



**STANDARD
MICROSTRUCTURES
OF
METALLIC
MATERIALS**

RADICAL *Instruments*

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MICROSTRUCTURES OF METALLIC MATERIALS

Sample No.	Title	Sample No.	Title
01	Dead Mild Steel	13	Mottled Cast Iron
02	Low Carbon Steel	14	Ductile Cast Iron
03	Medium Carbon Steel (Annealing)	15	Cartridge Brass
04	Medium Carbon Steel (Normalizing)	16	Muntz Metal
05	Decarburised High Carbon Steel	17	Tin Bronze
06	Inclusion in Steel	18	Electroplated Component
07	Hardened Steel	19	Anodised Aluminium
08	Tempered Steel	20	Fusion Welded Mild Steel
09	Carburised Steel	21	Friction Welded Steel
10	Tool Steel	22	Powder Metallurgy Component
11	Grey Cast Iron	23	Deformed Mild Steel
12	White Cast Iron		



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DEAD MILD STEEL

Mechanical Treatment :
Hot Rolled

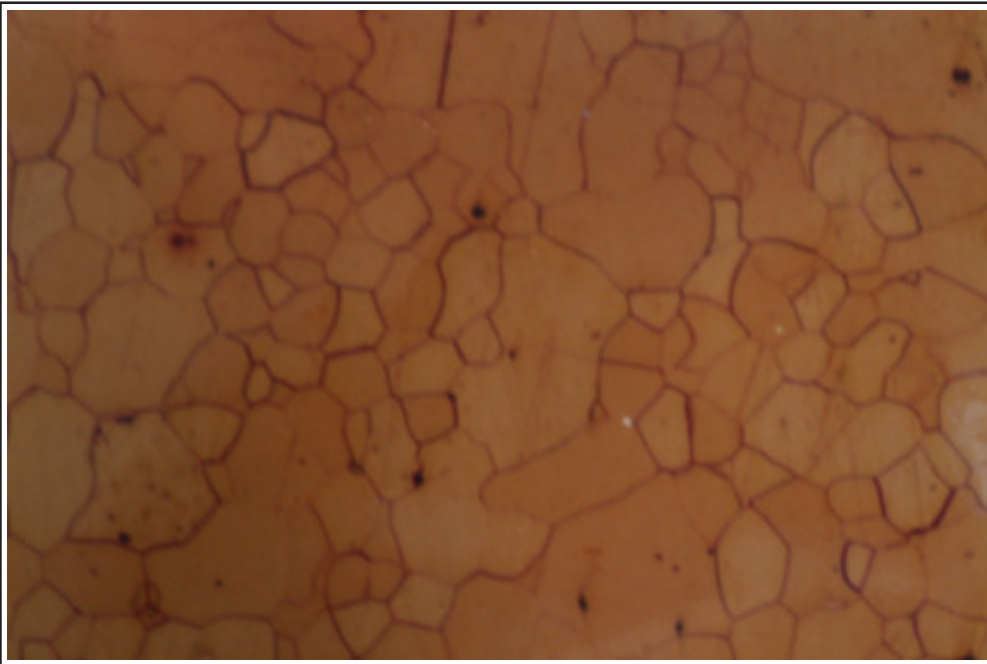
Heat Treatment :
Annealing

Average Composition :
0.05% Carbon
0.50% Manganese

Magnification : 200X

Etchant : Nital

Sample No. :1



DESCRIPTION : Microstructure is almost single phase. Polygonal equiaxed grains of ferrite are observed. Average grain size is ASTM no.8 by comparison method. Very small quantity of pearlite, less than 3% by volume, is also observed as dark phase.

