

ZA-12 Thin Wall Gravity Casting

The superior fluidity of Eastern's ZA[®] zinc-aluminum alloys is causing some foundries and casting buyers to re-evaluate their ability to cast and design light section components. These components could incorporate wall sections of 0.100 inches and less, produced using conventional sand and permanent mold casting methods.

Good examples of thin wall ZA casting are blender base housings for Hamilton Beach Co., Waterbury, CT. The two-piece housings (approximately 9"x9"x5" deep) were designed and are being produced as ZA-12 sand castings with wall sections of 0.094 inches. Wall sections of 0.375 inches or greater would be typical of these housings when in cast aluminum.

ZA-12 sand casting was chosen over die casting and permanent mold casting due to low tooling costs. Die casting was a natural consideration; however Hamilton Beach's quantity requirements (several thousand/year) could not justify the high tooling cost of die casting.

The success of the housings as sand castings is partially due to the special capabilities of Lion Head Cast Products, Bridgeport CT. Lion Head makes use of a very fine, natural bond sand system (00 Albany Sand), which produced a superb finish as well as better than average sand cast tolerances. Lion Head relied upon several years of ZA casting experiences to tackle the new, thin wall applications. Their success is an outstanding example of what is possible when sand casting with zinc-aluminum alloys.

Another recent example of thin wall ZA-12 parts are permanent mold castings made for Alta Technology, Inc., Stamford, CT. Four ZA-12 components were designed for their new check cancelling machine. Alta, a high-technology company, demanded thin wall castability as well as strength, rigidity and good finishing characteristics. One of the castings requires a polished and chromium plated surface to act as a mirror to reflect a beam of light.

Alta looked at several casting methods and materials, including Imported components from France. A U.S. source, however, was chosen, General Machine and Foundry, Inc, Wilton, NH, produced the castings in ZA-12. The flat frame components were cast to 0.090 inch nominal wall thickness with rib section of 0.070 inches. The foundry, which also permanent molds aluminum, Incorporated innovative die design and casting techniques with ZA-12. The new technology resulted in exceptionally smooth surfaces, far superior to their standard aluminum finish.

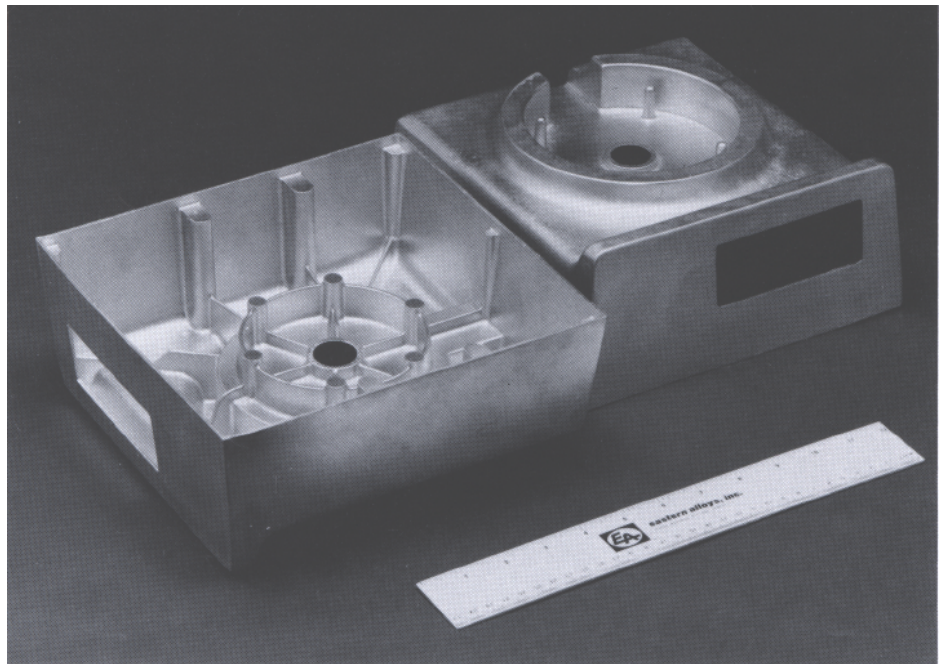
Why thin walls?

The thin wall castability of ZA-12 is a function of two inherent properties of zinc-aluminum alloys superior casting fluidity and high density. Compared to aluminum, ZA-12's density creates high static pressure during casting which, when coupled with enhanced fluidity, helps fill them mold sections. It should be noted that both foundries tried standard aluminum alloys after successfully making ZA-12 castings. Both were unable to make acceptable aluminum castings due to incomplete fill and other casting difficulties.

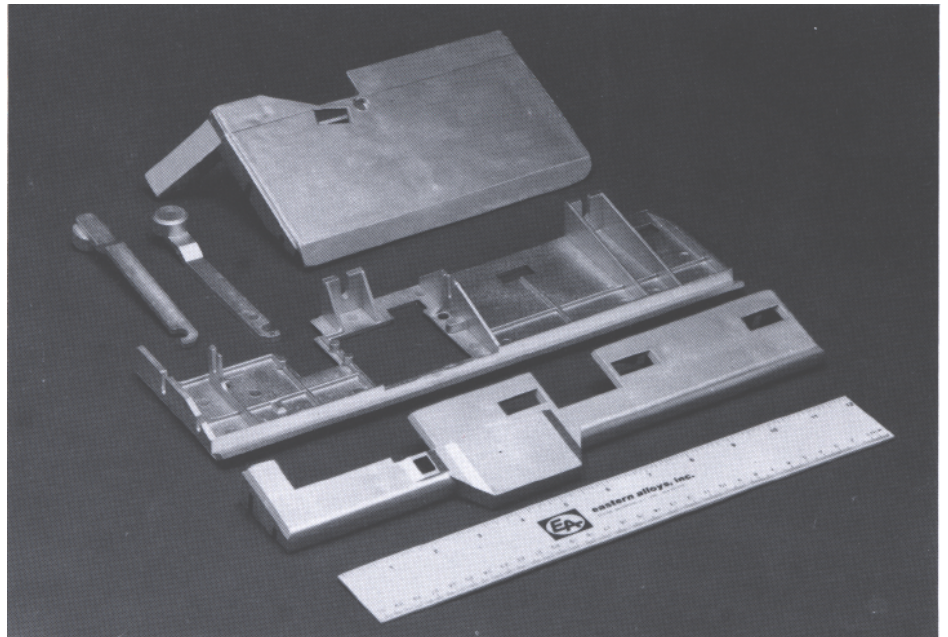
Foundries have often said that thinner than normal castings were possible with ZA alloys. These illustrations are current examples of what can be done to extend the limits of standard casting processes by taking advantage of the improved foundry characteristics of ZA alloys. The result is new opportunities for designers and material specifiers to reconsider conventional sand and permanent mold casting methods for thin wall designs using zinc-aluminum alloys.

For further information on ZA alloys, contact Eastern

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Hamilton Beach Co. blenderbase casting features thin wall (0.094 inch) ZA-12 sand casting. The commercial grade blender uses a second ZA-12 housing of similar design and size.



Thin wall ZA-12 permanent mold castings for Alta Technologies, Inc. check cancelling machine. Flat frame parts are cast to 0.090 inch with rib sections of 0.070 inch.



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