Hardened Tool-Steel Injection Mould Cores & Cavities

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This solution looks at how VT machining manufactures **injection mould cores, cavities and inserts that must hold fine detail at high hardness** for the tooling & mould sector, and how process and material choices combine to hit demanding requirements. It is written as a starting point for your own design discussion — every part is ultimately quoted and engineered to your drawing.

The natural first choice for this kind of component is H13 Tool Steel. H13 is a hot-work tool steel with excellent thermal fatigue resistance and toughness at high hardness, ideal for mould tooling exposed to repeated thermal cycling.

Why H13 Tool Steel?

H13 Tool Steel is specified here because of how its properties match the duty of injection mould cores, cavities and inserts that must hold fine detail at high hardness. We confirm the exact grade, temper or heat-treat condition with you before machining, and can supply material certificates for traceability. See our dedicated CNC Milling H13 Tool Steel capability page for process-and-grade detail.

Material Alternatives & Substitutions

Depending on cost, corrosion, strength or weight priorities, several alloys can substitute for H13 Tool Steel. Each links to its machining capability page:

Alternative	When to choose it
P20 Mould Steel	pre-hardened, machined directly without further heat treat for general mould bases
S136 Mould Steel	corrosion-resistant, mirror-polishable for optical and medical mould surfaces
NAK80 Mould Steel	pre-hardened to ~40 HRC with excellent polishability and EDM response
D2 Tool Steel	high-carbon high-chromium for maximum wear resistance on cold-work details

Recommended Process Routes

For injection mould cores, cavities and inserts that must hold fine detail at high hardness, the core shaping operations are usually:

- CNC Milling — primary shaping of the main geometry.
- CNC Sinker EDM — primary shaping of the main geometry.
- CNC Wire EDM — primary shaping of the main geometry.

High-Tolerance Process Combination

Where the drawing calls for cavity tolerances within a few microns, sharp internal corners by EDM and a polished or textured cavity finish, a single operation is rarely enough. We recommend combining processes in sequence so each stage refines the last:

1. CNC Milling — rough and semi-finish the part close to net shape, leaving controlled stock for finishing.
2. CNC Surface Grinding — bring critical features to final size and geometry with a precision finishing pass.
3. CNC Sinker EDM — produce the tightest features or hardened-material details that cannot be cut conventionally.
4. CNC Polishing — achieve the final surface finish, edge condition and cosmetic quality.

Sequencing the work this way isolates roughing distortion from the finishing stages, which is how tight tolerances are held repeatably in production. We plan the exact route from your tolerance scheme and first-article results.

Feature & Secondary Operations

Additional features and finishing are added with:

- CNC EDM Drilling
- CNC Honing
- CNC Engraving
- CNC Deburring

Related Applications

This solution supports the following application areas — each shows the broader range of parts and materials we make for that industry:

- Industrial Machinery
- Electronics & Enclosures

Standards & References

Relevant standards for this kind of work include AISI H13 / DIN 1.2344, ISO 8688 (tool life testing). These are cited for guidance only; we work to the standards and revisions named on your drawing.

Authoritative public references used in preparing this overview:

- Tool steel families and hardening overview
- Laser texturing of martensitic stainless/tool steel (surface engineering)

Frequently Asked Questions

What is the best material for injection mould cores, cavities and inserts that must hold fine detail at high hardness?

H13 Tool Steel is the usual first choice because h13 is a hot-work tool steel with excellent thermal fatigue resistance and toughness at high hardness, ideal for mould tooling exposed to repeated thermal cycling. Alternatives such as P20 Mould Steel, S136 Mould Steel, NAK80 Mould Steel are used when cost, corrosion or weight priorities differ.

Which processes hold the tightest tolerances for injection mould cores, cavities and inserts that must hold fine detail at high hardness?
We combine processes in sequence — typically CNC Milling, CNC Surface Grinding, CNC Sinker EDM, CNC Polishing — so roughing distortion is separated from finishing and the critical features are produced last.

Can you machine H13 Tool Steel to my drawing?
Yes. Send your CAD or 2D drawing, the grade and condition, the quantity and any finish or inspection requirements, and our engineers will confirm feasibility, pricing and lead time — usually within one business day.

What quality documentation can you provide?
Material certificates, dimensional inspection reports and first-article documentation are available on request, aligned to the standards named on your drawing.

Need injection mould cores, cavities and inserts that must hold fine detail at high hardness manufactured to your spec? Send your drawing and quantity for a fast quotation.

Request a Quote