Metallurgical Microscope

Microscope World's **metallurgical microscopes** have high magnification with reflected and transmitted light. Metallograph microscopes allow the user to view opaque items at high magnification. Specialty uses for metallurgical microscopes include use as measuring instruments for measuring thin films, electroplating coatings, grain size, surface inclusions, Decarburization, case depth, structures and defects. Our metallurgical microscopes are available in binocular and trinocular models with both upright, inverted and boom stand microscope systems.
Have Infinitive Optical System which provides excellent optical functions. With the stable stand structure, advanced stage design and comfortable operation, it is widely used in institute and laboratory to observe and identify the structure of various metal and alloy.

Specifications

Mechanical Body:

1. Axial focusing controls with large knobs, Pre-Focusing Lever and Tension Adjustment Ring.
2. Inverted quadruple nosepiece revolves on ball bearings.
3. Mechanical stage is 150 X 200 mm.
4. The mechanical stage has low positioned co-axial controls on balls rolling on guide ways.
5. Hand rest on both sides.

Trinocular Head:

1. Trinocular Siedentopf head inclined at 30 degree.
2. Phototube for photomicrography.
3. Diopter adjustment ring on ocular tube.
4. Interpupiliary distance from 55 mm to 75 mm.

Illuminator:
Koehler's illumination system with 6 V / 20 W halogen lamp, adjustable brightness.

Eye Piece:
Wide field 10X, (20mm)

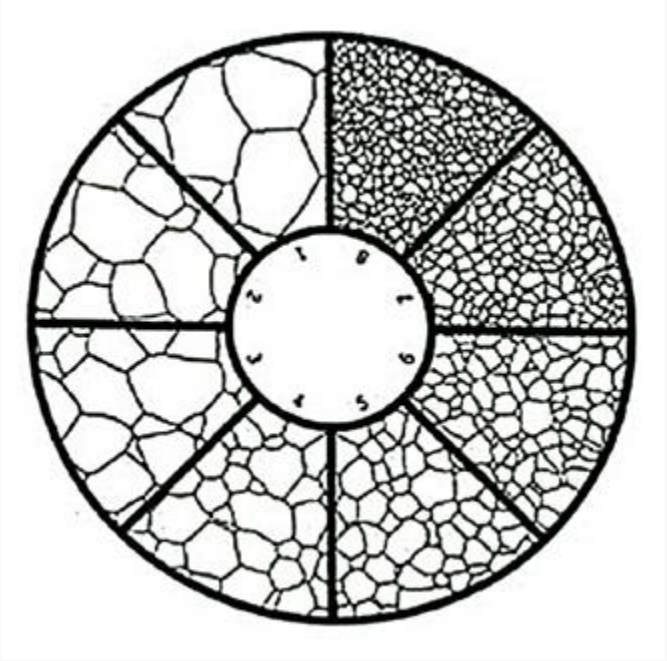
Objectives:
Achromatic objective PL 10X, PL 20X, PL 40X, PL 100X

Various Tests to be performed on Microscope
Microstructure by ASM HAND BOOK VOL-9

- Metallurgical phases and microstructures found in steels and their effects on steel strength and hardness.
- How to use the iron-carbon phase diagram to predict the phases present in a steel alloy based on composition and temperature.
- Microstructure changes that occur in steel during heating and cooling and the resulting effects on strength and hardness
- Effects of cooling rate on the microstructure that forms when steel is quenched during through hardening heat treatment.

Grain Size by ASTM E 112-13
Metals, except in a few instances, are crystalline in nature and, except for single crystals; they contain internal boundaries known as grain boundaries. When a new grain is nucleated during processing (as in solidification or annealing after cold working), the atoms within each growing grain are lined up in a specific pattern that depends upon the crystal structure of the metal or alloy. With growth, each grain will eventually impinge on others and form an interface where the atomic orientations are different.

As early as the year 1900, it was well known that most mechanical properties were improved as the size of the grains decreased. A few notable exceptions exist where a coarse grain structure is desired. Alloy composition and processing must be controlled to achieve the desired grain size. Metallographers examine polished cross sections of specimens from appropriate locations to determine the grain size.



