# COMPONENT GUIDEBOOK

WOOD, PLASTIC, METAL AND MORE: BITS AND BEYOND!

panda game manufacturing

# COMPONENT GUIDEBOOK

Welcome game designers and publishers! Within these pages, you will discover a plethora of game components with which you can craft a spectacular game. From meeples to miniatures and everything in between, Panda has you covered! This guide will help you find the perfect fit for your game's budget, theme, and mechanisms.

Most of these components can be tailored to your needs and customized by choosing a unique shape, matching a specific color, or printing a unique design. In this guide you'll find an explanation of the options for each component, recommendations for how the components can best be utilized, and examples of where you can see them in currently published games.

This guidebook covers the most common components found in board games as well as the information you need to know to customize those components. New to the third edition of the Component Guidebook is information on the Component Specification Sheet and chapter headings that correlate to the online quote request form. To find out about components printed on paper, please see our Panda Design Guidebook.

If you don't see something you're looking for, just ask your project manager. We offer some components not specifically listed in this guidebook, and we may be able to produce special components that are not generally offered. Your project manager will work with you to find the best solution for your unique component needs.

We hope that this guidebook provides you with useful information as you develop your board game design. We wish you the best of luck with your project, and hope to be a key partner on your journey!

Sincerely,
The Panda Team

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*Throughout this guide, look for the callout boxes below pointing out tips, warnings, and downloadable content available*

**PANDA TIP**

**DOWNLOADABLE CONTENT AVAILABLE**

# MANUFACTURING TIMELINE

**Quoting:** (game dependent) Panda generally recommends starting the quoting process when your game is about 80-90% complete. Once you submit a quote request, one of our project managers will reach out to learn about your game, answer any questions you have, and begin the process of pricing your game.

**Design Verification:** (file dependent) The design verification process ensures your files are ready for production. Your prepress specialist will review your printed files to ensure they meet our design guidelines for printing. As a final checkpoint during the design verification process, we will create a full set of online digital proofs to review and approve before we begin the sampling process.

Read our Design Guidebook to learn all about preparing files for the design verification process. The closer you follow our guidebook, the faster your files will be ready for print. You can find that guidebook here: https://pandagm.com/tools/guidebooks#design

**Pre-Production:** (2-3 weeks) Once your files and designs are approved, we will make a pre-production copy (PPC) of your game. This is a single, near-final quality prototype version of the printed components of your game (box, rules, cards, punchboards, game boards, etc.).

Your project manager will review the PPC with you on a video call to identify any final changes needed before starting mass production. You will also receive samples of all wood, metal, dice, plastic, and other non-printed components to ensure that you are satisfied with all items before mass production.

**Mass Production:** (10-12 weeks) Once your PPC and component samples are approved, we begin mass production. This timeline is dependent on the complexity of your game, quantity of components, and number of games being produced.

When mass production is nearly complete, we will send you a mass production copy (MPC) which is the first full, final, and complete mass production version of your game. This is the last checkpoint before we begin assembly and shipping of your games. Your project manager will review the MPC with you on a video call to ensure it is precisely the way you want it.

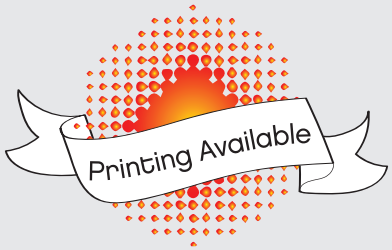
# MANUFACTURING TIMELINE

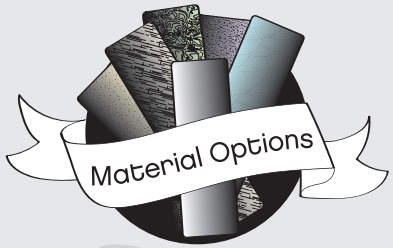
**Assembly:** (1-2 weeks) After you approve the MPC, we assemble your games. Our dedicated quality control team inspects your components to check that everything is complete and correct as assembled into the box.

**Shipping:** (4-6 weeks) Shipping times vary depending on method of delivery and destination, but you plan for up to 6 weeks to the final destination.

# CUSTOMIZATION






As you look through this guide, you'll see badges indicating how you can customize each component:

**Any Pantone C:** Nearly all of our components can be made in any Pantone C color. To find the colors that you need, either check out a Pantone Color Guide or find your color on the Pantone website at: www.pantone.com/color-finder

**Custom Shapes:** Many components, such as wooden pieces, offer fully customizable shapes and sizes at no additional charge. Others, such as metal coins, require unique tooling to customize the shape.

