Phillips Medisize
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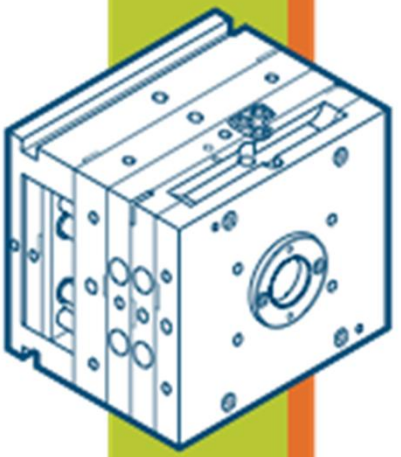
Mold Classification Guide

Phillips-Medisize focuses on providing customers with every level of tooling needed for the overall design and manufacturing of a product. This dedication helps achieve program objectives on time and within budget.



Choosing The Right Tooling Class

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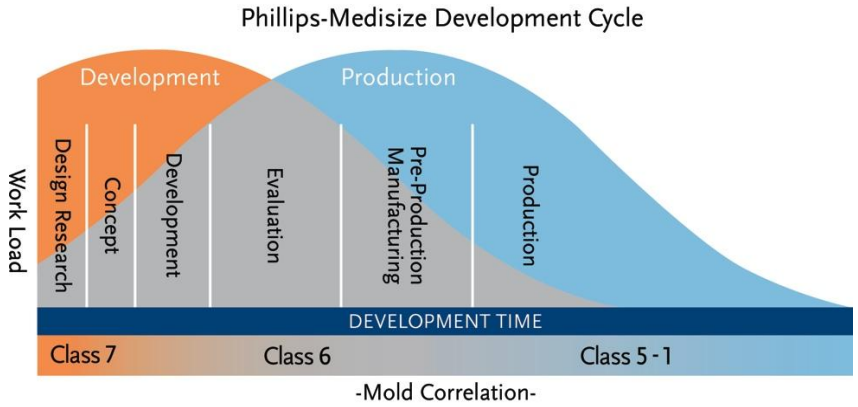
What Is The Right Tool Class For Your Development Program?

Phillips-Medisize offers three tooling classes – 5, 6, and 7 – for development purposes, as shown on the Phillips-Medisize Mold Classification Chart. Three development tool offerings enable a selection of tooling to meet the objectives of both your current development stage and overall program goals.

All development tooling is not created equal. A well-conceived development tooling strategy takes into consideration the complete cost of tooling and piece parts for your entire product development cycle. Phillips-Medisize works with you to create a successful developmental tooling strategy for your application by asking key questions and evaluating part geometry and material selection.

Each development program is unique, and therefore requires a carefully chosen developmental tooling strategy. Partnering with Phillips-Medisize early in the product development cycle promotes collaboration on a combined developmental and production tooling strategy. Choosing the right tooling strategy will provide you the opportunity to optimize overall program cost, manage risk, and ensure a smooth transition to commercialized product.



7 Questions For Tooling Strategy

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The following questions were developed by Phillips-Medisize to create a successful developmental tooling strategy.

What is the primary use for the parts?

The primary part use has a direct impact on the tooling class selection. For example, “fit and function” part needs may be well suited to class 7 molds, while “clinical build” parts will most likely be better suited to class 5 molds that can be validated.

What is the expected quantity of parts to be produced over the life of the mold?

A mold material and tooling approach must be selected to achieve program goals for tooling and piece part costs.

How closely do the part/tool designs need to replicate the intended production process?

To put it another way, how much learning is required during development to reduce risk in production launch? A class 5 mold provides greater opportunity to solve problems during development rather than production launch, than a class 7 mold.

What are the dimensional expectations for the program?

Tighter tolerances require different mold materials and construction techniques.

What are the cosmetic (appearance) requirements for the program?

Much like dimensional expectations, cosmetic requirements drive the mold material and construction techniques. More stringent cosmetic requirements increase cost and lead-time.

What are the first sample timing requirements after approved CAD database is available? Are expediting costs acceptable to meet timing needs?

100 percent CNC-cut geometry in a class 7 aluminum mold provides the shortest lead-time and lowest cost, with trade-offs in other areas. However, lead-time for all tool classes may be reduced by expediting costs.

What is the most critical characteristic of the program?

While quality, cost, and delivery are all important, an understanding of the needs in each of these areas can help achieve balance in your developmental tooling strategy. In general, the greater the quality, appearance, and production replication needs, the greater the tooling cost and timing. In many cases, the additional cost and timing invested in a class 5 mold may be worthwhile to provide greater learning for production, allow for more mold revisions, and produce a higher quantity of parts at a lower piece part cost than would be possible from a class 7 mold.

