

به نام خدا



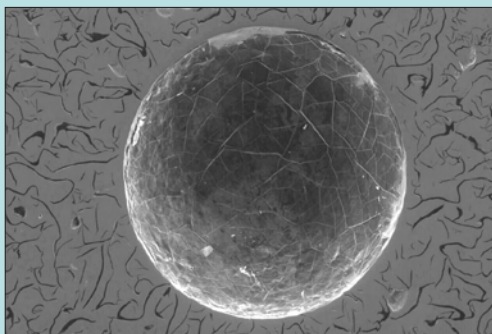
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Common Metallurgical Defects in Grey Iron

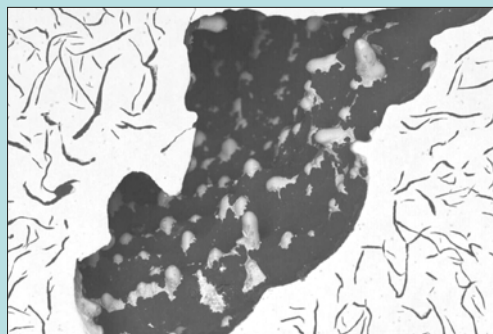
Hydrogen Blowhole



Possible Causes:

- High moisture content in charge or alloy materials (including rust)
- High content of aluminium or titanium
- High moisture content in moulding sand
- Build-up of dead clay in greensand
- Wet mould or core coating
- Use of damp refractories or patched linings
- Cores have become old and have picked up moisture

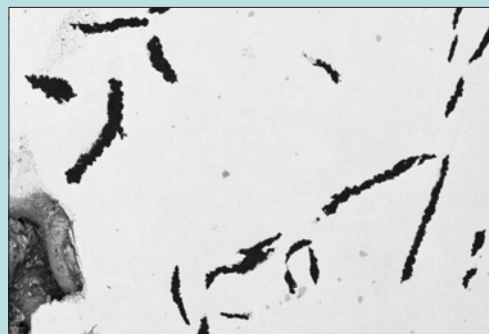
Nitrogen Fissure



Possible causes:

- Use of high steel scrap content in cupola melted iron with high coke charges
- Use of recarburiser with high nitrogen content
- Use of high nitrogen containing resins or build-up of nitrogen in the sand. Insufficient Ti or Zr contents to neutralise free nitrogen

Compaction of Graphite Flakes

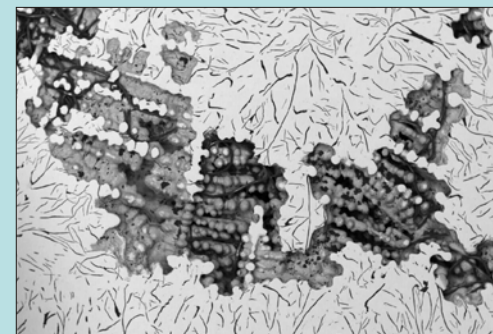


Normally found in medium to heavy sections, often in association with nitrogen fissures.

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- Insufficient Ti or Zr contents to neutralise free nitrogen

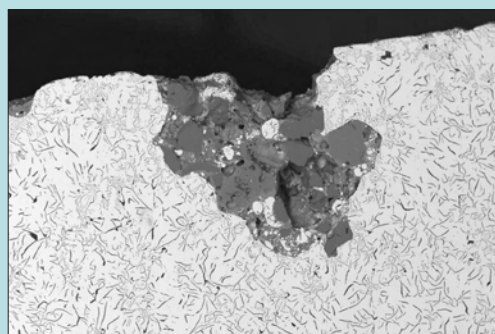
Shrinkage



Possible causes:

- Soft moulds or not properly cured binder
- Insufficient clamping or weighting
- Incorrect carbon content or carbon equivalent
- Hot spots resulting from poorly designed gates and risering systems
- Casting design causing large changes in casting section size or sharp radii
- Incorrect inoculation

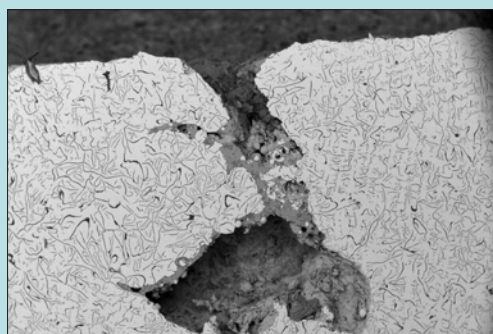
Slag Entrapment



Possible causes:

- Inadequate slag removal during melting and pouring
- Cold metal heels in ladles and receivers
- Lack of slag traps or filters
- Low pouring temperature
- Excess addition of slag forming materials
- Turbulent mould filling

Carbon Monoxide Blowhole

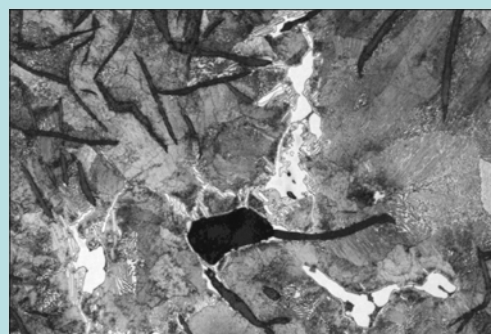


Possible causes:

- High sulphur in combination with high manganese content
- Low pouring temperature
- Improper slag separation
- Slag contaminated ladles and improper draining leaving a metal heel in the ladle

Note: Carbon monoxide blowhole is also known as the manganese sulphide blowhole.

