WHITE IRON WILL NORMALLY CONTRACT AT 1/4” PER FOOT.

Contraction is not always equi-dimensional, in that it is influenced by mass and configuration. Contraction is normally 1/8” per foot for the flake irons, and about 1/10” per foot for the nodular or “S” types of Meehanite unless annealing is resorted to. In such cases, an expansion occurs on annealing, making overall size contraction range from 0-1/16” per foot. Contraction, when hindered by the mold, will produce casting stress. Under like conditions, the material of lowest contraction will produce the greatest freedom from stress in the castings.

Consider a shape of square cross-section, such as a cube. Here again, cooling proceeds at right angles to the surface, and is necessarily faster at the corners of the casting. Thus, solidification proceeds more rapidly at the corners. In ordinary cast irons, higher hardness values may be expected at these corners. The Meehanite process, which utilizes nucleation of the melt to graphitize, is less subject to the effects of rapid chilling that might occur at external surfaces, such as corners, that radiate heat in two directions. An improved design of square or rectangular corners would involve rounding off the corners to promote more equal heat extraction through the mold wall (Figure 1).

The physical changes that occur during solidification have been discussed, without consideration of metallurgical changes. Cast iron is a material consisting of many distinct constituents, the nature of which is determined during the solidification process and even before the metal is melted for casting. Primarily, the deposition of graphite by the solidification process which itself is affected by design considerations (Figure 3).

Additionally, the relation of the two sections forming the corner to each other is of importance. If they are materially different, as in the illustration, contraction in the lighter member will occur at a different time from that in the heavier member. Differential contraction is the major cause of casting stress, warping, and cracking (Figure 2).

COMPANY INFORMATION:
Meehanite Metal Corp is a family of 24 different types of superior engineered cast irons, including nodular iron, flake graphite, and white cast irons. For more information, visit www.meehanitemetal.com or call (262) 240-0210.