SINK MARKS, DRAW, SUCK-IN

Depressions in the casting surface at heavy metal sections (intersections, etc.). The surface of the depressions is generally no different from that of other areas.

This defect most often appears at thickened sections of the casting and sometimes at the bottom of an internal shrinkage cavity or porous area.

Possible Causes

Solidification contraction (surface collapse) at locations such as heavy sections which are slow to freeze.

Occurs most frequently with alloys of wide freezing range, where atmospheric pressure collapses the mushy surface prior to complete solidification. (Ed. note). In die casting it may occur as a result of low metal and/or mold temperature together with insufficient metal pressure.

Note: In the case of inadequate local venting, defect B 121 (surface blowholes) may also occur at the same location. It is not always easy to characterize the defect and both causes must be taken into consideration (see also defect B 311-porosity).

Remedies

- Modify the design; avoid abrupt changes in section.
- Taper adjacent sections to obtain directional solidification.
- Where possible, add risers, supplementary gates or chills to assure proper sequence of freezing and feeding.
- In die casting, check metal and mold temperature as well as injection velocity and pressure.

Figure 152

Fragment of a gray iron casting showing sink marks at a heavy section.

D 141 - Aluminum Alloy, Die Cast

Figure 153

Aluminum alloy die casting showing sink marks on the surface opposite ribs and bosses.