D 114

FLOW MARKS

Al, Cu and Zn alloys - metal molds

On the surfaces of otherwise sound castings, the defect appears as lines which trace the flow of the streams of liquid metal.

Possible Causes
Oxide films which lodge at the surface, partially marking the paths of metal flow through the mold.

Remedies
- Increase mold temperature.
- Lower the pouring temperature if possible.
- Modify gate size and location (for permanent molding by gravity or low pressure).
- Tilt the mold during pouring.
- In die casting: vapor blast or sand blast mold surfaces which are perpendicular or nearly perpendicular to the mold parting line.

D 114 - Aluminum Alloy, Permanent Mold

Light alloy plate, 180 mm (7.2 in.) high, showing flow marks caused by excessive pouring temperature and a gate which was too narrow.

Remedy: Lower pouring temperature, increase mold temperature, open the gate area, incline mold during pouring.
**D 121**

ROUGH CASTING SURFACE

The casting surface is rough, the depth of the roughness texture being of the same order of magnitude as the size of the sand grains. The condition may be accompanied by the presence of sand inclusions.

In the case of green sand molding the roughness often appears in conjunction with other defects arising from sand expansion (D 132 - rat tail, D 230 scab), thus distinguishing the defect from defects D 121 - severe roughness, D 221 - burn on, and D 222 - burn in).

Especially common in green sand molds at core surface locations; in dry sand molds, at areas having little or no facing or backing.

**Possible Causes**

At the sand/metal surface there is an equilibrium between capillary forces of the sand (gas permeability), metal surface tension and metallostatic pressure. If metallostatic pressure exceeds the opposing forces, the liquid metal penetrates between the grains of sand at the mold wall causing a rough casting surface. Where the metallostatic pressure exceeds a critical value (penetration pressure), this may even lead to defect D 122.