

## Mold Steel & Material Compatibility Guide

Choosing the right mold steel is critical for ensuring optimal performance and longevity of your molds. This guide provides an overview of common and specialized mold steels, their key properties, typical applications, compatible molding materials, price levels, and why you might choose each one.

Mold Steel / Material	Key Properties	Typical Applications	Compatible Molding Materials	Price Level (1-5)	Why Choose This?
P20 (AISI P20 / 1.2311 / 3Cr2Mo)	<ul style="list-style-type: none"> <li>Pre-hardened HRC 28–32</li> <li>Good machinability, weldable</li> <li>Moderate wear resistance</li> </ul>	General injection molds, housings, non-critical parts	ABS, PP, PE, PS, PA6	1	Most cost-effective for prototypes & low-volume production
718H (1.2738 / ASSAB 718HH)	<ul style="list-style-type: none"> <li>Pre-hardened HRC 33–37</li> <li>Higher purity than P20</li> <li>Excellent dimensional stability</li> </ul>	Large appliance molds, automotive interior, high-cycle molds (>500K shots)	PC/ABS, TPO, PP	2	Upgraded P20—better polish, toughness, and longevity
NAK80 (JIS NAK80)	<ul style="list-style-type: none"> <li>Pre-hardened HRC 38–41</li> <li>Mirror polish (<math>R_a \leq 0.01\mu\text{m}</math>)</li> <li>Uniform etching texture</li> </ul>	Consumer electronics, cosmetic packaging, optical lenses	PMMA, PC, LCP, PBT	3	No heat treatment needed—ideal for fast-turn projects
S136 (1.2083 / AISI 420 Modified)	<ul style="list-style-type: none"> <li>Stainless, corrosion-resistant</li> <li>Polish to optical grade</li> <li>HRC 48–52 after HT</li> </ul>	Medical devices, food packaging, water-contact parts	FDA-grade resins, PVC, SAN	4	Zero rust risk—meets ISO 13485 for medical molds
420SS (AISI 420 / 1.2083 Variant)	<ul style="list-style-type: none"> <li>Martensitic stainless</li> <li>HRC 50–54 after HT</li> <li>Moderate corrosion resistance</li> </ul>	Pump housings, outdoor enclosures, mid-tier cosmetic molds	ABS, PVC, PP	3	Affordable stainless option with decent polish
H13 (AISI H13 / 1.2344 / SKD61)	<ul style="list-style-type: none"> <li>Hot-work steel</li> <li>HRC 48–52</li> <li>Excellent thermal fatigue resistance</li> </ul>	BMC/DMC molds, motor stators, EV components, under-hood auto	BMC, PPS, PEEK, LCP	3	Industry standard for high-temp thermoset molding
SKD61 (JIS SKD61 $\approx$ H13)	<ul style="list-style-type: none"> <li>Japanese equivalent of H13</li> <li>Tighter chemistry control</li> <li>Preferred by Japanese OEMs</li> </ul>	Japanese motor molds, power tool housings	BMC, PBT-GF	3	Meets JIS G4404—trusted in Asia-Pacific supply chains
Custom BMC Alloys	<ul style="list-style-type: none"> <li>CTI &gt; 600V</li> <li>High thermal conductivity</li> <li>Nitriding compatible</li> </ul>	High-voltage insulators, circuit breakers, EV battery trays	Electrical-grade BMC	5	Engineered specifically for arc-resistant, high-reliability BMC parts
DC53 (JIS DC53)	<ul style="list-style-type: none"> <li>Cold-work steel</li> <li>HRC 60–64 after HT</li> <li>2x toughness of SKD11</li> </ul>	High-wear inserts, thin-wall sliders, ejector pins	GF-PA, GF-PBT, PPS	4	Resists chipping in abrasive glass-filled resins
D2 (AISI D2 / 1.2379)	<ul style="list-style-type: none"> <li>High-carbon, high-chrome</li> <li>HRC 58–62</li> <li>Excellent wear resistance</li> </ul>	Precision inserts, cutting edges, long-life cores	Engineering plastics with fillers	3	Classic wear-resistant steel for critical mold components
A2 (AISI A2 / 1.2363)	<ul style="list-style-type: none"> <li>Air-hardening cold work steel</li> <li>Good dimensional stability</li> <li>HRC 58–60</li> </ul>	Medium-wear inserts, gauges, forming tools	Standard thermoplastics	2	Balanced wear/toughness at moderate cost

M2 (AISI M2 / 1.3343)	<ul style="list-style-type: none"> <li>• High-speed steel (HSS)</li> <li>• HRC 62–65</li> <li>• Retains hardness at high temp</li> </ul>	Micro-machining electrodes, fine-detail EDM parts	All (used for tooling, not direct molding)	4	For ultra-fine features requiring extreme edge retention
Elmax (Uddeholm Elmax / Powder Metallurgy)	<ul style="list-style-type: none"> <li>• High-corrosion stainless PM steel</li> <li>• HRC 54–58</li> <li>• Wear + corrosion resistance</li> </ul>	Medical, marine, corrosive chemical environments	PVC, flame-retardant resins	5	Premium powder steel—no trade-off between rust & wear
Vanadis 4 Extra (Uddeholm)	<ul style="list-style-type: none"> <li>• PM cold-work steel</li> <li>• Exceptional abrasive wear resistance</li> <li>• HRC 60–62</li> </ul>	High-GF content parts, abrasive composites	Long-fiber thermoplastics, mineral-filled PP	5	Best-in-class for extreme wear scenarios
S7 (AISI S7 / 1.2365)	<ul style="list-style-type: none"> <li>• Shock-resisting tool steel</li> <li>• High impact toughness</li> <li>• HRC 54–58</li> </ul>	Inserts subject to mechanical shock, snap-fit molds	Tough engineering plastics (e.g., PC/ABS)	3	Ideal when mold components face repeated impact stress
OHNS (Oil-Hardening Non-Shrinking)	<ul style="list-style-type: none"> <li>• Low distortion on hardening</li> <li>• Good dimensional control</li> <li>• HRC 58–60</li> </ul>	Precision molds requiring minimal post-HT adjustment	Precision optical or micro-fluidic parts	2	Cost-effective alternative to A2 for stable dimensions
HPM-MAGIC (Hitachi)	<ul style="list-style-type: none"> <li>• High-polish pre-hardened steel</li> <li>• Better than NAK80 in etching uniformity</li> <li>• HRC 37–41</li> </ul>	High-end smartphone housings, luxury packaging	LCP, PPS, transparent PC	4	Premium Japanese steel for brand-critical surface finish
STAVAX ESR (Uddeholm)	<ul style="list-style-type: none"> <li>• Electro-slag refined (ESR) S136</li> <li>• Ultra-clean, no porosity</li> <li>• Mirror polish + corrosion resistance</li> </ul>	Optical lenses, medical implants, semiconductor molds	Ultrapure resins, bio-compatible polymers	5	Highest-grade stainless for mission-critical applications

Contact Us

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