**Printing Available:** We can silkscreen custom images or text designs onto wooden components, and we offer custom printing for many other components.

**Material Options:** Most components have a standard material used in their production, but some components offer a number of different material options you can choose from. Depending on your design or quantity, Panda may recommend optimal material choices.

**Designing for Color Blindness:** Approximately six percent of board gamers are color blind. Online resources can help you determine what color palettes are most easily identifiable, and adding printed iconography or custom shapes can help color blind players identify different colors.

**Budget Tip:** Some components add a lot of bang for the buck, while other components are of premium quality. This section will highlight your relative costs for each component.

**Submitting your designs:** For most components, you will submit your design during the Design Verification step of the production process via a Component Spec Sheet. To submit a custom plastic design to Panda, you will need to provide a 3D file.

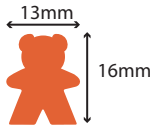
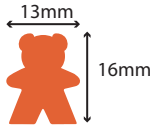
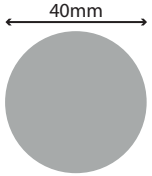
# COMPONENT SPECIFICATION SHEET

To submit your designs for components that aren't printed on paper, you will need to create a component spec sheet. This is particularly helpful for custom dice or unique wooden shapes. A component spec sheet template can be found on our tools page pandagm.com/tools or you may create your own.

After filling out a component spec sheet, save it as a PDF and send it to your project manager. Please ensure the component spec sheet includes the name of the component, illustrations/pictures from different views, specific Pantone colors, and number of units per game.

You can find the component spec sheet at [http://pandagm.com/tools](http://pandagm.com/tools)

GAME NAME - Publishing Company
**COMPONENTS**

| Component | Front View | Back View | Side View | Color | Units per Game |
|---|---|---|---|---|---|
| **BASE GAME** | | | | | |
| Panda Meeple Wood |   |   |   | Pantone **7579 C** | **3** units |
| Panda Token Plastic |   |   |   | Pantone **Cool Grey 5** INK Pantone **Black 6** | **1** unit |



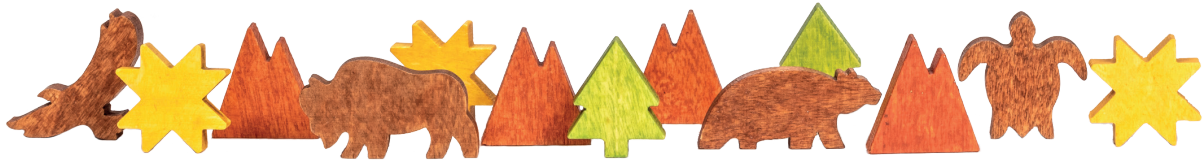

# 2D WOOD & ACRYLIC SHAPES

Wood is durable, cost effective, and produces a gratifying tactile experience. It can complement the theme of a variety of games and it is infinitely customizable. Acrylic shapes are made via similar processes to wood, and are a great alternative if you have a shiny or futuristic theme to your game.

Customization: Although we regularly use standard shapes such as cubes and discs, all of Panda's wooden or acrylic components are custom made for each game. Because pieces are customized for each game, it is quite easy to personalize the shape, color, and size of your wooden or acrylic pieces.

Wood & acrylic pieces can be made in any Pantone color. You may wish to consider using a non-standard color palette for your game. Check out the Pantone color finder to help you determine the best color choices for your wood pieces: www.pantone.com/color-finder Make sure to select the Pantone Formula Guide Coated option from the Color Library.

Stains and ink washes can also be applied to wood pieces. Due to variations in the wood, staining will not be as consistent as traditional painting, but can give your pieces a natural-looking effect.

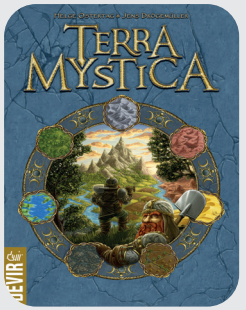


# 2D WOOD & ACRYLIC SHAPES

Wood pieces also have the option laser engraving or etching designs to the surface of the wood. Laser engraving can add depth to your wood pieces, and can make your game even more deluxe.

To add more detail, silk screened images may be printed onto the flat surfaces of wood or acrylic components. Silkscreening can add characteristics or information to your pieces. Typically only 1 or 2 colors are used for each silk screened image, as additional colors raise the cost and can cause the image to appear muddled. Please indicate the number of colors in your design when placing a request for screen printed pieces.

