V-Process Aluminum Casting Advantages

Zero Degree Draft
This is a unique feature of the V-PROCESS, which reduces weight and machining, and offers thinner and consistent wall thickness.

Thin Walls
The V-PROCESS allows consistent wall thickness of 0.125”(3.175mm), thinner wall sections are achievable in isolated areas.

Tight Tolerances
The V-PROCESS produces castings approximately twice as accurate as typical sand castings:
+/- 0.010”(0.25mm) for the first 1”(25.4mm), add 0.002”(0.05mm) per inch thereafter, add +/-0.020”(0.508mm) across parting line.

Unlimited Pattern Life
We guarantee the pattern will last the life of your product with quick, easy, and inexpensive tool modifications.

150 RMS Finish
Compared to 250-550 for sand and 200-500 for permanent mold, V-PROCESS offers a considerable advantage.

Excellent Casting Integrity
With our automated molding line, the casting dimensions are repeatable.

MISSION STATEMENT
Harmony Castings exceeds customer expectations by delivering quality products and building long-term relationships based on trust and confidence in our performance. Our dealings with our customers, vendors, employees and our community are rooted in integrity.

Visit our website: harmonycastings.com
Send files and prints to: quotes@harmonycastings.com
### Aluminum Castings: Process Comparisons

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<th>Process</th>
<th>Typical Size Range</th>
<th>Tolerances</th>
<th>Surface Finish</th>
<th>Min. Draft Required</th>
<th>Min. Section Thickness</th>
<th>Nominal Lead Time</th>
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<td>V-PROCESS Castings</td>
<td>Up to 150 lbs</td>
<td>± .010” for the first 1”, then add ± .002” per inch. Add a maximum .020” across parting line</td>
<td>125-150 RMS</td>
<td>None</td>
<td>.125”</td>
<td>Samples: 2 to 6 weeks Production: 2 to 6 weeks after approval</td>
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<td>Sand Castings</td>
<td>Ounces to tons</td>
<td>± 1/32” to 6”, then add ± .003” per inch. Add ± .020” to .090” across parting line</td>
<td>200-550 RMS</td>
<td>1 to 5 degrees</td>
<td>.25”</td>
<td>Samples: 2 to 6 weeks Production: 2 to 6 weeks after approval</td>
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<td>Investment (Lost Wax)</td>
<td>Ounces to 20lbs</td>
<td>± .003” to 1/4”, ± .004” to 1/2”, ± .005” to 3”, then add ± .003” per inch</td>
<td>63-125 RMS</td>
<td>None</td>
<td>.060”</td>
<td>Samples: 8 to 10 weeks Production: 5 to 12 weeks after approval</td>
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<td>Permanent Mold</td>
<td>Ounces to 100lbs</td>
<td>± .015” to 1”, then add ± .002” per inch. Add ± .010” to .030” across parting line</td>
<td>150-300 RMS</td>
<td>2 to 5 degrees</td>
<td>.1875”</td>
<td>Samples: 8 to 20 weeks Production: 10 to 12 weeks after approval</td>
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<td>Plaster Mold</td>
<td>Ounces to 50lbs</td>
<td>± .005” to 2”, then add ± .002” per inch. Add ± .010” across parting line</td>
<td>63-125 RMS</td>
<td>1/2 to 2 degrees</td>
<td>.070”</td>
<td>Samples: 2 to 10 weeks Production: 4 to 8 weeks after approval</td>
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<td>Die Casting</td>
<td>Ounces to 15lbs</td>
<td>± .002” per inch. Add ± .015” across parting line</td>
<td>32-63 RMS</td>
<td>1 to 3 degrees</td>
<td>.030” to .060”</td>
<td>Samples: 12 to 22 weeks Production: 8 to 14 weeks after approval</td>
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</table>

### V-PROCESS Sequence

1. The pattern (with vent holes) is placed on a hollow carrier plate.
2. A heater softens the .003” to .008” plastic film. Plastic has good elasticity and a high deformation ratio.
3. Softened film drapes over the pattern with 200 to 400 mm Hg vacuum acting through the pattern vents to draw it tightly around the pattern.
4. The flask is placed on the film-coated pattern. Flask walls are also a vacuum chamber with the outlet shown at right.
5. The flask is filled with dry, unbonded sand. A slight vibration compacts sand to maximum bulk density.
6. A sprue cup is formed and the mold surface leveled. The back of the mold is covered with unheated plastic film.
7. Vacuum is applied to the flask. Atmospheric pressure then hardens the sand. The vacuum is released, pressurized air is introduced into the carrier and the mold is stripped.
8. The cope and drag assembly form a plastic-lined cavity. During pouring, molds are kept under vacuum.
9. After cooling, the vacuum is released and free-flowing sand drops away leaving a clean casting, with no sand lumps. The sand is cooled for re-use.