Iron Ore

Iron ore is a soft, malleable metal that when alloyed with carbon forms steel, the building block of modern society. Iron is sourced from oxide ores, usually hematite or magnetite.

Hematite, (Fe_2O_3) and its hydrated forms (goethite/limonite), are the main ores sourced in Australia and can be mined at a grade suitable for direct feeding to the blast furnaces. Some low grade deposits need upgrading by mineral processing applications such as gravimetric, magnetic or surface properties.

Magnetite (Fe_3O_4) is mined as a low grade ore needing upgrading, usually magnetically, to make the grade needed to feed the extraction processes. The magnetite mineral itself is some 74% iron so the upgrading focusses on the removal of the low grade waste minerals from the magnetite, through low intensity magnetic separation, with some finessing to get final grades optimal for downstream operations.

Our Expertise

Engenium's experience covers a diverse commodity base and throughput range. Engenium has the ability to evaluate your resource and utilise sound metallurgical and mineralogical principals to engineer flowsheets. These skills are available for either hematite or magnetite based ores.

Our Process and Discipline Engineers have the project development and technical experience to take your project from core assessment through testwork and plant design to successful operation.

Hematite testwork ascertains if the minerals associated with the ore deposit render the hematite unsaleable, then determining how to separate these minerals.

The magnetite testwork focusses on separating the high grade material from the low grade gangue mineralisation, with special final cleaning techniques to be used, if required. Because the separation takes place on finely ground ore special skills to optimise the size reduction process are needed.

Our Capabilities

The services provided by Engenium include:

- Metallurgical testwork design, supervision, interpretation and geo-metallurgical assessment of both magnetite and hematite based ore bodies.
- Process selection studies, based upon ore mineralogy, incorporating comminution, screening, gravimetric magnetic and flotation.
- Comminution studies and projects include single, two and three stage crushing, high pressure grinding rolls, single stage SAG milling, single stage ball milling, SAB, SABC, AG milling, rod milling, fine and ultra-fine milling.
- Tailings handling including thickening and filtration, paste tailings, paste backfill and filtered tailings.
- Engineering, including concept and feasibility studies across all disciplines, and owner's team representation during studies and project development.
- Management and coordination, including project management, study management, owner's representation, project implementation strategies, design management, project engineering, cost control, scheduling.
- Commissioning, operations ramp-up and optimisation.

Delivering Value. Delivering Results.