoint. For selected edge finishing, open Fillet / Chamfer and begin with a small radius or chamfer on the intended edges.
8. Save another checkpoint after finishing. Export the desired scope and check it in the receiving CAD system or slicer.

What this exercise verifies

This combines numerical dimensions, bottom-referenced Pos Y, a Solid target and a direct Subtract action. The reviewed scratch scene completed this construction through Manifold WASM without MEDUSA.

If the hole is absent, check overlap and the target/cutter choice. If the entire block disappears, inspect whether the cutter was larger than the retained body or whether an unintended object was clicked.

47 | Worked workflows: gears, imports and delivery

A straight gear pair

1. Open Gear.Gen and choose Straight.
2. Choose module 2 and 24 teeth. Set the thickness and bore radius needed by the design.
3. Enable the mating gear and set 48 teeth, or use the corresponding ratio preset.
4. Choose a deliberate backlash and moderate quality. Add the pair.
5. Check the 72 mm nominal centre distance and inspect the tooth engagement.
6. Save as JSON. Export the parts separately or together using Include, and perform a manufacturing fit test.

Inspect a received assembly

1. Save the current scene. Use New if a clean project is appropriate.
2. Import STEP, retain the original source file and wait for processing.
3. Expand the file group, select representative bodies and frame them.
4. Check a known overall dimension. Inspect colour, body count and available PMI.
5. Save a NASSCAD JSON scene. Avoid treating it as a complete substitute for the original STEP.

Prepare a laser/CNC contour

1. Model the plate or extrude a closed sketch.
2. Select only the intended part(s). Choose Selected shapes.
3. Export a section through the body's interior at the correct world Y.
4. Open SVG/DXF in the target CAD/CAM software. Check size and closed contours.
5. Apply process compensation and generate the actual machine instructions in that system.

Deliver a model responsibly

Keep the editable JSON, original imported files and delivery export together. Include the unit and a known dimension in the handover. Inspect the export in the receiver, especially after a mesh/B-Rep fallback. A successful export dialog is not a proof of fit or complete semantic preservation.

48 | Troubleshooting reference

Symptom	Check and next action
Buttons show but an engine fails to load	For Electron, use the complete current Setup/Portable package and inspect Logs. For separate offline browser files, keep the full folder and use a local static server if file-URL loading is blocked
A part seems absent	Find it in Objects, select and Frame; check opacity and whether it is hidden behind another body
Numeric value does not affect the part	Commit the field with Enter/Tab; confirm the active object and the field's unit
Rotating seems to change dimensions	Dim is local; inspect the rotated part's overall envelope
Part jumps or moves too coarsely	Check snap step; distinguish object scaling from camera sensitivity
Alt-drag moves everything	It moves grid/scene in this edition; use middle drag for camera pan
Cannot reopen a generator by double-clicking	Use Edit .gen params in Properties
Sketch will not extrude	Repair open ends, duplicates, self-intersections and invalid nested loops
A tagged sketch relationship does not update	Current actions are not a full persistent solver; edit numeric properties and apply supported actions again
Boolean fails	Check at least two operands, overlap, roles, topology and final engine error
Intersect acts like subtraction	Mixed Solid/Hole forces subtractive handling; make all operands Solid for an ordinary intersection
Fillet/chamfer fails	Reduce size, select fewer edges, inspect reference face and repair geometry
Export includes only one part	Reopen Export and choose All design or the correct selection
STEP is faceted in another CAD	Read export route/warnings and preserve original native source; protocol alone cannot recreate analytic surfaces
PMI control is absent	Check actual source annotations, supported entities and the large-file scan limit
STL has the wrong size	Check source unit assumption and deliberately rescale geometry, not just Unit display
Section has no contours	Verify scope and world Y intersects the model interior
MEDUSA unavailable	In Electron, check the status panel and log; restarting NASSCAD restarts its owned engine. In the browser, check the separately started companion, version and port. Browser booleans remain available
Memory allocation warning	Save, then adjust Pool/quality in Performances, reload where required and inspect fallback allocation
Recent work lost after reload	Load a saved JSON, or accept a desktop recovery offer when available. Cache/history and automatic recovery are not guaranteed project archives