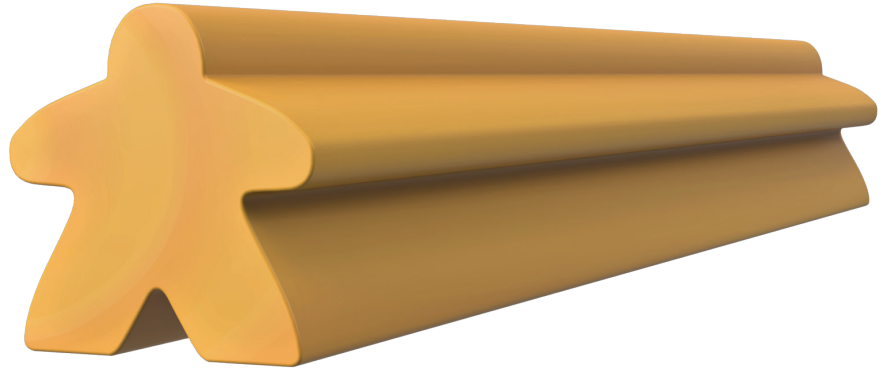
*Examples of our wood shapes can be found in Stop Thief and Terra Mystica.*

# 2D WOOD & ACRYLIC SHAPES

Wooden and acrylic pieces for games can be produced via machine or laser cutting processes.

Most pieces are machine cut, which is a high quality and cost-effective method. Making machine cut pieces is similar to cutting a loaf of bread; a long piece of material is used and is cut into the specified shape (our meeple loaf), then each individual meeple is sliced off. This process works well for simple designs, such as meeples, houses, or discs, which are flat on two sides and contain no undercuts.



Making laser cut pieces is similar to using a cookie cutter: a sheet of wood or acrylic is cut into unique shapes with laser precision. The process of laser cutting will need to be used if you have designed tokens that have undercuts and are too complex to be made by machine.

# 2D WOOD & ACRYLIC SHAPES

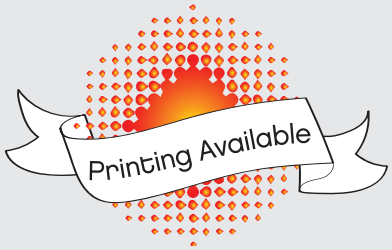
Let us know if any of the pieces have any hidden information, stacking, flicking, or interlocking requirements. Your project manager will work with you to determine the best cutting method.

**Budget Tip:** The cost of these pieces will depend upon the volume of material used and relative complexity. For example, a simple custom farmer meeple that's about the same size as a standard meeple (16 x 16 x 8mm) won't cost significantly more than the standard meeple if it is able to be machine cut. The cost will increase if your custom design is larger or requires laser cutting. Acrylic shapes are very slightly more expensive than wood.

**Submitting Your Design:** Use the Component Spec Sheet to provide a drawing of each design and include the Panone color for each piece. Submit a PDF of each unique silkscreen design, and be sure to include the Pantone colors desired for the silkscreen design.

Please visit https://pandagm.com/components/wood for additional information for wooden components.






# DICE

Dice are the ultimate randomizer. Size, shape, color, and iconography can all be customized to match your game.

**Customization:** During the quoting process, discuss your dice designs with your project manager. Standard options include any solid color for pips or base, and some standard sizes have an option for squared or rounded corners. You may replace the standard pips on any or all faces of your dice by opting to create custom engraved, silkscreened, or heat transfer dice.

Our standard shapes for dice are 6-sided (D6), 4-sided (D4), 8-sided (D8), 10-sided (D10), 12-sided (D12), and 20-sided (D20).

Visit https://pandagm.com/components/dice for additional information on dice.

**PANDA TIP**
Custom engraving is a fixed cost, so many clients use standard dice to start their Kickstarter campaign and offer custom engraving as a stretch goal.

# DICE

**Budget Tip:** Dice can be a particularly expensive component. Fortunately, there are several ways that you can design your dice to maximize the bang for your buck.

- Use only one ink per die face. Using multiple colors for engraved dice on the same face is more difficult to manufacture, and will significantly raise costs.
- Consider the size of the dice. Lowering the size from 16mm to 14mm will reduce the manufacturing costs.
- Determine how many dice you really need. If players can share dice, you can reduce your game's cost per unit.
- The tooling cost for custom dice differs based upon the complexity of the design. Custom silk screening or heat transfer is also an option.

**Submitting Your Design:** Use the Component Spec Sheet to identify the number of faces, base color, and pip or engraving color. If you are requesting a unique design for one or more of your die faces, please also submit a completed Dice Template and indicate if the design is to be engraved, screen printed, or heat transfer.