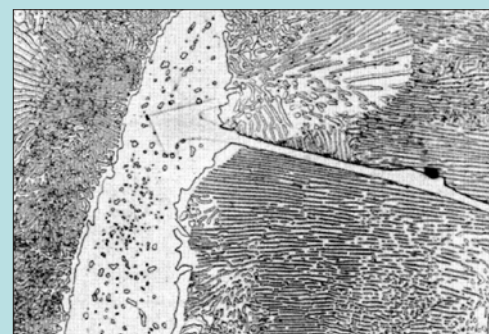
Intercellular Carbide



Possible causes:

- Excessive levels of strong carbide promoting elements such as Cr, V, Ti and Mo
- Low levels of graphite promoting elements such as Si and Ni in base iron
- Low solidification rate
- Insufficient inoculation
- Superheating and long holding of base iron
- Too high amount of steel scrap in the charge

Steadite

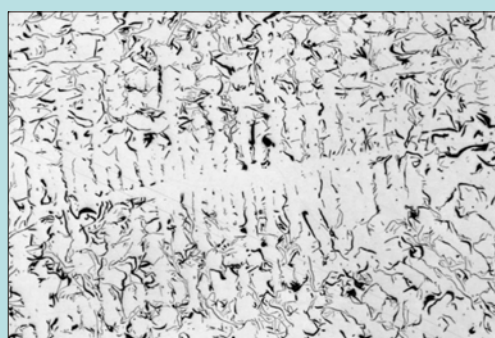


Possible causes:

- Excessive or high phosphorous content
- Slow cooling in thicker section castings

Note: High phosphorous content also increases the shrinkage tendency and brittleness of the iron.

Undercooled Graphite



Possible causes:

- Insufficient inoculation
- Rapid solidification
- Superheating or long holding of metal prior to pouring
- High content of titanium
- Low carbon equivalent

C Type Graphite

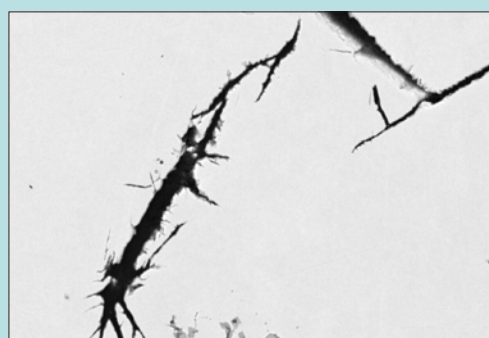


Also called Kish-graphite, is mainly found in iron with hyper-eutectic composition.

Possible causes:

- Often found in condition of very slow cooling rate and near eutectic compositions

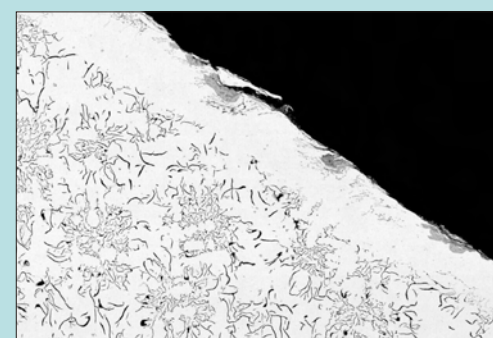
Widmanstätten Graphite



Possible causes:

- Excessive or high content of trace elements such as Pb, Bi and Sb
- Often seen in thicker sections subject to slower cooling rate and segregation.

Ferritic Rim



Possible causes:

- Too low content of volatiles in greensand moulds.
- Under inoculation
- Slow pouring rate
- Low pouring temperature.

Elkem produces a comprehensive range of inoculants for the manufacture of grey cast irons. These are suited to most application methods, ladle inoculation, in-stream inoculation or by addition in a wire.

The Elkem range of inoculants includes:

Superseed® 75 or **Superseed® 50** inoculants. The most widely used inoculant for grey irons of medium to high sulphur content. The low addition rates necessary to achieve maximum chill reduction mean that the iron is less prone to shrinkage.

Reseed® inoculant. Specifically designed for low base sulphur irons.

Foundrisil® and **Barinoc®** inoculants. Particularly suited to low sulphur applications and irons which are subject to long pouring times. Other specialty inoculants are available.

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Please refer to your local Elkem representative for further information on the range of products available for grey, compacted and ductile irons.

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