

Casting Process Comparison

Process	Precision Sand Castings	Green Sand Castings	No-Bake Sand Castings	Permanent Mold	Die Casting	Semi-Solid casting	Investment (Lost Wax) Castings
Common Alloys	aluminum, zinc, magnesium	Any Castable alloy	any castable alloy	Aluminum, Zinc, Brass	Aluminum A380, A413, A360, A383 Zinc #3, #7, #5 ZA8 Magnesium AZ91D	Aluminum A356 357 355 319 A390 380	any castable alloy
Typical Size Range Equipment dependent	oz. -200 lbs.	no limitation- equipment dependent	50 - 200 lbs.	oz. - 100 lbs.	oz. - 30 lbs.	Oz-15lbs	oz. - 20 lbs.
Tolerances approximations only Equipment and process control dependent	±.020" to 10", then add ±.001"/", thereafter. Add minimum of .010" across the parting line and for cored features.	Irons, Aluminum, brass +/- 1/32"/ft Steels +/- 1/16"/ft	±.020" to 10", then add ±.001"/", thereafter. Add minimum of .010" across the parting line and for cored features.	±.015"/" to 1", then add ±.002"/" thereafter. Add ±.010" to .030" across the parting line.	+/- .025 to +/- .010 Add ±.015" across the parting Line.	+/- .025 to +/- .010 Add ±.015" across the parting Line.	±.3" to 1/4" ±.4" to 1/2" ±.5" to 3", then add ± .003"/".
Flatness	Within .020" (geometry dependent)	All alloys .30-50" linear ft. (geometry dependent)	Within .030" (geometry dependent)	Within .015" (geometry dependent)	.008" up to 3" and .003" / in after	.008" up to 3" and .003" / in after	Within .015" (geometry dependent)
Surface Finish	125-175 RMS, except on cored areas.	500RMS typical	120-175 RMS, except on cored areas.	150-300 RMS	32-63 RMS	32-63 RMS	63-125 RMS
Minimum Draft Required	Zero to 3°	1° to 3°	1/2° to 3°	2° to 4°	1/2° to 3°	1/2° to 3°	None
Minimum Wall Section	Typical: .140"-. 187" Minimum: .080" (geometry dependent)	1/4"-1/2" depending on size and gating options	Typical: .187"-. 500" Minimum: .150" (geometry dependent)	Typical: .187"	.030" in zinc and Magnesium .060" Aluminum	.060"-.100"	.060"
Typical Quantities	All	All	All	>500	>2500	>2500	<1,000
Typical Tooling Price (N.R.E.)	\$500 - \$5000	\$500-\$25000 Core box, equipment and volume dependent	\$500-\$5000 Core box(s), and equipment dependent	\$10K - 15K	\$5K - 250K	\$5K - 250K	\$3K - 10K
Nominal Lead Times	Samples: 1 - 4 wks. Production: 1 - 5 wks. after approval.	Samples 4-6 weeks and Production 4-10 weeks	Samples: 2 - 8 wks. Production: 1 - 5 wks. after approval.	Samples: 12 - 16 wks. Production: 1 - 5 wks. after approval	Samples: 10-18 wks. Production: 8 -14 wks. after approval	Samples: 10-18 wks. Production: 8 -14 wks. after approval	Samples: 2 - 4 wks. Production: 5 - 12 wks. after approval