Carbon Black

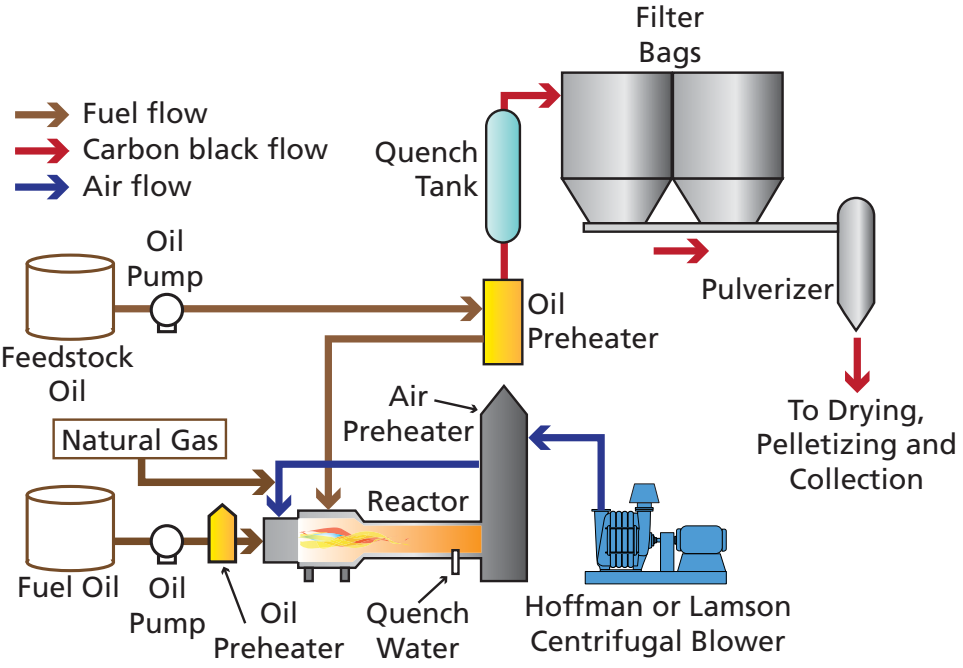
HOFFMAN LAMSON
by Gardner Denver

Carbon black is produced by the reaction of oil or gas with a limited supply of combustion air at temperatures of 1320-1540°C (2400-2800°F). The unburned carbon is collected as an extremely fine black particle.

Carbon black is most frequently used as a reinforcing agent in rubber compounds (especially tires). Carbon black distributes and absorbs stress applied to a rubber component and improves its tensile strength, tear strength and abrasion resistance. It can also impart electrical conductivity/resistivity to a rubber compound for dissipating static charge in applications such as automotive belts. Specialty blacks are used in a variety of applications in the plastics, inks and coatings markets where they are used as a pigment and offer properties such as conductivity, viscosity and UV protection.

Two major processes are presently used to manufacture carbon black: the oil furnace process (90% of US production) and the thermal process (10%). The production of lamp black and acetylene black are small-volume specialty black operations that constitute less than 1% of total production. North America accounts for only 21% of carbon black production. Other big sources are Asia (45%) and Europe (18%).

Oil Furnace Process - In the oil furnace process (shown here), an aromatic liquid hydrocarbon feedstock is heated and injected continuously into the combustion zone of a natural gas-fired furnace, where it is decomposed to form carbon black. The recovered carbon black is finished to a marketable product by pulverizing and then wet pelletizing to increase bulk density.



Thermal Process - The thermal process is a cyclic operation in which natural gas is thermally decomposed (cracked) into carbon particles, hydrogen and a mixture of other organics. Two furnaces are usually used. The first cracks natural gas and makes carbon black and hydrogen. The effluent gas from the first reactor is cooled and the black is collected in a fabric filter. The filtered gas is used as a fuel to heat the second reactor. When the first reactor becomes too cool to crack the natural gas, the positions of the reactors are reversed, and the second reactor is used to crack the gas while the first is heated.

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Hoffman & Lamson multistage centrifugal blowers create a high volume of air at high pressure to force air through the combustion process. The large volumes of air and increased pressures greatly enhance the combustion efficiency. The airflow also carries the carbon particulate and exhaust gases through the quench tower and into the bag filters.

Hoffman & Lamson multistage centrifugal blowers are designed to fit the needs of each carbon black process. Ask about our many installations found worldwide.

More info: www.epa.gov/ttnchie1/ap42/ch06/final/c06s01.pdf

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HOFFMAN LAMSON

www.HoffmanandLamson.com
info.hoffmanlamson@gardnerdenver.com
Phone: +1 724-239-1500 Fax: +1 724-239-1502