*Examples of our dice can be found in Tiny Epic Galaxies and Tricorne.*



**DOWNLOADABLE CONTENT AVAILABLE**
Die templates are available at www.pandagm.com/tools

# STANDARD COMPONENTS

Panda offers a variety of standard components for use in your game:

**Stones or Marbles:** Glass marbles and stones come in a variety of colors and sizes. Stones have a flat bottom so they don't roll around while on your table.

**Acrylic Gems and Diamonds:** Panda offers a few different styles and sizes of acrylic gem pieces. They can be customized with any Pantone color.

**Pawns:** Panda offers a few size and shape options, and they can be customized with any Pantone color.

**Plastic Sand Timers:** We can make sand timers between 10 seconds to 3 minutes in 5 second increments. The color of the sand and caps can be customized.

**Dry Erase Pens:** Dry erase pens come in a wide variety of colors. They can also come with or without erasers on the cap.

**Plastic Cubes:** Cubes come in a variety of sizes and are the most basic shape. Cubes can be customized with any Pantone color.

**Plastic Chips:** Plastic Chips are similar to dealer chips. These are available in different materials and styles, including ABS, resin, and clay. Ask your project manager for more information on options for plastic chips.

# STANDARD COMPONENTS

**Plastic Discs:** Plastic discs are small and thin, like tiddlywinks. Ask your project manager about available options for different diameters or thicknesses.

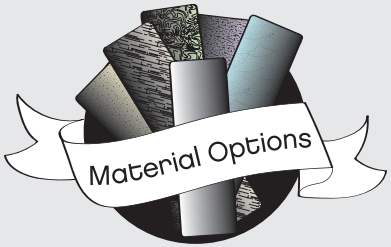
**Plastic Rivets for Cardboard Dials:** Rivets are small round plastic pieces used to connect two pieces of cardboard together. They can be used to create dials to track points or or other resources.

> **Budget Tip:** If you are already using punch board sheets in your game, adding trackers using punch board and rivets may add very little to your unit cost. In addition, dials are a cost effective way of replacing a large number of resource tokens.

**Plastic stands for Cardboard Figures:** Plastic stands can be used to hold up cards or punch board pieces. They are a simple and cost-effective way to offer custom player pieces.

> **Customization:** Panda has several different molds to hold punch boards and cards of varying thickness. When you request plastic stands, please indicate what they will be holding to ensure we use the correct size. When designing your punch board pieces to be held in a stand, be sure to account for the space at the bottom of your design that will be covered by the plastic stand.
>
> Clear and black are the most common color requests, but you can customize the color by specifying a Pantone color code. This piece is a standard part and the dimensions cannot be customized.






# CLOTH BAGS

Cloth Bags are ideal for keeping pieces organized or hidden. Bags can be made from six different materials: cotton, canvas, faux velvet, microfiber, silk, and linen.

**Customization:** All cloth can be made in the size and color that you specify. Bags all come with two drawstrings standard, and you can request to add a plastic closure tab.

Bags may be customized by adding silkscreening (cotton only), full color printing (microfiber only), or custom embroidery.

**Budget Tip:** Talk to your project manager for pricing of fabric options. For custom designs, embroidery is more expensive than silkscreening. Any additions - such as zippers or closure tabs - will increase the cost.

**Submitting Your Design:** Submit the dimensions, color, fabric choice, and any additional features on your component spec sheet. For silkscreened or embroidered designs, please provide an image of your design with the custom colors identified when you submit your spec sheet.

# PLASTIC TRAYS AND CUSTOM CONTAINERS


**Plastic Trays:** Vacuum formed plastic trays are the ultimate in customizable component containment, and are an upgrade from cardboard trays. By default, plastic trays are black, but other color options may be available at an additional cost. Plastic trays are approximately 0.9mm thick, and you can have the option to add a clear lid. Panda can help you design simple trays, but more complicated designs require professional files and may be significantly more expensive. Ask your project manager for more information.

**Component Containers:** Custom vacuum formed containers are an alternative to trays. They not only store pieces when the game is put away, but they are a great way to keep game pieces organized on the table. By default, component containers are translucent, but other color options may be available at an additional cost.

**Submitting your Design:** For custom component containers or plastic trays, submit a 2D or 3D design of your container and an inventory of what it will be containing. If you are providing a digital rendering of your design, please submit both STEP and source file. Vacuum formed plastics can be engraved or screen printed on flat surfaces. Engraved lines must be at least 2-3mm wide.

