

MSE-305

Heat Treatment of Metals

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Invariant reactions present in Fe-Fe₃C Phase Diagram

Eutectoid Reaction:

- During cooling of austenite (γ -ferrite) having 0.8% C at constant **eutectoid temperature** (727°C) undergoes eutectoid transformation to form a mixture of alternate lamellae of ferrite (0.02% C) and cementite (Fe₃C).
- Phase changes that occur upon passing from the γ -region into the α +Fe₃C phase field.

Eutectic Reaction:

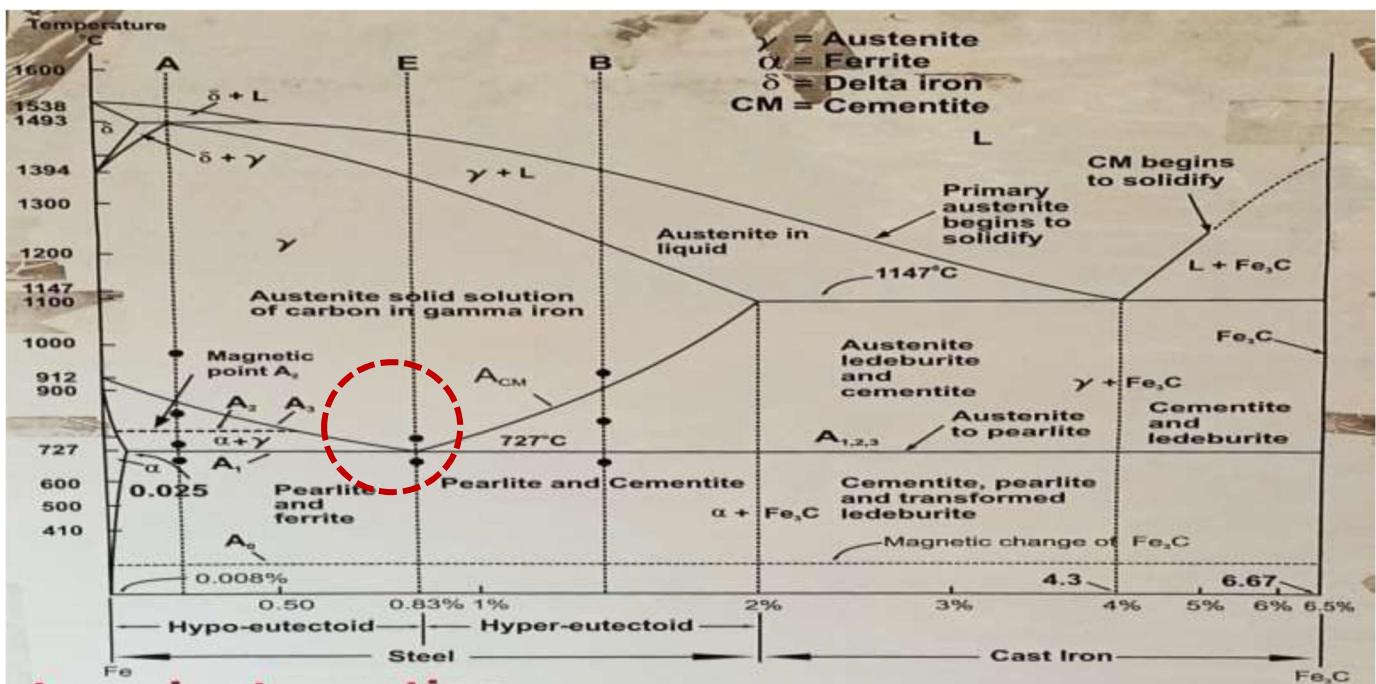
- Ferrous alloys contain more than 2.1 wt% C are called Cast Irons.
- The Fe-C alloys having carbon between 2.11% C and 4.3% C are called **hypo eutectic cast irons.**

Alloys having carbon between 4.3 %C and 6.67% C are called **hypereutectic cast irons**.

