Inspections of Casting

Visual inspection

Visible defects that can be detected provide a means for discovering errors in the pattern equipment or in the molding and casting process. Visual inspection may not suitable of the detection of subsurface or internal defects.

Dimensional inspection

Dimensional inspection is one of the important discovering of casting. When precision casting is required, we make some samples for inspection the tolerance, shape, size and also measure the profile of the cast. This dimensional inspection of casting may be conducted by various methods:

- Standard measuring instruments to check the size of the cast.
- Contour gauges for the checking of profile, curves and shapes
- Coordinate measuring and Marking Machine
- Special fixtures

X-Ray Radiography

In all the foundries the flaw detection test are performed in the casting where the defects are not visible. This flaw detection test is usually performed for internal defects, surface defects etc. These tests are valuable not only in detecting but even in locating the casting defects present in the interior of the casting. Radiography is one of the important flaw detection for casting. The radiation used in radiography testing is a higher energy (shorter wavelength) version of the electromagnetic waves that we see as visible light. The radiation can come from an X-ray generator or a radiation source.

Magnetic particle inspection

This test is used to detect the location of cracks that extend to the surface of iron or steel castings, which are magnetic nature. The casting is first magnetized and then iron particles are sprinkled all over the path of the magnetic field. The particles are moved to the direction of the lines of force. A discontinuity in the casting causes the lines of the force to bypass the discontinuity and to concentrate around of the defect.

Fluorescent dye-penetration test

This method is very simple and applied for all cast metals. It is applying a thin penetration oil-base dye to the surface of the casting and allowing it to stand for some time so that the oil passes into the cracks by means of capillary action. The oil is then

completely wiped and cleaned from the surface. To detect the defects, the casting is painted with a coat of powdered and then viewed under ultraviolet light. The oil being fluorescent in nature, can be easily detect under this light, and thus the defects are easily detected.

Ultrasonic Testing

Ultrasonic testing used for detecting internal voids in casting is based on the principle of reflection of high frequency sound waves. If the surface under test contains some defect, the high frequency sound waves when emitted through the section of the casting, will be reflected from the surface of defect and return in a shorter period of time. The advantage this method of testing over other methods is that the defect, even if in the interior, is not only detected and located accurately, but its dimension can also be quickly measured without in any damaging or destroying the casting.

Macroscopic examination

The macroscopic inspection is widely used as a test in steel production because it is provide effective means of determining internal defects in the metal. Macroscopic examination may detect one of the following conditions:

• Crystalline heterogeneity, depending on solidification

•Chemical heterogeneity, depending on the impurities present or localized segregation

• Mechanical heterogeneity, depending on strain introduced on the metal.

Microscopic Examination

Microscopic examination can enable the study of the microstructure of the metal alloy, composition, type and nature of any treatment given to it, and its mechanical properties. In the case of cast metals, as steels, cast iron, malleable iron, microstructure examination is essential to discovery of metallurgical structure and composition. Grain size and distribution, grain boundary area can be observed by this procedure. Distribution of non-metallic inclusion can also be found from this process of inspection.