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.

**Barinoc®, Foundrisil®, Reseed® and Superseed®** are registered trademarks of Elkem ASA.

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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**Common Metallurgical Defects in Grey Iron**

- **Hydrogen Blowhole**
  - Possible causes:
    - High moisture content in charge or alloy materials
    - Cold metal heels in ladles and receivers
    - Poorly designed or operated ladles
    - Low pouring temperature
    - Excess addition of slag forming materials
    - Turbulent mould filling
  - Possible causes:
    - Inadequate slag removal during melting and pouring
    - 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 risers
    - Casting design causing large changes in casting section size or shape ratio

- **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**
  - 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

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

- **Slag Entrapment**
  - 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

- **Carbon Monoxide Blowhole**
  - 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

- **Intercellular Carbide**
  - 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

- **Steadite**
  - 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 risers
    - Casting design causing large changes in casting section size or shape ratio

- **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 hypereutectic composition.
  - 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.

- **Widmanstätten Graphite**
  - 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.

- **Ferritic Rim**
  - Possible causes:
    - Too low content of volatiles in greensand moulds
    - Under inoculation
    - Slow pouring rate
    - Low pouring temperature

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

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