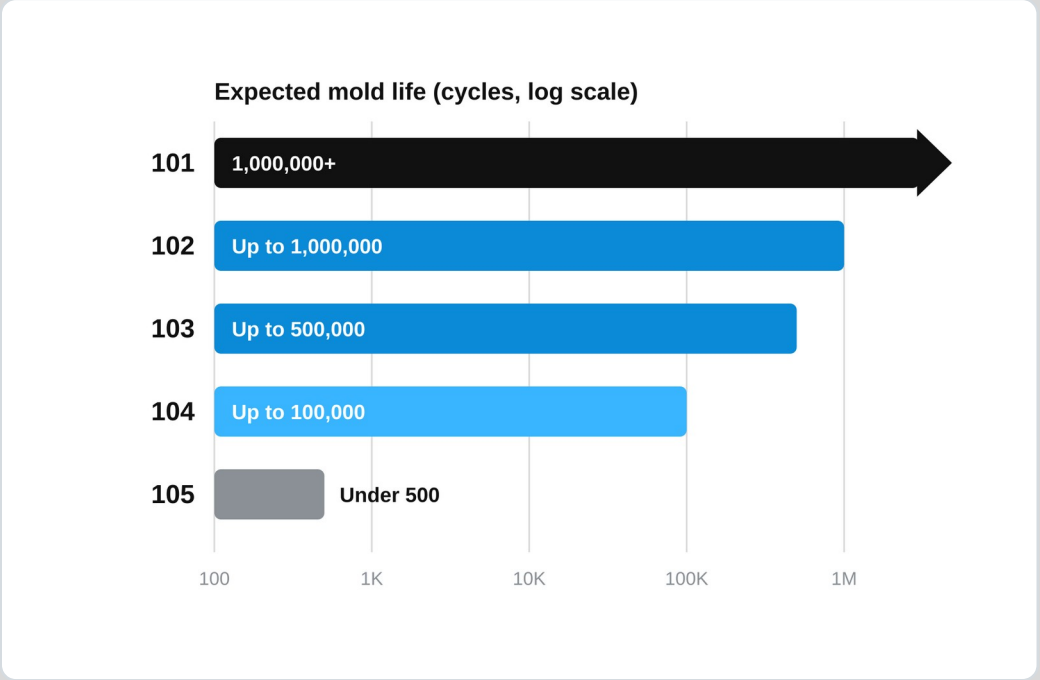
TRUE POSITION PLASTICS

TOOLING GUIDE

SPI Mold Classifications

Class 101 to 105: what each class means, how it's built, and how to pick the right one.



2026 Edition

Five classes at a glance

These classifications were originally defined by the SPI (Society of the Plastics Industry), now the PLASTICS Industry Association. They are widely used in North America and globally to set expectations between buyer and moldmaker.

CLASS 101	CLASS 102	CLASS 103	CLASS 104	CLASS 105
1,000,000+ cycles	**Up to 1,000,000 cycles**	**Up to 500,000 cycles**	**Up to 100,000 cycles**	**Under 500 cycles**
High-volume production	**Medium to high-volume production**	**Medium-volume production**	**Low-volume production**	**Prototype / short runs**
Premium mold construction	High quality, slightly less robust than 101	General-purpose molds	Limited tool steel and cooling	Often aluminum or soft tool steel

Cycle counts are expected life for the class, not a guarantee. Maintenance, material, and processing decide the real number.

SIDE BY SIDE

What each class requires

Requirement	101	102	103	104	105
Expected life	1,000,000+	Up to 1,000,000	Up to 500,000	Up to 100,000	Under 500
Detailed mold design	**Required**	**Required**	Recommended	Recommended	Not required
Mold base hardness	**280 BHN min.**	**280 BHN min.**	165 BHN min.	Mild steel or aluminum	Any material
Cavities and cores	**48 HRC min.**	**48 HRC min.**	280 BHN min.	Aluminum, mild steel, or agreed metal	Cast metal, epoxy, or any suitable material
Guided ejection	**Required**	Depends on volume	Optional	Optional	Optional
Slide wear plates	**Required**	Depends on volume	Optional	Optional	Optional
Corrosion-resistant cooling	**Required**	Depends on volume	Optional	Optional	Optional
Parting line locks	**Required**	Recommended	Optional	Optional	Optional

280 BHN is about 29 HRC (pre-hardened steel such as P20). 165 BHN is soft, mild-steel range. Blue marks a firm requirement.

Class 101 tooling in detail

Applications

- **Automotive production**
- **Consumer electronics**
- **Medical devices, when high repeatability is required**
- **Any high-cavitation mold running 24/7**

Typical construction requirements

Tool steel	High-grade tool steel such as H13, S7, or hardened stainless like 420SS.
Hardness	Cores and cavities hardened to at least 48–50 HRC. Mold base at least 280 BHN.
Cooling	Full cooling system with corrosion-resistant or plated channels.
Ejection	Guided ejection, built for long-term, high-cycle performance.
Parting lines	Precision ground, with wear-resistant inserts and parting line locks.
Guiding	Precision leader pins, bushings, and interlocks. Slides run on wear plates.

