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PEOPLE'S REPUBLIC OF CHINA**

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**Guide for the energy efficiency assessment of the continuous
galvanizing process**

钢带连续热镀锌工序能效评估导则

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1 Scope

China's national guide to assessing the energy efficiency of continuous hot dip galvanizing. It specifies the terms and definitions, the assessment procedure, the boundary and scope of energy consumption accounting, the baseline and actual energy consumption, and the indicators and analysis. A galvanizing line cleans the strip, anneals it in a controlled atmosphere furnace, cools it to the temperature of the zinc bath, passes it through the molten zinc, wipes the coating to thickness with air knives, cools it and coils it. The furnace is where the energy goes, and it is doing two jobs at once: annealing the steel to give it the mechanical properties the customer ordered, and reducing the surface oxide so that the zinc will wet it. Those two requirements set the temperature and the atmosphere, and they leave less freedom than an energy assessment might hope for. Which is why the boundary question matters so much here - the waste heat available at the exit of the furnace is substantial, and whether it is recovered is most of the difference between lines.

This Standard specifies the terms and definitions, assessment procedures, boundary and scope of energy consumption statistics, benchmark energy consumption, actual energy consumption, energy efficiency index, energy efficiency analysis and energy efficiency optimization measures for the energy efficiency assessment of continuous galvanizing process. This Standard is applicable to the energy efficiency assessment and energy-saving potential analysis of continuous galvanizing process of an iron and steel enterprise.

2 Normative references

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

GB 17167 General principle for equipping and managing of the measuring instrument of energy in organization of energy using

GB/T 21368 Specification for equipping and managing of measuring instrument of energy in the iron and steel industry

GB/T 23331 Energy management systems -- Requirements

GB/T 28924 Guides for calculating energy efficiency index of an iron and steel enterprise

YB/T 4211 Determination and calculation of heat balance of furnace for CGL YB/T 4662

Guides for energy efficiency assessment of an iron and steel enterprise

3 Terms and definitions

The terms and definitions defined by GB/T 23331, GB/T 28924, and YB/T 4662

7.1 Data acquisition

7.1.1 The field data acquisition includes but is not limited to the following. The process parameters shall be taken under stable production conditions. The variation shall be averaged over the statistical period.

- a) production information, including the production scale, quantity of conforming products during the statistical period, etc.;
- b) raw material conditions, including the types of raw material plates, etc.;
- c) product conditions, including the specifications, steel type, plating type, post-processing type, etc.;
- d) consumption of energy and energy-consuming working media, such as consumption of gas, natural gas, electricity (the annealing furnace is heated separately from the others), circulating water, compressed air, nitrogen, hydrogen, steam, liquid ammonia, etc.;
- e) energy recovery, such as steam recovery, recovered steam pressure, temperature, etc.;
- f) ambient temperature.

7.1.2 The field data acquisition shall be carried out in accordance with YB/T 4211.

7.2 Principle for standard coal conversion coefficient of energy and energy-consuming working media

7.2.1 The actual fuel energy consumed by the energy-using unit shall be converted into the

amount of standard coal based on its net calorific value. For unmeasured ones, SEE Table B.1.

7.2.2 Steam shall be converted into the amount of standard coal based on its enthalpy value. SEE Table B.2.

7.2.3 The standard coal used for the conversion of energy-consuming working media is shown in Table B.3.

7.2.4 The conversion relationship between standard coal and heat is $1 \text{ kgce} = 29\,307.6 \text{ kJ}$.

7.2.5 The equivalent value of the electric standard coal conversion coefficient shall be taken, that is, $1 \text{ kW}\cdot\text{h} = 0.122\,9 \text{ kgce}$.

10 Energy efficiency optimization measures

The continuous galvanizing process can use but is not limited to the following energy efficiency optimization measures.

- a) IMPROVE the energy control level;
- b) Efficient heat exchange technology of combustion air for the annealing furnace;