# CUSTOM SHAPES

Sometimes a game requires a very unique piece, one so unique that it must be formed in a mold. Molded plastics and metals are an exciting prospect that should be approached with careful consideration.

This section will cover submitting your custom plastics designs, what the production timeline looks like, and the options that are available to you. The intention is to provide you with an understanding of the scope of a project containing molded pieces. To determine the exact impact custom pieces will have on the production of your game, speak with your project manager.

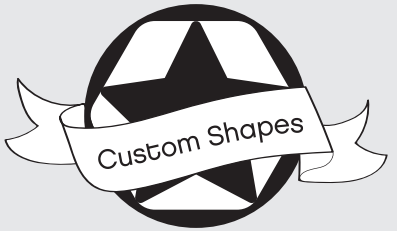
# METAL OBJECTS

Adding metal components to your game is a great way to add a little heft to your pieces, and makes for a premium experience.

**Customization:** Metal components require creating custom molds and can be customized in size, shape, and design. Electroplated designs are limited to metallic colors. Painted colors will be less metallic in appearance, and can achieve rich, solid colors.

**Budget Tip:** Metal components require fixed tooling costs for the molds, and the materials are more expensive than other components. Additionally, you may have higher freight and fulfillment costs due to the heavier weight of metal. Consider keeping the quantity of metal components low.

**Submitting Your Design:** When requesting your quote, please send a 3D STL file for your design. For metal coins, you may also submit a black and white drawing of your metal coin to illustrate the shape, thickness, and recessed areas. Metal miniatures must have more exaggerated details than plastic minis, and we recommend keeping each detail (raised or recessed areas) above 0.2mm so they show up after molding.



*Think outside of the disc. Metal coins don't have to be round!*

# PLASTIC MINIATURES

Custom plastic figures are a beautiful way to help a game to stand out among the hundreds of games that are released each year. However, custom plastics increase complexity, cost, and length of time to produce a game.

The increased complexity of dealing with plastics means that projects containing custom plastics take longer. Be sure to plan for that timing (about 7 months for production).

**Submitting your Design:** To submit a custom plastic design to Panda, you will need to either provide a STP file or 3D STL file.

STP files are the most common format for plastic designs to be submitted to Panda. They are built by a 3D artist to describe the surface geometry of an object. The advantage of submitting STP files is that they can be sent digitally; you can ensure that your designs have precise dimensions, and they are easy to adjust. When submitting STP files, ensure that your designer prepares the files to designate the final dimensions for each piece. We also recommend that any facial features are exaggerated so that the desired level of detail is maintained throughout the molding process.

When creating your miniature 3D designs, ensure all details (raised and indented areas) are visible to the naked eye. Generally, the human eye can see details larger than 0.2mm, but we recommend keeping all details at least 0.4mm to achieve apparent visibility. The molding process can obscure some fine design elements, so try to thicken/deepen the details to make them stand out in the final product.

Some miniatures have thin sections representing weapons, tails, tentacles, etc. For hard plastics such as ABS, POM, HIPS, and Acrylic, keep these sections at least 0.6mm in diameter to prevent warping and breaking during molding or play. For softer plastics, such as PVC, these sections must be at least 1.5mm thick. Our skilled plastic engineers can help to enhance your details and improve durability during production if necessary.

*Examples of our plastic miniatures can be found in Mechs vs Minions and Fate of the Elder Gods.*


**Undercuts:** Some designs can only be made from multiple pieces. These are called factory assembled miniatures because we will assemble them for you before packaging in the game box. The main reason for molding a miniature in multiple pieces is undercuts.

An undercut is created when the features of a design overlap in multiple dimensions. Two-dimensional (or mostly two-dimensional) miniatures are easy to remove from their molds because they can be lifted out cleanly in one direction. An undercut is created when there are two or more layers of plastic in a third dimension, as illustrated in Figure 1. Undercuts make it impossible to lift the miniature directly from the mold. If you can find a portion of your model that has "empty space" (such as an arm bent in front of a mini's chest), it likely has an undercut. These are shaded orange in Figure 2.

We can solve undercuts by molding the miniature in multiple pieces as shown in orange in Figure 3. Each part of the design that creates an undercut is manufactured separately and attached during assembly, making the process more complicated and expensive.

Another way to solve undercuts is to alter the design so that it can be removed from a mold. If it is possible to change the design so that there are no features that overlap in multiple directions, as shown in Figure 4, then factory assembly is not required. A skilled 3D artist or sculptor with tabletop game experience will be an excellent resource to help optimize your design.

