4C1. Coal Cartridge System (CCS)

Technology overview

1. System overview

The Coal Cartridge System (CCS) collectively imports and blends imported coal on behalf of medium-/small-lot consumers who use several thousand tons of coal per year, but for whom it is difficult to directly import. Through CCS, the imported coal is blended into suitable qualities and supplied to consumers as pulverized coal. This system was subjected, under a 3-year program starting in 1985, to demonstration tests at manufacture/supply and combustion bases, in an attempt to establish the reliability of CCS in regards to coal blending and meeting the consumers' quality requirements. As a result, the first Japanese CCS center, with a capacity to produce 200 thousand tons per year, was built in 1991 and operation of two CCS coal-dedicated boilers commenced.

2. Features

In a typical pulverized coal-fired system, before the coal is combusted, it is stored in a stockyard. Next, it is pulverized in a mill prior to being fed to a boiler. In CCS, however, the coal is pulverized at a production/supply facility, and all processes are completed within a sealed environment, from loading the coal onto tank lorries to delivery and unloading into consumers' coal silos after which it is then supplied to boilers. This environment-friendly process not only eliminates the problem of the dispersion of coal dust, but also enables smoother operation through easier control of powder flows and, therefore, fluctuations in boiler loads. CCS provides several benefits to consumers, like negating the need for a mill or a coal yard since the coal can now be stored in a silo. It also reduces capital investments because of the compact equipment configuration, thus leading to labor savings, as well as a better environment. CCS is, as mentioned above, a pulverized coal utilization system featuring improved coal handling and a sealed-carriage system.

3. Technical data

General attributes of CCS coal are shown in Table 1.

Table 1 General attributes of CCS coal

Brand		Referential control	A	B	C
Raw coal for mixture			3 kinds	3 kinds	2 kinds
Total moisture Wt%		AR	2.9	2.8	2.7
Heating value kcal/kg		*	6490	6480	6490
Ultimate analysis	Moisture Wt%	dry	0.0	0.0	0.0
	Ash Wt%	dry	12.1	12.4	12.1
	Volatiles Wt%	dry	39.6	39.5	35.6
	Fixed carbon Wt%	dry	48.3	48.1	50.3
Fuel ratio			1.22	1.22	1.41
Proximate analysis	Carbon Wt%	daf	80.30	80.00	82.00
	Hydrogen Wt%	daf	5.80	5.80	5.90
	Nitrogen Wt%	daf	1.60	1.50	1.50
	Oxygen Wt%	daf	11.80	12.40	10.50
	Sulfur Wt%	daf	0.48	0.47	0.45
Total sulfur Wt%		dry	0.45	0.43	0.41
Grain size -200 mesh		dry	84.5	78.9	83.50

4. Process flow

Figure 1 shows a process flow diagram and system overview of a CCS coal production/supply facility.

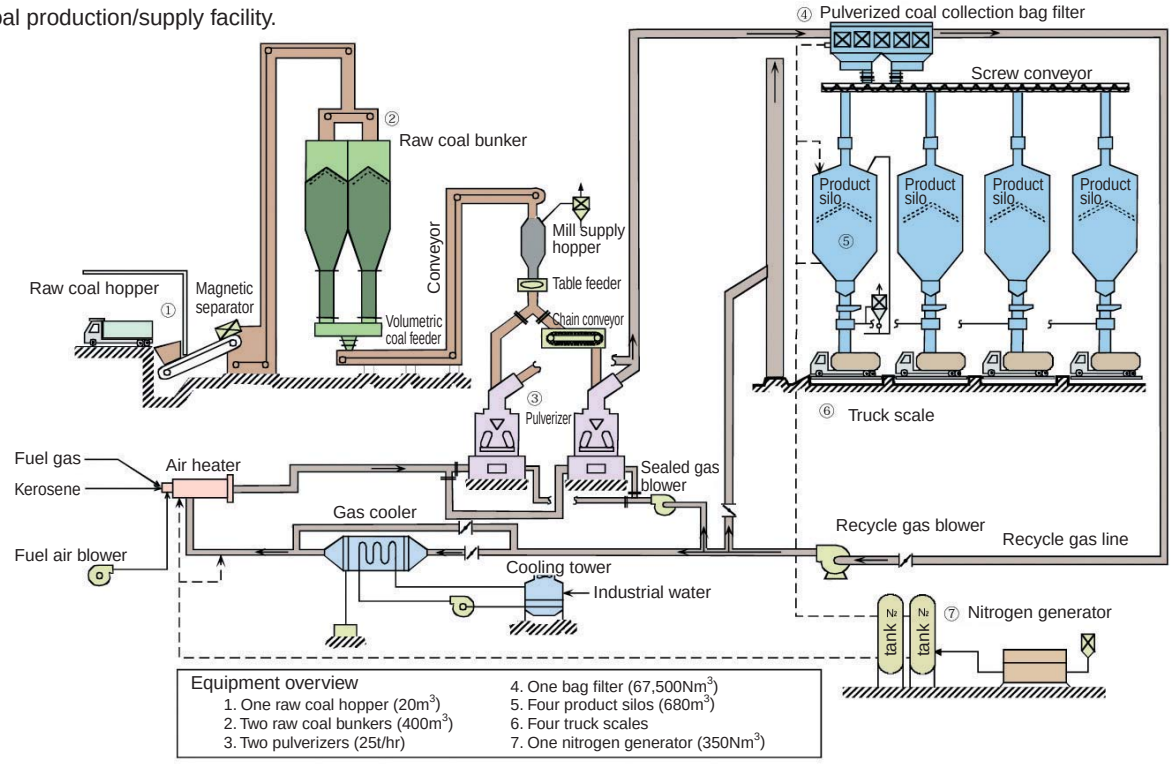

Fig. 1 Process flow of CCS coal production/supply facility