49 | Keyboard and mouse reference

Main 3D workspace

Input	Action
Click / Shift or Ctrl + click	Select / toggle multiple selection
Double-click selected surface	Show or hide handles, dimensions and rotation together
Drag empty space / Shift + drag	Box selection / add to selection
Left drag selected body	Translate selection on the work plane
Right drag / Middle drag / Wheel	Orbit / camera pan / camera zoom
Alt + left / Alt + right drag	Move grid/scene in 3D / XZ
Select all button	Select the scene objects; use this explicit GUI control
Ctrl + D / C / V	Duplicate / Copy / Paste
Ctrl + Z / Y	Undo / Redo
Delete or Backspace	Delete selection when not editing a text/number field
Arrow keys	Move the active object horizontally, camera-relative
Alt + Up / Down	Move the active object in Y
L / S / N / H	Alignment / snap cycle / theme / panels
1 / 2 / 3 / 4 / 5	Reset / Top / Front / Right / Reset camera
Escape	Cancel the current selection gesture or clear selection as appropriate

Arrow movement uses the current snap step, or a 1 mm fallback when snap is off. It concerns the active object; do not assume it moves a multiple selection as a rigid group. Keyboard commands depend on focus: clicking into a field gives typing/editing priority. The built-in help lists Ctrl + A, but the reviewed main keyboard handler does not implement it as object selection; use Select all.

Sketcher

S Select; P Point; L Line; R Rectangle; C Circle; A Arc; B Bezier; X Trim; E Extend; K Fillet; F Fit; G Grid; T Theme. Ctrl + Z undoes; Ctrl + Y or Ctrl + Shift + Z redoes. Delete removes selected entities. Escape cancels the active draw sequence. Supported typed dimensions are completed with Enter.

50 | Glossary and review basis

Term	Meaning in this manual
B-Rep	Boundary representation using faces, edges and vertices
Tessellation	A sampled triangle approximation of a surface
Manifold / watertight	Topology suitable for a closed solid; not a claim of manufacturing accuracy
CSG	Constructive solid geometry through union, subtraction and intersection
Operand	A source body used by a boolean
Hole	A subtractive body role in the workspace
Dim	Intrinsic size along local object axes
Bbox	World-axis enclosing box
Pivot / origin	Reference used for object transforms and some measurements
PMI	Product and manufacturing information imported with supported STEP content
Module	Metric gear tooth-size parameter
Pitch	Thread axial advance per turn, or another explicitly stated periodic spacing
Radial clearance	An allowance applied to radius; its diameter effect is twice as large

Review basis and scope

This manual describes NASSCAD 4.7.0. The original illustrated chapters were reviewed on 8 October 2026; supplements dated 26 October and the revised pages dated 30 October cover the later controls and workflows. It includes the Electron All-in-One desktop edition, browser edition, MEDUSA lifecycle, modelling tools, project safeguards and diagnostics. Internal programming functions belong to the NassScript reference.

Illustrations show application workflows. Some older screenshots retain an earlier top-bar arrangement; the compact menu is illustrated in chapter 43. The October updates cover STEP import/export guidance, Fillet / Chamfer, boolean controls and the gray Hole appearance. The regression checks cover selected projects, materials, booleans, STEP files, mesh exports and browser safeguards. They do not cover every STEP/IFC variant or guarantee repair of every industrial model.

Source modules reviewed include the main HTM, nasscad-gens.js, nasscad-io.js, quick-fillet.js, step-import.js, step-export.js, step-xcaf.js, ifc-import.js, ifc-export.js, nasscad-buildvolume.js, nasscad-materials.js and console integration. The desktop supervisor/pipe bridge and project safeguard module are also part of this edition.

Keep this edition with its application version. Interface and engine updates can change behaviour. Consult the official site and current NassScript documentation for later changes.