*Figure 1*

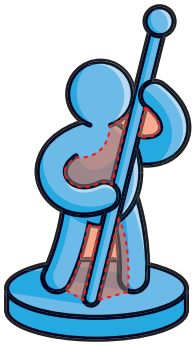


*Figure 2*

*Figure 3*

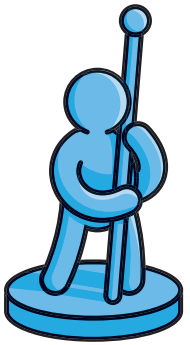
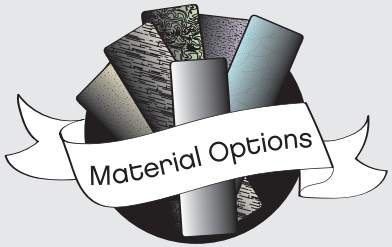


*Figure 4*






# PLASTIC MINIATURES

**Multiple Plastic Colors:** If your miniatures come in multiple colors, we will need to reset the molds for each color used. To minimize costs to you, our technicians will try to group same-colored sculpts within a mold. If the same sculpt appears in multiple colors within the game, it will likely increase production costs.

**Pre-Painted Miniatures:** Panda is able to produce high quality pre-painted miniatures. Typically, we only recommend pre-painted miniatures for games with very large production runs (over 10,000 units). Also, pre-painted miniatures will add significant time to your production process. If you are interested in having your plastic pieces pre-painted, please let your project manager know very early in the production process and they will guide your next steps.

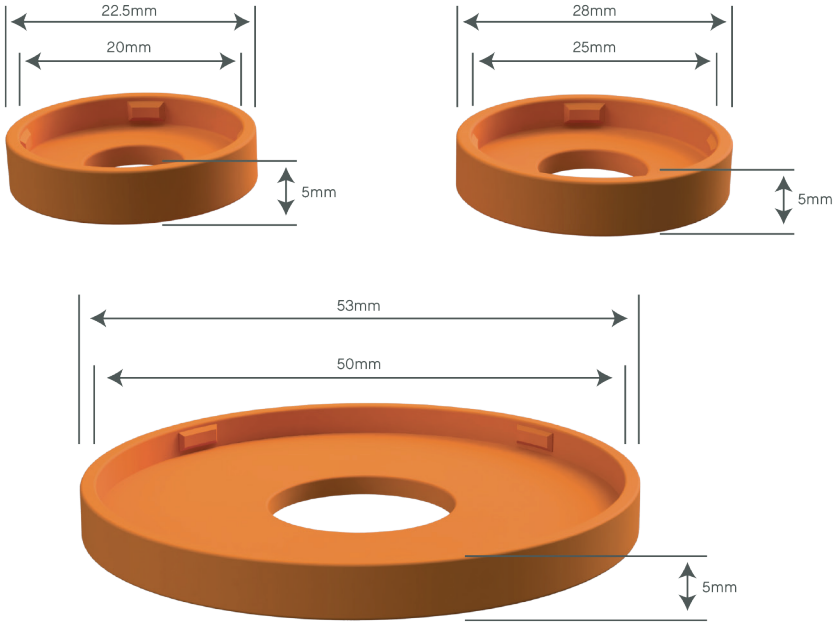
# BASE SNAPS

To avoid the costs associated with resetting molds for different colors, we offer plastic base snaps. They are colored round bases that snap onto the bottom of your plastic miniature, negating the need to manufacture multi-color miniatures. This creates better looking miniatures as some colors like yellow do not show details as well as grey. In addition, it is much more cost effective to produce miniatures in a single color.

You can find the snap bases when requesting a quote in the classic components section.

**Budget Tip:** A mold already exists for these in 20mm, 25mm and 50mm diameter round. However, if you chose to use a non standard base size, there will be a tooling fee.