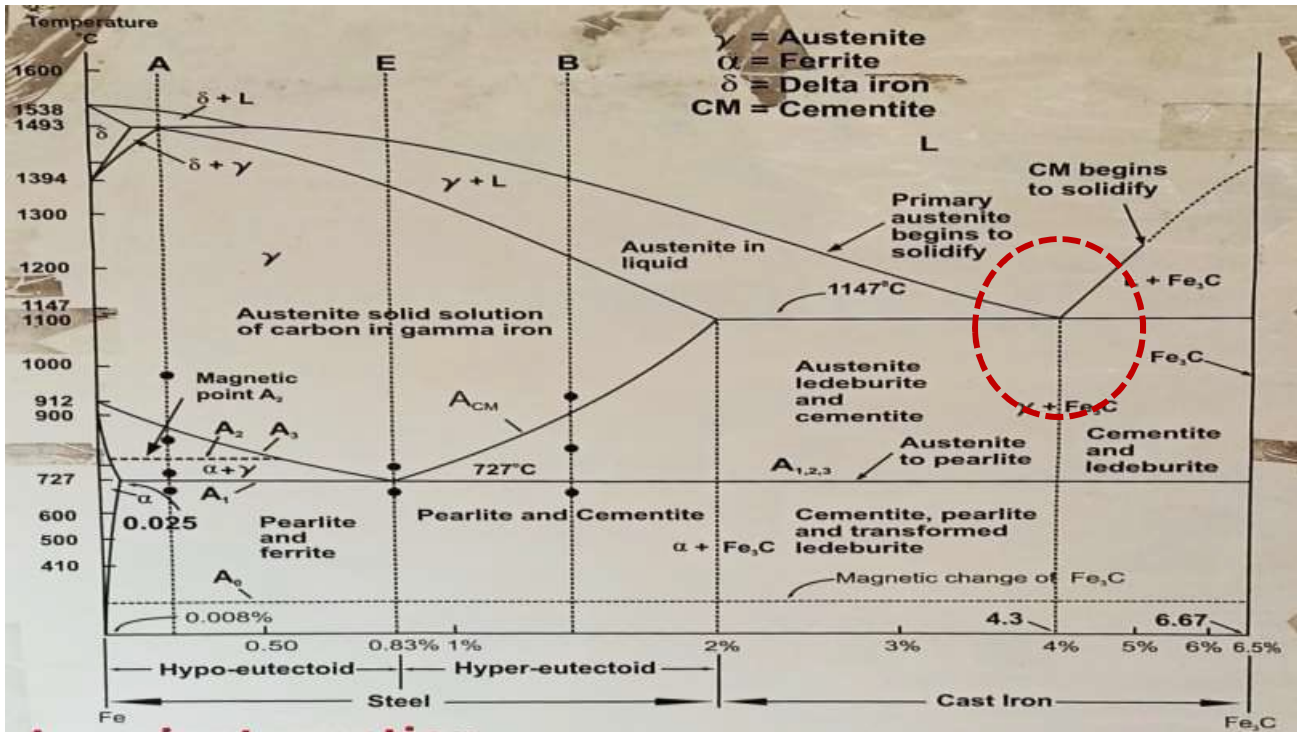
Alloys of Fe with 4.3 % C carbon is called **eutectic cast iron**.

Eutectic Reaction:

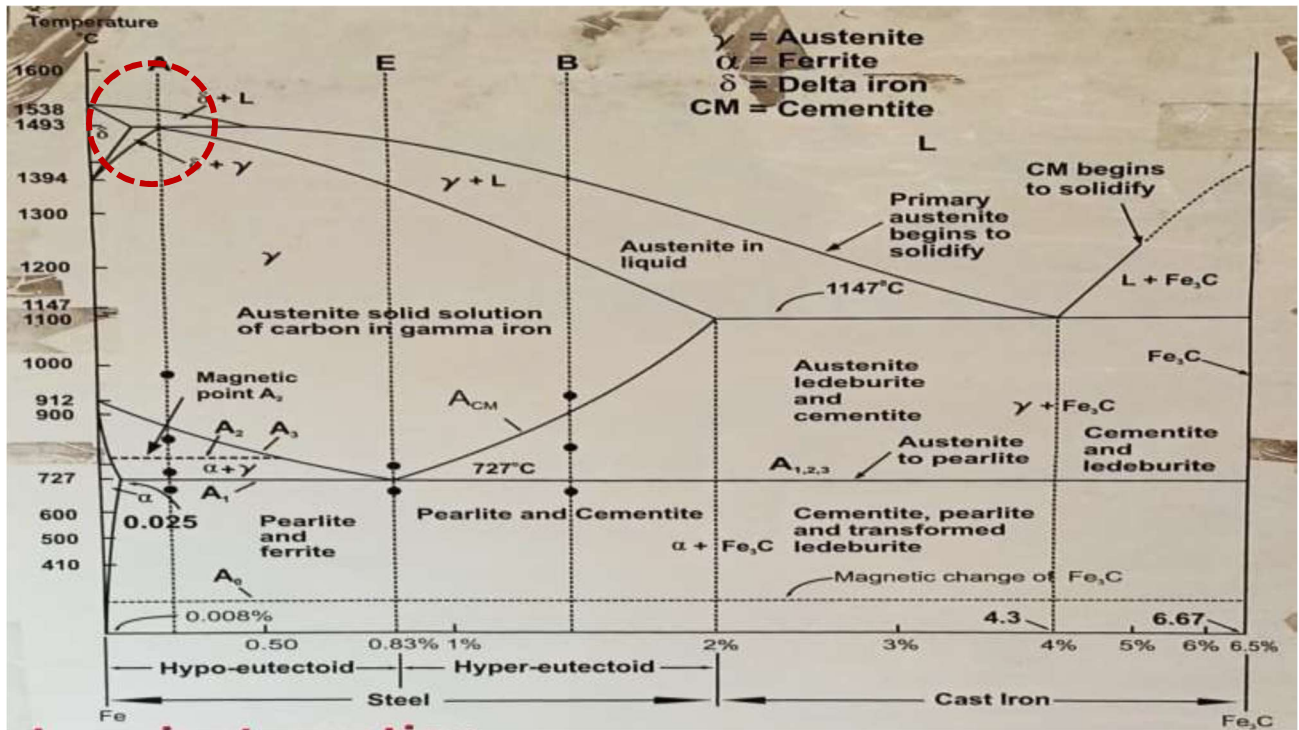
Consider an alloy of peritectic composition (0.16 % C), Then the weight fractions of liquid phase will be 14.63% and δ -ferrite phase will be 85.37%.



Eutectoid Reaction



Eutectic Reaction



Peritectic Reaction