# Injection Molding Design Checklist

✔ Use this checklist during product development, mold design, and trial runs to ensure high-quality, cost-effective injection molding results. Print and check each box as you review.

## 1. Part Design

| | |
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| ■ | Ensure uniform wall thickness (variation ≤ ±15%). |
| ■ | Add fillets and radii (≥0.5× wall thickness). |
| ■ | Avoid sharp corners; use gradual transitions. |
| ■ | Include draft angles (1–2° typical). |
| ■ | Design ribs and bosses correctly (0.5–0.7× nominal wall). |

## 2. Gate and Runner Design

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| ■ | Position gates at thickest sections for proper packing. |
| ■ | Minimize weld lines by careful gate placement. |
| ■ | Use hot-runner systems for high-volume production. |
| ■ | Balance runner layout for even filling. |
| ■ | Check gate size for optimal flow. |

## 3. Cooling System

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| ■ | Place cooling channels close to cavity surface. |
| ■ | Use conformal cooling for complex parts. |
| ■ | Maintain uniform mold temperature. |
| ■ | Target 60–70% of cycle time for cooling. |
| ■ | Run mold-flow simulation to find hot spots. |

## 4. Material Selection

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| ■ | Choose resin for mechanical/chemical requirements. |
| ■ | Account for shrinkage and stability. |

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| ■ | Verify additive compatibility. |
| ■ | Ensure UV/flame rating if required. |
| ■ | Follow supplier's recommended processing window. |

## 5. Mold Construction

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| ■ | Select proper mold steel based on production volume. |
| ■ | Provide adequate venting to prevent burns. |
| ■ | Locate parting lines in non-critical areas. |
| ■ | Ensure proper ejector pin layout. |
| ■ | Specify surface finish per SPI standard. |

## 6. Assembly Considerations

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| ■ | Use inserts with retention features (knurling/undercuts). |
| ■ | Design snap-fits to reduce assembly time. |
| ■ | Avoid excessive interference fits. |
| ■ | Plan for automation when volumes are high. |

## 7. Quality & Tolerance

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| ■ | Define achievable tolerances for molding process. |
| ■ | Compensate for shrinkage in tool design. |
| ■ | Plan for first-article inspection (FAI). |
| ■ | Monitor process with SPC. |
| ■ | Run mold trials before mass production. |

## 8. Cost & Efficiency

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| ■ | Choose cavity number based on volume. |
| ■ | Use family molds carefully (similar cycle times). |
| ■ | Evaluate cycle time and scrap rate. |
| ■ | Apply lean manufacturing principles. |