Casting Defects - Sand Mold, Metal Casting

Introducing various metal casting defects with many pictures by Dandong Foundry in China. These are common sand casting defects on the surface and inside of cast iron and cast steel parts.

1. Blowhole is a kind of cavities defect, which is also divided into pinhole and subsurface blowhole. Pinhole is very tiny hole. Subsurface blowhole only can be seen after machining.

![Blowhole Defect](image)

2. Burning-on defect is also called as sand burning, which includes chemical burn-on, and metal penetration.

![Sand Burning Defect](image)

3. Sand inclusion and slag inclusion are also called as scab or blacking scab. They are inclusion defects. Looks like there are slag inside of metal castings.
4. Sand hole is a kind of shrinkage cavity defect. They are empty holes after sand blasting.

5. Cold lap or also called as cold shut. It is a crack with round edges. Cold lap is because of low temperature or poor gating system.

6. Joint flash is also called as casting fin, which is a thin projection out of surface of metal casting. Joint flash should be removed during cleaning and grinding process.
7. Misrun defect is a kind of incomplete casting defect, which causes the casting uncompleted. The edge of defect is round and smooth.

8. Shrinkage defects include dispersed shrinkage, micro-shrinkage and porosity.

9. Shrinkage cavities are also called as shrinkage holes, which is a type of serious shrinkage defect.
10. Shrinkage depression is also a type of shrinkage defect, which looks like depressed region on the surface of metal castings.

11. Elephant skin is a type of surface defect, which cause irregular or wrinkle shapes surfaces.

12. Veins defect is also called as rat tail, which looks like many small water flow traces on the surface of metal castings.
13. Rough surface, coarse surface is also a kind of surface defect. Normal rough surfaces can judged as defects, but too rough and uneven in surface will be a defect.

14. Mismatch in mold defect is because of the shifting molding flashes. It will cause the dislocation at the parting line.

15. Mechanical damage is because the damage during machining or delivery processes.
16. Slag inclusion is also called as exogenous inclusion, entrapped slag.

17. Raised mold defect. Because of the flotage of liquid metal, the mould flasks are raised caused the top part of casting become higher or thicker than lower part.

18. Crack defects normally happen inside of metal castings. This defect will reduce the properties of metal castings.
19. Abnormal nodulizing or under-nodulizing defects. Because of many reasons, the spheroidization of graphite for ductile iron will be affected, therefore, caused the bad spheroidization rate.

20. Uneven hardness defect means the uneven hardness on the same surfaces. When machining harder positions, the machining will become more difficult.

21. Sand drop is also called as sand crush. The sand mold drops part of sand blocks, so they will cause the similar shaped sand holes or incomplete.
22. Deformation will cause the oversized tolerance for flatness and straightness. This is a very common defect for long castings, and flat castings with thin wall thickness. The reasons are the deformation during cooling process in sand molds, or in air, sometimes, the overly sand blasting could cause this problem.

23. After welding repair, even after machining or grinding, the welding marks will still be visual. For unimportant casting surfaces, if the client allows welding repair, then these marks should be acceptable. But for high pressure-bearing positions, or if the client has clearly forbidden any welding repair, then these marks will be taken as defects.

24. Chill iron could effectively reduce the shrinkage for the key positions, so using chill iron is very common in iron foundries. However, the edges of chill irons could be clearly found by visual inspection. Some clients will not require to grind them if these marks do not affect the appearance.
clients could require the casting manufacturer to grind them just for better surface looking. Clearly notice that these marks should not be judged as the casting defects.

Chill Iron Marks

25. Chill defects are also called as "casting chilling defects". The surface of the castings with this defect will be extremely white, shiny and smooth. The left one of the parts on the following photo is showing this defect. The defective castings will be fragile and crispy, so during machining, some edges will be broken. This defect was caused by the low temperature of sand molds, and prematurely out of sand molds, so the hot iron become chilled quickly. The proper annealing heat treatment to the casting could solve this defect.

Casting Chilling Defects