

ICS 27.010
CCS F01



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB 16780-2021

The norm of energy consumption per unit product of cement

水泥单位产品能源消耗限额

Issued on: October 11, 2021

Implemented on: November 1, 2022

**Issued by: State Administration for Market Regulation;
Standardization Administration of China**

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Foreword

This document was drafted in accordance with the rules given in GB/T 1.1-2020, "Directives for standardization - Part

1.Rules for the structure and drafting of standardizing documents". This document replaces GB 16780-2012 "The norm of energy consumption per unit products of cement"; compared with GB 16780-2012, the major technical changes are as follows: -- Change the terms and definitions of energy consumption related indexes (see 3.1~3.5; 3.1~

3.8 of version 2012); -- Add the norm grade of energy consumption (see Chapter 4); -- Delete the advanced value of energy consumption (see

4.3 of version 2012); -- INCLUDE the norm of electricity consumption of the cement preparation section in the step-by-step energy consumption norm of the cement enterprise in Appendix B IN the text; delete Appendix B (see 4.3; Appendix B of version 2012); -- Change the correction coefficients of influencing factors in the calculation of the norm of energy consumption per unit product (see 5.3;

5.3.4.2 of version 2012); -- Change the calculation formula of the norm of energy consumption index (see 6.2;

5.3 of version 2012); -- Delete the energy-saving management and measures (see Chapter 6 of version 2012); -- Delete the calculation method for the average 28d compressive strength of clinker (see Appendix A of version 2012). Please note that some of the contents of this document may involve patents. The issuing organization of this document is not responsible for identifying patents. This document shall be under the jurisdiction of Standardization Administration of the People's Republic of China. The previous versions of the documents which are replaced by this document are as follows: -- GB/T 16780-1997,

GB 16780-2007, GB 16780-2012. The norm of energy consumption per unit product of cement

1 Scope

China's mandatory national standard for the energy consumption norm per unit of cement product. Cement is the single largest industrial consumer of energy in China and one of the largest sources of carbon dioxide anywhere, because the chemistry itself releases it: calcining limestone drives off carbon dioxide before any fuel is burned. This standard is one of the instruments by which that consumption is governed. It sets three levels for both clinker and finished cement - the limit that an existing plant must not exceed, the tighter figure required of new plants, and the advanced level that the best installations reach - expressed as comparable coal and electricity per tonne. The effect is regulatory rather than advisory: a plant above the limit faces closure or forced upgrade, which is how China has retired a large part of its older, smaller and least efficient kiln capacity.

This document specifies the norm grade, technical requirements, statistical scope and calculation method of energy consumption per unit product of cement (hereinafter referred to as energy consumption). This document applies to the calculation and assessment of energy consumption of energy consumption units of manufacturing enterprises of common portland cement, as well as the energy consumption control of newly- built, rebuilt and expanded projects.

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. For dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB 175, Common Portland Cements

GB/T 213, Determination of calorific value of coal

GB/T 384, Determination of calorific value of petroleum products

GB/T 2589, General principles for calculation of the comprehensive energy consumption

GB/T 12723, General principles for establishing allowance of energy consumption per unit throughput

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

GB/T 21372, Portland cement clinker

GB/T 27977, Test and calculation methods of electricity efficiency of cement production

3 Terms and definitions

Terms and definitions determined by GB 175, GB/T 2589, GB/T 12723, GB/T 21372, and the following ones are applicable to this document.

3.1 Energy consumption per unit product of clinker During the period of statistical report, the various energy consumed by energy consumption units in the production of cement clinker, which is equivalent to the energy consumed by 1 t of cement clinker.

3.2 Energy consumption per unit product of cement During the period of statistical report, the various energy consumed by energy consumption units in the production of cement, which is equivalent to the energy consumed by 1 t of cement.

3.3 Fuel consumption per unit product of clinker During the period of statistical report, the fuel quantity such as coal and diesel consumed by energy consumption units in the production of cement clinker, which is equivalent to the standard coal quantity consumed by 1 t of cement clinker.

4 Energy consumption norm grade

4.1 See Table 1 for the norm grade of comprehensive energy consumption per unit product of cement, where grade 1 has the lowest energy consumption.

4.2 See Table 2 for the norm grade of energy consumption, electricity consumption and fuel consumption per unit product of clinker, where grade 1 has the lowest energy consumption.

4.3 See Table 3 for the norm grade of electricity consumption of the cement preparation section, where grade 1 has the lowest energy consumption.

5 Technical requirements

5.1 For existing enterprises that produce cement and cement clinker products, the limit value of energy consumption per unit product shall meet the requirements of grade 3 in Table 1 ~ Table 3;

5.2 For newly-built, rebuilt and expanded enterprises that produce cement and cement clinker products, the access value of energy consumption per unit product shall meet the requirements of grade 2 in Table 1 ~ Table 3;

5.3 When the altitude of the existing enterprise plant that produces cement and cement clinker products is greater than 1 500 m,

5.4 When the proportion of clinker in cement products is higher or lower than 75%, for each increase or decrease of 1%, the grade-1, grade-2, and grade-3 norm values of energy consumption per unit product of cement shall be increased or decreased by

6.1 Statistical range

6.1.1 Statistical range of energy consumption per unit product of clinker Within the scope of energy consumption management of cement clinker product manufacturing enterprises, various energy sources consumed in the main production process and auxiliary production process from the entry of raw fuel into the production plant to the output of cement clinker, excluding the energy consumed during the project construction period like infrastructure, technological transformation.

6.1.2 Statistical range of energy consumption per unit product of cement Within the scope of energy consumption management of cement product manufacturing enterprises, various energy sources consumed in the main production process and auxiliary production process from the entry of raw fuel into the production plant to the delivery of cement products, excluding the energy consumed during the project construction period like infrastructure, technological transformation. If co-processing or alternative fuels are used, the amount of energy consumed and the amount of alternative fuels shall be counted separately.

6.2 Calculation methods

6.2.1 Fuel consumption per unit product of clinker The fuel consumption per unit product of clinker shall be calculated according to Formula (2).

6.2.2 Electricity consumption per unit product of clinker The electricity consumption per unit product of clinker shall be calculated according to Formula (4).

6.2.4 Electricity consumption per unit product of cement The electricity consumption per unit product of cement shall be calculated according to Formula (6).

6.2.5 Energy consumption per unit product of cement The energy consumption per unit product of cement shall be calculated according to Formula (8).

6.2.6 Power consumption of the cement preparation section The power consumption of the cement preparation section is calculated according to Formula (9).