The following Mold Classification chart is to be used as a guideline to closely align tooling specifications with customers needs. If you have any questions, please contact your local Phillips-Medisize sales or engineering representative.

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	Production Tooling				Developmental Tooling		
Mold Classification	**Phillips-Medisize Class 1**	**Phillips-Medisize Class 2**	**Phillips-Medisize Class 3**	**Phillips-Medisize Class 4**	**Phillips-Medisize Class 5**	**Phillips-Medisize Class 6**	**Phillips-Medisize Class 7**
Tool Life/Cycles*	1,000,000+	Under 1,000,000	Under 500,000	Under 100,000	Under 50,000	Under 10,000	Under 5,000
Mold Design per Phillips Specification Book	Production tooling specifications	Production tooling specifications	Production tooling specifications	Production tooling specifications	Production tooling specifications	Developmental tooling specifications	Developmental tooling specifications
Steel Certification	Required	Required	Required	Required	Recommended	Not required	Not required
Mold Base Certification	Dedicated SS mold base to be minimum 28 Rc	Dedicated mold base to be minimum 28 Rc	Dedicated mold base to be minimum 8 Rc	Mild steel or aluminum (universal base optional)	Mild steel or aluminum (universal base optional)	Mild steel or aluminum (universal base optional)	Universal base
Mold Surface Materials - Cavities, Cores, Inserts, Etc.	Min. 48 Rc (25% spares quoted as separate line item)	Min. 48 Rc	Min. 28 Rc	Mild steel, aluminum, or any other agreed upon material	Mild steel, aluminum, or any other agreed upon material	Mild steel, aluminum, or any other agreed upon material	Aluminum
Mold Construction Techniques	CNC cut + EDM	CNC cut + EDM	CNC cut + EDM	CNC cut + EDM	CNC cut + EDM	CNC cut + EDM	100% CNC cut
Guided Ejection	Required	Recommended	Recommended for hard to eject parts	Recommended for hard to eject parts	Not required	Not required	Not required
Parting Line Locks	Required	Recommended	Recommended	Not required	Not required	Not required	Not required
Side Actions - Forming Undercuts	Slides or lifters only	Slides or lifters only	Slides or lifters only	Slides or lifters only	Slides or lifters only	Pickouts, slides, or lifters	Pickouts only
Slide Wear Plates	Required	Recommended	Recommended	Not required	Not required	Not required	Not required
Temperature Control Provisions in Cavities, Cores, Slides Wherever Possible	Required	Required	Recommended	Recommended	Recommended	Optional	Optional
Corrosion Resistant / Plate Cooling Channels	Required	Recommended	Not required	Not required	Not required	Not required	Not required

***Note:** Highly abrasive, corrosive, or difficult to process materials may significantly reduce these numbers or change the classification requirements.

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Part Characteristics							
Part Size	Open, up to dedicated base	Open, up to dedicated base	Open, up to dedicated base	Open, up to dedicated base	Open, up to dedicated base	Open, up to dedicated base	Open, up to dedicated base
Part Geometry / Complexity	No geometry or complexity limitations	No geometry or complexity limitations	No geometry or complexity limitations	No geometry or complexity limitations	No geometry or complexity limitations	No geometry or complexity limitations	Low complexity; minimal step parting line
Part Surface Finish	Up to SPI A1 texture available	Up to SPI A1 texture available	Up to SPI A2 texture available	Up to SPI A3 texture available	Up to SPI A3 texture available	Up to SPI A3 texture available	Up to SPI A3, (max for aluminum
Part Intent / Function							
Dimensional Tolerances**	Up to SPI Fine	Up to SPI Fine	Up to SPI Fine	Up to SPI Fine	Up to SPI Fine	Up to SPI Commercial	Commercial plus .003"
Intended Part Use	Production	Production	Production	Production	Market-entry of low volume production	Fit, form, function; limited production where validation is not required	Fit, form, and function; not representative of production parts; not for validation or production use
Tool Design Intent	Production tool design (based on SPI 101)	Production tool design (based on SPI 102)	Production tool design (based on SPI 103)	Production tool design (based on SPI 104)	Mimic production tool concept (production facility design involvement)	Minimal production plant involvement; basic review for long-term manufacture	Minimal engineering evaluation of part and tool design for long-term manufacture
Delivery							
Estimated Build Time	8+ Weeks	7+ Weeks	6+ Weeks	5+ Weeks	4+ Weeks	3+ Weeks	5+ Business Days

****Note:** Selective areas of a part can be held to "fine" tolerance based on the *SPI Guide for Standards and Practices of Plastic Molders*. There are many factors which affect a molders ability to meet tight tolerances, please contact your Phillips-Medisize representative for additional information.