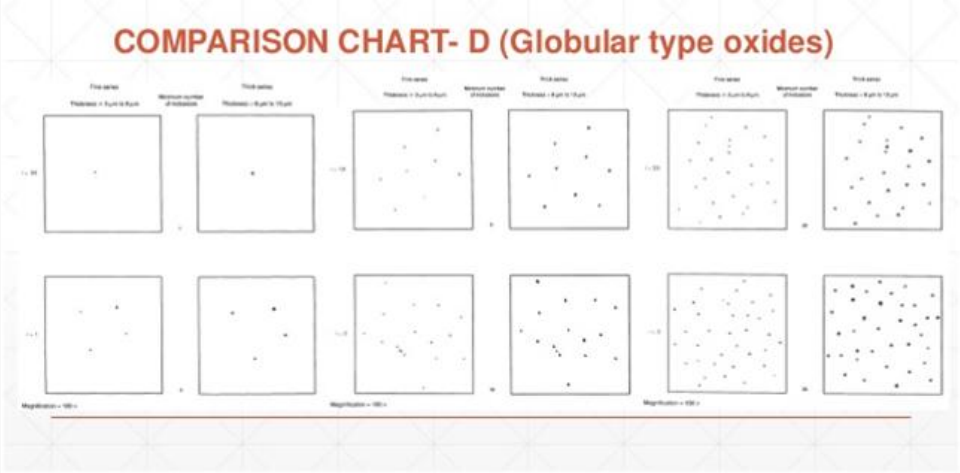
Inclusion Rating by ASTM E 45-13

Inclusions are non metallic particles embedded in the steel matrix. Chemical compounds of metals like (Fe, Mn, Al, Si, Ca etc) with non metals (O,S,N,C,H).

An Inclusion is a mismatch with the steel matrix. Both may have different properties resulting in underied effect.

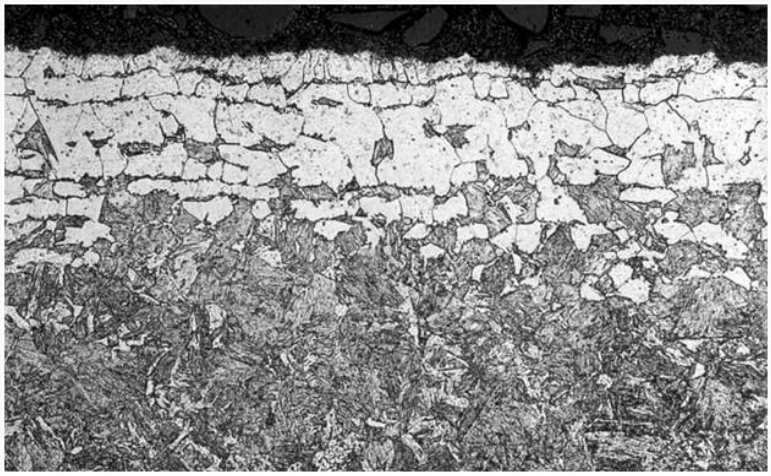
CLASSIFICATION OF INCLUSIONS

- Type A and C inclusions are very similar in size and shape.
- They are distinguished based on their colour when viewed under brightfield illumination.
- Type A-Sulfide are light gray.
- Type C-Silicate are black.
- The B-type stringers consist of a number (at least three) of round or angular oxide particles with aspect ratios less than 2 that are aligned nearly parallel to the deformation axis.
- The D-type are globular in shape.



De-Carburization by ASTM E 1077-01

The term is typically used in metallurgy, describing the reduction of the content of carbon in metals (usually **steel**). **Decarburization** occurs when the metal is heated to temperatures of 700 °C or above when carbon in the metal reacts with gases containing oxygen or hydrogen.



Advantages of Microscope:

1. An inverted microscope gives you greater freedom than an upright one
2. Microscopes enable you to look at more samples in a shorter period of time
3. With an inverted microscope, you cannot crash an objective into the sample
4. Inverted microscopes save you time and money in sample preparation
5. An inverted microscope works in the same direction the world does.