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LOW CARBON STEEL

Mechanical Treatment :
Hot Rolled

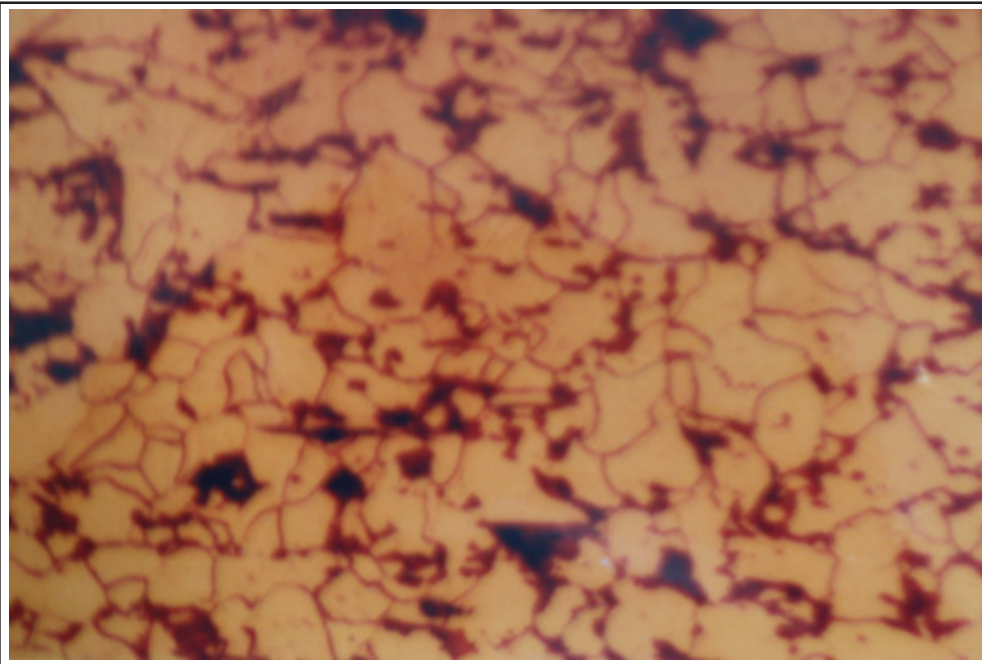
Heat Treatment :
Annealing

Average Composition :
0.18% Carbon
0.50% Manganese

Magnification : 200X

Etchant : Nital

Sample No. :2



DESCRIPTION : A typical two phase structure is observed. Ferrite is bright phase whereas Pearlite is dark phase. Ferrite occupies about 25% volume and pearlite is the balance. Grains of ferrite phase are polygonal and equiaxed. Pearlite is unresolved.

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MEDIUM CARBON STEEL

Mechanical Treatment :
Hot Rolled

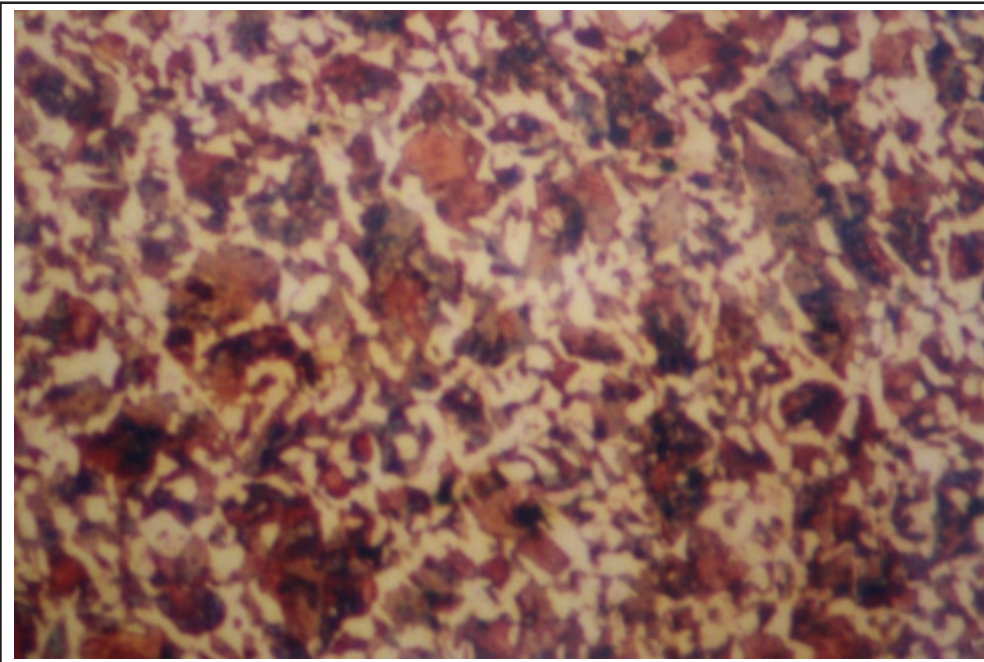
Heat Treatment :
Annealing

Average Composition :
0.40% Carbon
0.50% Manganese

Magnification : 200X

Etchant : Nital

Sample No. :3



DESCRIPTION : A typical phase structure is observed. Ferrite is bright phase whereas Pearlite is dark phase. Ferrite occupies about 50% volume and pearlite is the balance. Grains of ferrite phase are polygonal and equiaxed. Pearlite is unresolved.

