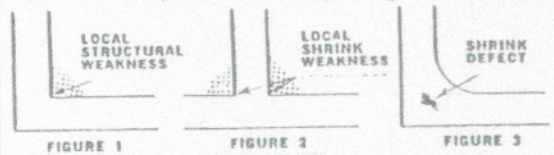
ACE FOUNDRY

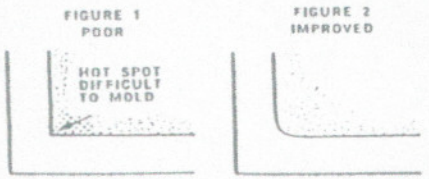
Specifications from the Aluminum Assocation

BASIC CASTING DESIGN RULES

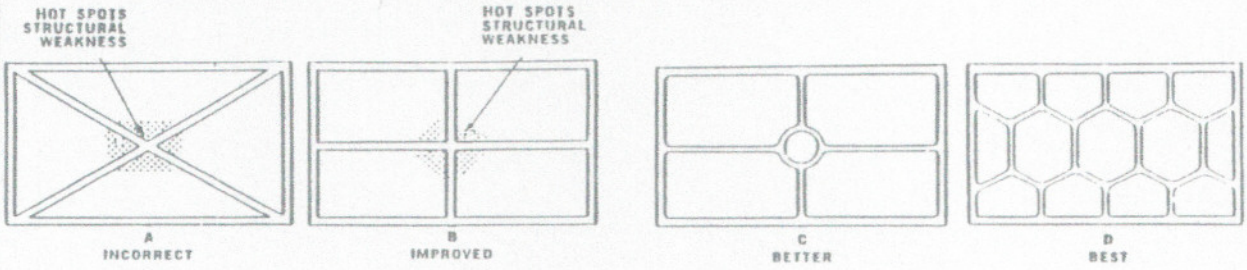
It is all to common to design to suit the engineering department but not the foundry, and the result may be failure or disappointment. From the foundryman's viewpoint, it is of first importance to design a casting that can made rather than one that may be perfect engineering-wise but which cannot be produced commercially and free from structural weakness. Consultation between Designer and Foundryman will permit consideration of the foundry problems that are likely to be encountered and will promote the making of a sound casting. The time and cost of manufacture can also be considered at this preliminary stage of casting design. Important questions that the foundryman can answer include: type of pattern equipment needed, metal shrinkage, molding method required, conditions necessary to make a dependable casting, machine finish and dimensional limitations.

In designing adjoining sections, avoid acute angles. Replace all sharp angles with radii and minimize heat stress concentration. Design all sections as nearly uniform in thickness as possible. Avoid abrupt section changes, eliminate sharp corners at adjoining sections. Fillet all sharp angles.

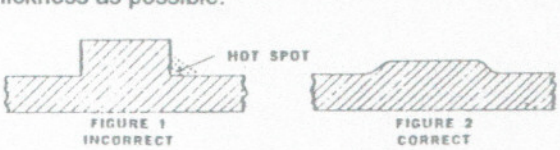




Design ribs and brackets for maximum effectiveness avoid cross ribs or ribbing on both sides of a casting. Avoid complex ribbing. It simplifies molding procedure, assures more uniform solidification conditions and eliminates hot spots. Casting stresses and stress distribution favor omission of ribbing if the casting wall can be made of ample strength and stiffness itself. Avoid the use of ribs meeting at an acute angle. Ribs meeting at acute angles cause molding difficulties, increase costs and aggravate the risk of defective castings.



Bosses, lugs & pads should not be used unless absolutely necessary. Bosses and pads increase metal thickness, create hot spots and cause open grain or draws. Blend into casting by tapering or flattening the fillets. A continuous rib instead of a series of bosses permits shifting hole location. Thickness of bosses & pads should preferably be less than the thickness of the casting section they adjoin. Design all sections as nearly uniform in thickness as possible.



When the inside diameter of a cylinder is less than the wall thickness of the casting, it is better to cast solid. Holes can be produced by cheaper and safer methods than by coring.