

Drying Free Gunning Material Contributing to Carbon Neutrality

Gunning materials are widely used as repair materials for various incinerator and kilns. Conventionally, a cement-containing material has been the mainstream as a gunning material, but the construction body requires a long time drying to remove moisture from the cement hydrate. Therefore, a large amount of CO₂ is emitted during drying. In addition, long construction period required. This time, we have developed a drying free gunning material that does not contain cement and does not require drying. CO₂ emission reduction and shortening of construction period became possible.

Features of drying free gunning materials

- ① require hardening curing only, no drying.
- ② help customers reduce fuel costs.
- ③ can contribute to ensure the number of operation.
- ④ provide excellent durability as it has high adhesive strength.

**Contributing to SDGs Goal 13
" CLIMATE ACTION "**

- Can be applied to conventional dry gunning systems.
- Can be constructed simply by changing the water line to a solution binder line.

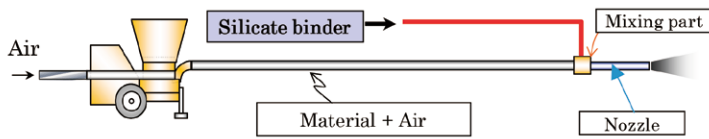


Fig. 1 Schematic of Drying Free gunning system Process.

Experiment quick firing (Fig.3)

- Constructed with a thickness of 230mm at R.T.
- After 24 hrs of curing, the temperature was rapidly raised to 800 °C in 60 minutes.
- The construction body was sound after the rapid heating.

Applications

- Various types of incinerator (industrial waste kiln, stoker furnace and fluidized incinerator).
- Various furnaces for non-ferrous (cement, aluminum etc.) industries.
- Iron- and steelmaking furnaces repair.

*Example of Drying Free results in actual furnace

- Incinerator :
 - Construction thickness: 200mm, Curing time: 24hrs.
 - Operation started after heating up to 800°C in 12 hrs.
- Aluminum melting furnace:
 - Hot construction at 800-1000°C,
 - Construction thickness: 250mm.
 - Operating started after 1.5hrs curing.

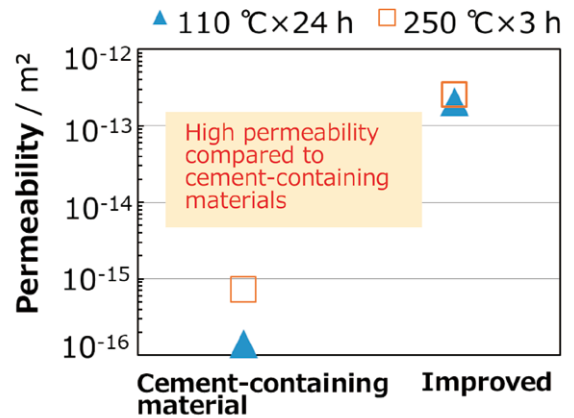


Fig. 2 Comparison of materials permeability.



Fig. 3 Result of rapid heating experiment.

Table 1 Improved material properties

	DFG-A90L	DFG-A75L	DFG-A50L
Chemical composition			
/ mass%			
Al ₂ O ₃	89	75	45
SiO ₂	6	16	47
Bulk density			
110 °C × 24 h	2.68	2.53	2.12
1400°C × 3h	2.62	2.58	2.13
Cold crushing strength			
/ MPa			
110 °C × 24 h	10	18	17
1400°C × 3h	80	89	83

This article is reprinted with some additions and reconstructions to the following paper:
Koga et al.: Taikabutsu, 73[9]426-431(2021).