**Submitting your Design:** Simply indicate the diameter and PMS color of the snap base.





*Examples of our snap bases can be found in Cry Havoc.*

# PLASTIC MINIATURES TIMELINE

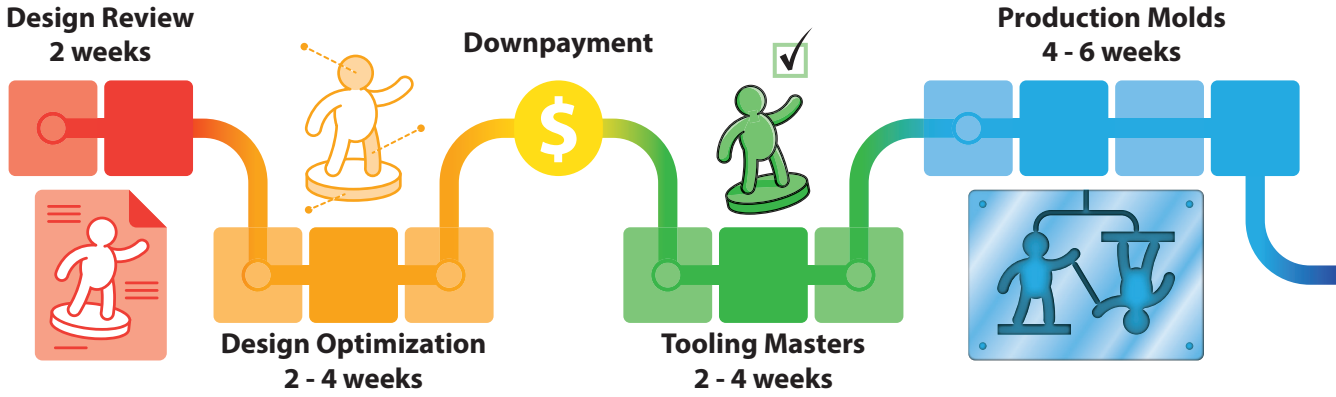
Please note this production timeline is a rough estimate. Due to the longer timeline involved with custom plastics, it is very important to inform your project manager very early on if you are thinking about using custom plastics.

**Design Review — 2 Weeks per Cost Estimate:** Please ensure all 3D files are submitted in the final dimensions for each piece. Our team will review the files to ensure the designs are optimized for injection molding, and they will provide pricing based on your designs.

**Design Optimization (optional) — 2-4 weeks:** Panda's plastic engineers can optimize your designs for injection molding. This may allow your pieces to be manufactured more affordably and with a greater level of detail. Speak to your project manager to discuss how design optimization can improve your project.

**Downpayment:** Once you are ready to proceed with production, you will be asked to pay 50% of the production cost of your plastic pieces and 100% of the tooling cost.

**Tooling Masters — 2-4 weeks:** We will create high-quality wax replicas of your miniatures. We then create a temporary silicon-based mold for each figure. We use the temporary molds to create resin tooling masters of your miniatures. These resin samples are analyzed for undercuts and other impediments to manufacturing. Our engineers will provide recommended changes to lower costs or improve structural integrity.



# PLASTIC MINIATURES TIMELINE

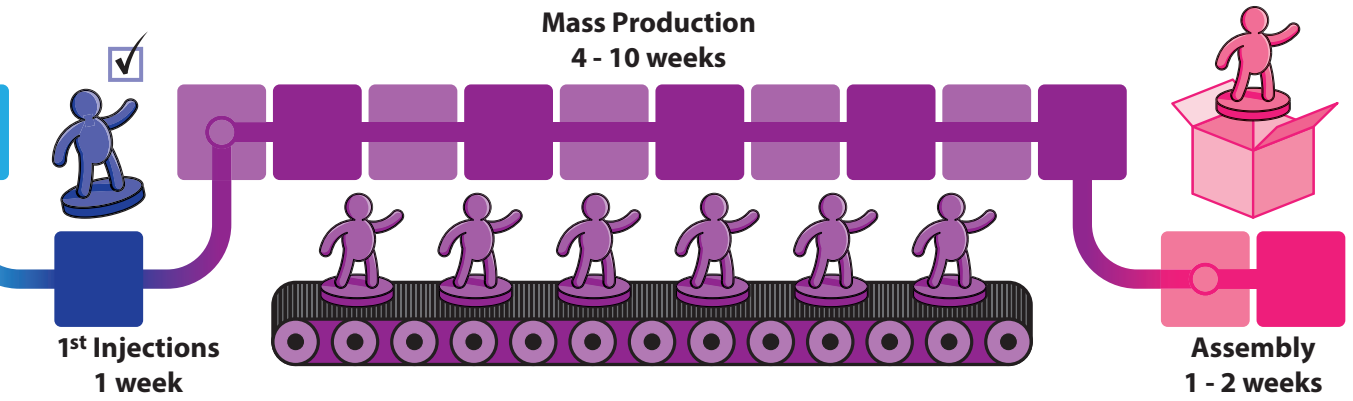
One set of tooling masters will be air shipped to you for approval. This is the final checkpoint before the steel production molds are made for your pieces. Once the tooling masters are approved, our team will use them to create final molds and no further changes can be made.

**Creation of Production Molds — 4-6 weeks:** Upon your approval, Panda will create steel production molds of your plastic pieces. Molds can be used over 300,000 times, so they will be available for future print runs of your game.

