

## Technical Description of Commodities

**Coke** is produced by the destructive distillation of metallurgical coal in either vertical (by-products recovery) or horizontal (non-recovery) batteries. Its main use is as a reductant in the iron-making blast furnace. Various metallurgical and chemical processes also require coke's reducing properties. Foundry coke, with low ash (7-10%) and large sizing (>90mm), is used in cupola furnaces for iron castings and stone wool insulation. Coke breeze is used in ore-sintering processes, as well as a sacrificial buffer in the manufacture of electrodes.

A **coking coal** is one that can be converted into coke by heating in the absence of air to drive off the hydrocarbons. When heated to a sufficiently high temperature, the coking coal passes through a transient plastic phase in which it softens, swells and then solidifies into a coherent cellular coke. A coal's "caking" properties are the main determinant of its suitability for coke production. Various caking tests measure its tendency to swell, become plastic and re-solidify during de-volatilization. To be suitable for coking, the coal must also produce a coke that meets certain strength and hardness requirements.

**Anthracite** is a low-volatile (<10%), high fixed carbon (>80%) coal used in industrial and other applications, as well as power generation. From a historical perspective, the latter application accounted for most of total anthracite demand but is now in steep decline. We primarily divide the anthracite market into applications needing sized lumps and those for fines (<10mm typically). Anthracite lumps can be used as a low-cost replacement to metallurgical coke in various industrial processes, as well as a household fuel. They are also calcined (de-volatilized) for electrode manufacture and electric-arc furnace steelmaking. The main application for anthracite fines is as a fuel in ore sintering and pelletizing applications.

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*Last Updated: October 31, 2021*