B 121 - Steel, Dry Sand

Fragment of Pelton wheel casting of cast carbon steel (0.5% C, 0.8% Mn, 0.5% Si). Surface blowholes which were eliminated by use of proper deoxidation (0.04% Al rather than 0.015% Al previously used).

B 121 - Aluminum Alloy, Die Cast

Die-cast aluminum alloy housing cover showing surface blowholes.

Figure 51

Figure 52

Cavities in reentrant angles of castings, extending toward the interior. Their edges are generally rounded, differing in this respect from defect B 212 (fillet or corner shrinkage).

Possible Causes

Heating of the sand causes expansion, vaporization, evaporation, distillation, etc., resulting in the generation of gases whose pressure may be sufficient to cause them to penetrate the casting at points of the surface which are last to solidify (hot spots), such as reentrant angles.

The defect is aggravated by solidification shrinkage or, in the case of gray and ductile irons, by the expansion of the solidified skin due to graphitization.

When these latter factors predominate, the defect is properly classified as B 212 (corner shrinkage), and remedies sought under that category.

Diagnosis Hint

When the effect of gas is preponderant (defect B 122) the cavity and the corners are rounded, whereas they are rough and generally dendritic in the case of fillet shrinkage (B 212).
Remedies
- Provide ample fillets at reentrant angles.
- Minimize use of materials which tend to evolve gases when heated.
- Increase sand permeability and venting of mold.
- Use an external chill or core in locations subject to such defect.
- Increase liquid metal pressure, feed.

B 122 - Steel, Green Sand
Cast steel shackle, 250 x 250 x 50 mm (10 x 10 x 2 in.), with corner blowholes.

Figure 53

B 122 - Cast Iron, Dry Sand
Gray cast iron planer bed weighing 30 tons, with corner blowholes.

Cause: Reentrant angle and facing sand which evolved too much gas. Defect was eliminated by use of chills covered with a layer of refractory wash.

Figure 54

Figure 55

Figure 56