CAST FACTS

Veins and Fins

These casting defects can cause considerable problems, not only with additional cleaning, but also by producing undesirable chilled areas.

Veining appears on the casting as an irregular fin or fins of metal protruding from the surface of the casting. Two conditions must exist. The core or mold surface develops a crack from either expansion-contraction forces or mechanical handling and the metal must be fluid enough to enter the crack. In the following description of causes, (T) signifies thermal cracking, and (M) signifies mechanical cracking.

CAUSES

Casting and Pattern Design
1) Sharp corners that develop hot spots. (T)
2) Thin cores surrounded by heavy metal sections. (T)
3) Massive sections. (M)

Pattern Equipment
1) Uneven metal sections in core box equipment causing nonuniform heat distribution in shell or hot box equipment. (T)
2) Inadequate support from core dryers causing cracked cores. (M)
3) Warped core dryers. (M)

Flask Equipment and Rigging
1) Rough mechanical handling of uncured cores. (M)
2) Misaligned shell or hot box equipment causing cracking of cores. (M)
3) Flasks not rigid enough for molding process. (M)
4) Loose flask bars. (M)
5) Rough conveying of cores or molds. (M)

Gating and Riser ing
1) Gate causing metal to impinge on core causing hot spot in critical area. (T)
2) Riser too close to core print (hot spot). (T)
3) Insufficient number of gates causing local hot spots. (T)

Molding Sand
1) Excessive organic material in sand (as coal, etc.). (T)
2) Excess moisture in the sand for skin-dried or oven-dried molds. (T)
3) Improper nulling. (T-M)
4) Excess amounts of fines in molding mixes. (T)

Core Practice
Most veining is found on core surfaces. When this defect occurs it is necessary to determine whether the crack producing the vein is of mechanical or thermal crack origin. The solution to the problem will depend on accurately determining the cause. If a core is cracked before the casting is poured, it will probably result in a fin or vein on the casting.
1) Weak cores (green or cured). (M)
2) Cores too dense. (T)
3) Excess binders. (T)
4) Too rapid heating and cooling in the core oven. (T)
5) Baking temperature too high. (T)
6) Brittle cores. (T-M)
7) Improperly reinforced cores—rods, wires or bars. (M)

Pouring Practice
1) Pouring too hot for metal composition. (T)
2) Pouring too fast, causing metal to forcibly impinge on a core (hخذ high). (T)

8) Inadequate dryer support or dryer. (M)
9) Improper portions of hexagonal (shell) cores for prevalent midly conditions. (T)
10) Cores stored under conditions of high humidity. (T)
11) Poor sand mixing. (T-M)
12) Inadequate hot plasticity of sand. (T)

Molding Practice
1) Excessive sticking of molds. (T)
2) Inadequately reinforced or parted molds. (M)
3) Nonuniform torching of skin molds. (T)
4) Uneven clamping of molds. (T)
5) Excessive mold wash. (T)
6) Soft ramming. (M)

Metal Composition
1) Metals with a tendency to veining such as high-carbon-aluminum-phosphorus irons. (T-M)

Pouring Practice
1) Pouring too hot for metal composition. (T)
2) Pouring too fast, causing metal to forcibly impinge on a core (hخذ high). (T)

A casting exhibiting severe veining at its internal corners.

This article is excerpted from two publications: Analysis of Casting Defects available at $22.00 for members, $44.00 for nonmembers, and Cast Defects Handbook, $12.00 for members, $24.00 for nonmembers.