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Guides for energy efficiency assessment of continuous galvanizing process

钢带连续热镀锌工序能效评估导则

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Guides for energy efficiency assessment of continuous galvanizing process

1 Scope

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 Actual energy consumption

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 kgce = 29 307.6 kJ.

7.2.5 The equivalent value of the electric standard coal conversion coefficient shall be taken, that is, 1 kW·h = 0.122 9 kgce.

7.3 Actual energy consumption calculation

The actual energy consumption is calculated according to the Formula (3):

- a) whether it complies with relevant national laws, regulations, policies, and mandatory standards;
- b) whether there is any backward technology or equipment that is forbidden or obsolete;
- c) the use of new energy-saving processes, new technologies, and new products recommended by the state and industry.

9.2 Outfit and monitoring analysis of energy measuring equipment

The outfit and monitoring analysis of energy measuring equipment shall include but shall not be limited to the following:

- a) According to the requirements of GB 17167 and GB/T 21368, ANALYZE whether the outfit scheme of the energy measuring equipment for continuous galvanizing process is scientific and reasonable;
- b) The state of energy utilization in the continuous galvanizing process can be monitored in accordance with GB/T 15316.

9.3 Analysis of energy efficiency level

The analysis of energy efficiency level shall include but shall not be limited to the following:

- a) Energy efficiency analysis of continuous galvanizing process;
- b) The energy efficiency analysis of the heating furnace for continuous galvanizing process can be in accordance with GB/T 29728;
- c) The energy efficiency analysis of important equipment can be in accordance with GB 18613, GB 30254, GB 19761, and GB 19762;
- d) The energy control analysis can be in accordance with GB/T 30258;
- e) The analysis on the rationality of electric energy utilization can be in accordance with GB/T 3485;
- f) The analysis on the rationality of thermal energy utilization can be in accordance with GB/T 3486;
- g) The energy-saving potential analysis and energy system optimization can be in accordance with GB/T 30715.

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;
- c) Energy-saving and environment-friendly combustion technology of the annealing furnace;

References

- [1] GB/T 3485 *Technical guides for evaluating the rationality of electricity usage in industrial enterprise*
- [2] GB/T 3486 *Technical guides for evaluating the rationality of heat usage in industrial enterprise*
- [3] GB/T 15316 *General principles for monitoring and testing of energy saving*
- [4] GB 18613 *Minimum allowable values of energy efficiency and energy efficiency grades for small and medium three-phase asynchronous motors*
- [5] GB 19761 *Minimum allowable values of energy efficiency and energy efficiency grades for fan*
- [6] GB 19762 *The minimum allowable values of energy efficiency and evaluating values of energy conservation of centrifugal pump for fresh water*
- [7] GB/T 29728 *Energy consumption grades of furnace for CGL*
- [8] GB 30254 *Minimum allowable values of energy efficiency and the energy efficiency grades for cage three-phase high voltage induction motor*
- [9] GB/T 30258 *Implementation guidance for energy management systems in iron and steel industry*
- [10] GB/T 30715 *Guideline for energy system optimization of iron and steel production process*

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