Maintenance and real-world mold life

Expected maintenance

- Regular preventive maintenance is essential.
- Hot runner systems are typically included and maintained accordingly.
- Inserts may need replacement or re-polishing periodically over the mold's life.
- Track cycles with a mold counter so maintenance runs on shots, not on the calendar.

Cycle life vs. maintenance

Class 101 molds are designed for 1 million+ cycles, but real life can exceed **2–3 million cycles** with proper:

- Maintenance and cleaning
- Mold steel selection
- Part design (abrasiveness, ejection force, flash issues)
- Processing parameters (pressure, speed, temperature)

Production molds below Class 101

Class 102 Up to 1,000,000 cycles

Medium-to-high production. High quality at a fairly high price.

- Detailed mold design required
- Mold base 280 BHN min.; cavities and cores 48 HRC min.
- Guided ejection, wear plates, and plated cooling depend on the volume expected
- Parting line locks recommended

Best for: abrasive materials (glass or mineral filled) and close-tolerance parts.

Class 103 Up to 500,000 cycles

Medium production. The most popular general-purpose class.

- Detailed mold design recommended
- Mold base 165 BHN min.; cavities and cores 280 BHN min. (pre-hardened, such as P20)
- All other extras optional

Best for: low-to-medium production in non-abrasive resins, where budget matters.

Low-volume and prototype molds

Class 104 Up to 100,000 cycles

Low production. Limited tool steel and cooling.

- Detailed mold design recommended
- Mold base may be mild steel or aluminum
- Cavities in aluminum, mild steel, or another agreed metal
- Expect shorter life with abrasive materials

Best for: limited runs, bridge tooling, and non-abrasive materials.

Class 105 Under 500 cycles

Prototype only. Built to prove the design, not to run production.

- Often aluminum or soft tool steel; may be cast metal or epoxy
- Minimal features; everything else is optional
- Parts may not match production tooling exactly

Best for: fit, form, and function checks before committing to production steel.

Common mold steels and where they fit

Material	Typical hardness	Character	Typical class
H13	48–52 HRC (hardened)	Tough, heat-check resistant; the standard for hardened cavities	101, 102
S7	54–56 HRC (hardened)	Shock resistant; good for shut-offs and high-wear details	101, 102
420 stainless	48–52 HRC (hardened)	Corrosion resistant, polishes well; medical and corrosive resins	101, 102
P20	28–32 HRC (pre-hardened)	Machines easily, no heat treat; the general-purpose workhorse	103 (102 mold bases)
Mild steel (1018/1045)	Below 20 HRC	Low cost, wears quickly; plates and low-stress parts	104
Aluminum (7075, QC-10)	About 150–170 BHN	Fast to machine, excellent cooling, low wear resistance	104, 105

Hardness values are typical ranges; the final spec depends on the steel supplier and heat treat.

How to choose the right class

Total cycles over the program

Annual volume × program years ÷ cavities. Classes are rated in mold cycles, not parts.

Material abrasiveness

Glass, mineral, or flame-retardant fillers wear soft steel fast. Specify hardened cavities.

Tolerance and cosmetics

Tight tolerances and high-polish finishes call for hardened, stable steel.

Upfront cost vs. cost per part

A higher class costs more to build but less per part at high volume.

WORKED EXAMPLE

150,000 parts per year for 5 years, in a 4-cavity mold:

750,000 parts ÷ 4 cavities = 187,500 cycles

By volume alone, Class 103 covers it.

If the resin is 30% glass-filled, upgrade the cavities and cores to 102-level hardened steel (48 HRC min.).

Specify the class on the quote request so every moldmaker prices the same mold.

SUMMARY

Key takeaways

Class 101 molds are top tier, built for longevity, high-speed cycles, and minimal downtime. They carry the highest upfront cost but offer the lowest cost per part over time when production volumes are high.



Match the class to the volume

Over-building wastes money; under-building wears out the mold before the program ends.



Material changes the answer

Abrasive or corrosive resins justify hardened or stainless steel at any volume.



Maintenance sets real life

A well-kept mold can run far past its class rating. A neglected one won't reach it.

We hope this helps you specify the right mold for your program.

About True Position Plastics

We specialize in complete tooling and process solutions, from DFM and mold design reviews to complex multi-cavity mold builds, including 3-plate systems, hot runner designs, and insert molding.

We work directly with trusted global mold vendors, providing full project management from quotation to first shots and press-side support during validation.

If you have an injection molding project, a mold design question, or need a second set of experienced eyes on your tooling, we're here to help.

TRUE POSITION PLASTICS
WWW.TRUEPOSITIONPLASTICS.COM

Contact us
justin@truepositionplastics.com
www.truepositionplastics.com
650-313-1715

Scan to visit