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**Specification for High Radiative
Coating Energy-Saving Technology**

高辐射覆层节能技术规范

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Table of Contents

| | |
|--------------------------------|---|
| Foreword..... | 3 |
| 1 Scope | 4 |
| 2 Normative References..... | 4 |
| 3 Terms and Definitions..... | 4 |
| 4 Principle | 5 |
| 5 Applicable Conditions..... | 5 |
| 6 Technical Requirements..... | 6 |
| 7 Energy-Saving Indicator..... | 8 |
| 8 Effect Assessment..... | 9 |

Foreword

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Standard was proposed by China Iron and Steel Industry Association.

This Standard shall be under the jurisdiction of National Technical Committee for Standardization of Steel (SAC/TC 183).

Drafting organizations of this Standard: Shandong Huimin Science & Technology Co., Ltd., and China Metallurgical Information and Standardization Institute.

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Specification for High Radiative Coating Energy-Saving Technology

1 Scope

This Standard specifies the terms and definitions, principle, applicable conditions, technical requirements, energy-saving indicator and effect assessment of high radiative coating energy-saving technology.

This Standard is applicable to the industrial furnaces in the metallurgical, coking, petrochemical, power, heat, and the like industries; other industries' furnace can use this standard for reference.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 31934 Measuring and Calculation Method for Heat Storage Capacity of High Radiative Coating

GB/T 32287 Methods of Determination and Calculation of Heat Balance for Hot Blast Stove and Blast Furnace

YB/T 134 Infrared Radiation Coatings at High Temperature

YB/T 4313 Methods of Determination and Calculation of Heat Balance in Regenerative Furnace of Iron and Steel Industry

3 Terms and Definitions

The following terms and definitions are applicable to this document.

3.1 High radiative coating energy-saving technology

The energy-saving technology to improve the heat efficiency of furnace by the high radiative coating material through finely ground to a medium diameter of less than

20 μ m; is coated on the surface of base material through interface modified treatment; and forms the high-temperature-oxidation-resistant coating firmly combining with base.

3.2 High radiative coating material

The materials composite made between the high emissivity powder and high temperature binder.

3.3 Heat storage capacity

Under the setting temperature and specified time conditions, the heat absorbed by the heat-retainer.

4 Principle

When the high radiative coating material is coated on the corresponding part of the furnace, the surface emissivity of base material is improved; the radiative heat transferring between the base surface and gas under high temperature is strengthened; and energy efficiency of furnace is improved.

5 Applicable Conditions

5.1 Applicable principle

The application of high radiative coating energy-saving technology shall satisfy the following conditions:

- a) The base surface shall be solid, hard to peel off, no glaze, no oil stains;
- b) Coating shall not contact liquid, solid materials or water vapor;
- c) Working temperature of coating shall be at 300°C~1700°C.

5.2 Applicable furnace

5.2.1 Common furnace

The types and coating parts of the common furnace adopting high radiative coating energy-saving technology can refer to Table 1.

Table 1 -- High Radiative Coating Energy-Saving Technology Applicable Furnace and Coating Parts

| Industries | Furnace Types | Coating Parts |
|------------|-------------------------------|---|
| Metallurgy | Blast furnace hot-blast stove | Surface of heat-retainer in heat storage room |
| | Steel-rolling heating furnace | Inner wall of furnace, surface of heat-retainer |
| Coking | Coke oven | Inner wall of vertical flue, surface of heat-retainer in heat |

| | | | | |
|---|---------------|----------------------|-----|--|
| 4 | Petrochemical | Tube heating furnace | 2.0 | Entire inner wall of radiative room, outer surface of furnace tube |
| 5 | Power, heat | Boiler | 2.0 | Entire inner wall of radiative room, outer surface of wall-cooling wall tube |

8 Effect Assessment

8.1 Test of heat storage capacity

It shall be tested as per GB/T 31934.

8.2 Test of energy-saving effect

- a) Compared the furnace adopting high radiative coating energy-saving technology with the furnace not adopting high radiative coating energy-saving technology but has the same furnace type, the same working condition.
- b) The heat balance test of blast furnace hot-blast stove shall be implemented as per the provisions of GB/T 32287; other furnaces shall refer to GB/T 32287 and YB/T 4313 to test.
- c) The energy-saving effect of high radiative coating energy-saving technology shall be calculated as per Formula (1):

$$\eta = \frac{B_w - B_t}{B_w} \times 100\% \quad \dots\dots\dots (1)$$

Where:

η – energy-saving rate of high radiative coating energy-saving technology;

B_w – fuel consumption per unit production of the furnace not adopting high radiative coating energy-saving technology, in m^3/m^3 , or m^3/t , or t/t ;

B_t – fuel consumption per unit production of the furnace adopting high radiative coating energy-saving technology, in m^3/m^3 , or m^3/t , or t/t ;

NOTE: when furnace product and fuel are both gas, the unit is m^3/m^3 ; when furnace product is solid or liquid, while fuel is gas, the unit is m^3/t ; when furnace product is solid or liquid, while fuel is solid or liquid, the unit is t/t .

_____ **END** _____