**Creation and Approval of First Injections — 1 week:** As soon as the molds are made, our team will send the first test injections through your mold. Production quality miniatures will be sent to you for approval. Once you have received and approved these miniatures, mass production will begin.

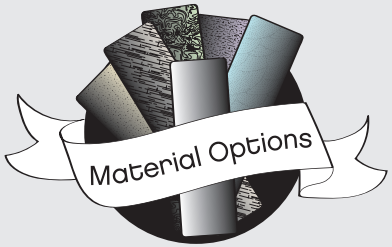
**Mass Production — 4-10 weeks:** During this time, all of your plastic pieces will be manufactured. Once production is completed, you will receive final production samples of your plastic pieces.

**Assembly and Packaging — 1 - 2 weeks:** Assembly time varies based on project complexity.



# POLYRESIN PIECES






If custom injection plastics are a bit too complex for your needs, polyresin can be a simpler alternative. Resin pieces are made with a silicone mold, which makes them much easier to manufacture than plastic miniatures. Due to the brittle nature of resin material, custom polyresin pieces must have strong structural integrity.

Polyresin pieces can be custom painted with multiple colors. We recommend that polyresin pieces be kept to under 30 mm in diameter.

The process for developing custom resin bits is very similar to the process for miniatures.

**Submitting Your Design:** Please submit 3D STL files for your designs of custom polyresin pieces. Our factory may make small adjustments to optimize for mass production.

*Examples of our polyresin pieces can be found in Element.*

# GLOSSARY OF COMMON TERMS

**Acrylonitrile Butadiene Styrene (ABS)**
ABS plastic is a very hard plastic that is most commonly used for geometric shapes with little detail. It is expensive to manufacture but can be a good choice for pieces such as miniature bases. ABS also looks good when translucent.

**Acrylic (Polymethyl Methacrylate)**
Acrylic is a very hard plastic that can be both transparent and polished. However, it is the most expensive type of plastic that we manufacture.

**Clay Composite**
Clay Composite is a material that consists of clay mixed with plastic that is used for poker chips.

**Electroplated Zinc**
Electroplated zinc is the most commonly used metal alloy for metal coins. It is durable and will carry a whole host of finishes: solid or translucent, glossy or matte.

**Foil**
Stamped foil is available in gold, silver, and other metallic hues. Foil can be applied to flat plastic surfaces as well as printed materials.

**Heat Transfer**
Heat transfer is a process by which a full color image is printed and then adhered to a plastic surface.

**High Impact Polystyrene (HIPS)**
HIPS is a graft copolymer of polystyrene used in injection molding that is less brittle than polystyrene.

**Pantone C / PMS**
The Pantone Matching System (PMS) is a system for designating specific colors. Pantone colors are used to indicate consistent CMYK colors as well as metallic and other inks not producible by a CMYK process. Due to the nature of our product line, we request colors come from Pantone's Coated line. See pantone.com for more information.

**Polyoxymethylene (POM)**
POM is an opaque plastic that is utilized for its hardness and durability.

**Resin / Polyresin**
Resin is a thermoplastic best used for less detailed pieces. Resin pieces are made with a silicone mold which is much more affordable and flexible than the standard steel mold. Silicone molded pieces can be made with some undercuts, but resin is somewhat brittle, and therefore breaks more easily. It is best suited for shapes with a strong structural integrity. Consequently, we do not recommend making humanoid figures in resin.

**Polystyrene (PS)**
PS plastic is most commonly used for plastic inserts and small plastic cubes. It is the most affordable type of plastic that Panda manufactures. However, it is also a fragile plastic that is best used for shapes with strong structural integrity.

**Polyvinyl Chloride (PVC)**
PVC is typically used when creating humanoid figures that have a high level of detail. PVC plastics can vary in hardness depending on the manufacturing process. The hardness of PVC is graded in degrees. We typically manufacture plastics that are between 60 and 110 degrees. Lower degree ratings equate to softer plastics. Manufacturing PVC in a softer plastic allows there to be slight undercuts in the designs while harder plastic retains more detail. Typically, Panda will use the hardest PVC possible while still retaining the viability and integrity of the original designs.

**Silk Screen**
Silk screening is a method for stenciling on individual Pantone inks to a flat surface, up to four per component.

**Tooling**
Tooling refers to a fixed production cost for the development of a mold.

**Vacuum Mold**
A vacuum mold is a special mold that uses heat and suction to form a sheet of plastic. This is primarily utilized for plastic box inserts and component containers.

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