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MEDIUM CARBON STEEL

Mechanical Treatment :
Hot Rolled

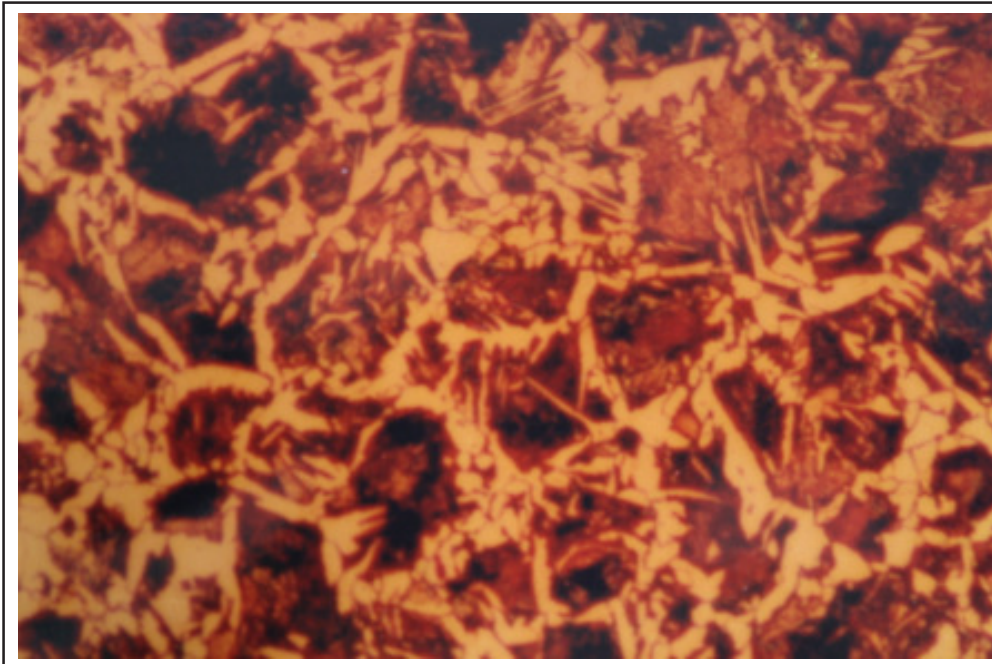
Heat Treatment :
Normalizing

Average Composition :
0.60% Carbon
0.50% Manganese

Magnification : 200X

Etchant : Nital

Sample No. :4



DESCRIPTION : A typical phase structure is observed. Ferrite is bright phase whereas Pearlite is dark phase. Ferrite occupies about 25% volume and pearlite is the balance. Typical Widmanstatten type structure is observed.

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DECARBURISED HIGH STEEL

Mechanical Treatment :
Hot Rolled

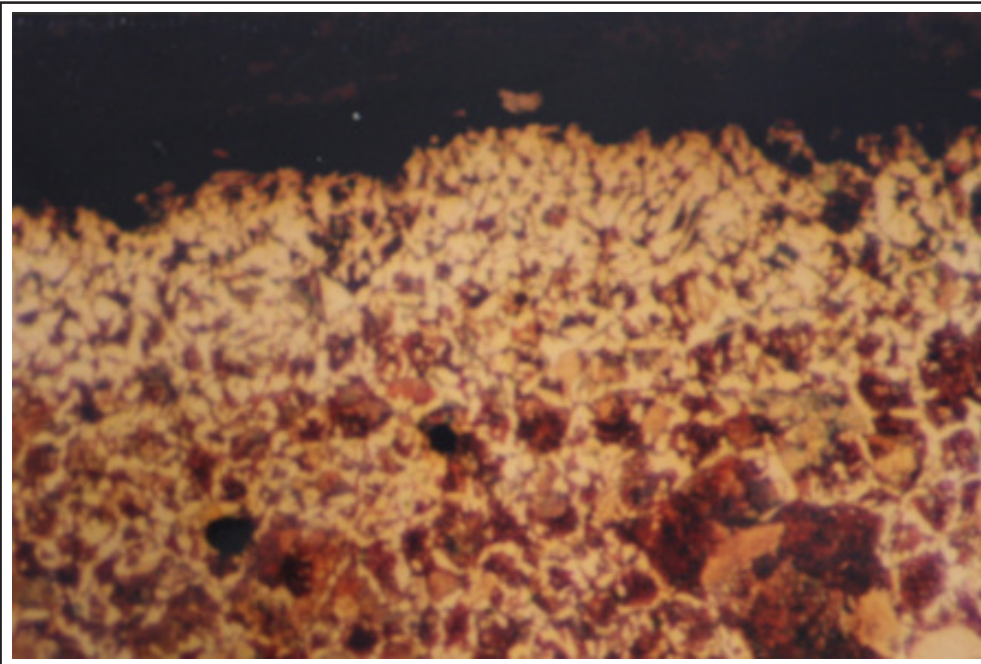
Heat Treatment :
Annealing

Average Composition :
0.70% Carbon
0.50% Manganese

Magnification : 200X

Etchant : Nital

Sample No. :5



DESCRIPTION : A typical two phase structure is observed. Ferrite is bright phase whereas Pearlite is dark phase. Ferrite occupies about 10% volume and is present in the grain boundary area of pearlite. Pearlite is unresolved. In the surface region low carbon steel structure is observed because of decarburising during heat treatment.

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