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Replacing GB 29449-2012, GB 29440-2012

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**Norm of energy consumption per unit production of tyre and  
carbon black**

轮胎和炭黑单位产品能源消耗限额

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## Foreword

This document was drafted in accordance with the provisions of GB/T 1.1-2020 “*Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents*”.

This document replaces GB 29449-2012 “*The norm of energy consumption for per unit product of tyre*” and GB 29440-2012 “*The norm of energy consumption per unit product for carbon black*”. Compared with GB 29449-2012 and GB 29440-2012, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

- a) DELETE some terms and definitions (see 3.1 ~ 3.7 of GB 29449-2012 and 3.1 and 3.2 of GB 29440);
- b) ADD level of allowance value of energy consumption (see Clause 4 of this document);
- c) DELETE advanced values of energy consumption (see 4.3 of GB 29449-2012 and GB 29440-2012);
- d) MODIFY “Statistical scope” (see 6.1 of this document, 5.1 of GB 29449-2012 and GB 29440-2012);
- e) DELETE “Energy-saving management and measures” (see Clause 6 of GB 29449-2012 and GB 29440-2012).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The issuing authority of this document shall not be held responsible for identifying any or all such patent rights.

This document was proposed by and shall be under the jurisdiction of National Standardization Administration.

The previous released versions replaced by this document are as follows:

- GB 29449, first issued in 2012;
- GB 29440, first issued in 2012;
- this is the first integrated revision.

# Norm of energy consumption per unit production of tyre and carbon black

## 1 Scope

This document specifies the level of allowance value of energy consumption per unit production (abbreviated as energy consumption), technical requirements, statistical scope of tyre and carbon black, and describes the calculation methods.

This document applies to the energy consumption calculation, evaluation and assessment of existing all-steel radial tyres, semi-steel radial tyres, earth-mover tyres and diagonal tyres and carbon black production for the rubber industry, as well as energy consumption control for new, rebuilt and expanded projects.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 213 Determination of calorific value of coal

GB/T 384 Determination of calorific value of petroleum products

GB/T 1190 Technical specification of earth-mover tyres

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

GB/T 3778 Carbon black for use in rubber products

GB/T 6326 Tyre terms and definitions

GB 9743 Passenger car tyres

GB 9744 Truck tyres

GB/T 12206 Testing method to determine the calorific values of town gas

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

GB 17167 General rules for energy measuring instrument equipping and managing of energy user

### **6.1.1 Energy consumption per unit production of tyre**

**6.1.1.1** The statistical scope of comprehensive energy consumption of tyre production includes the primary and secondary energy actually consumed by the main production system, auxiliary production system and subsidiary production system of tyre production enterprises from the entry of raw materials into the factory boundary to the delivery of tyre products, but does not include various energy consumed by the construction of projects such as infrastructure and technical transformation.

**6.1.1.2** The energy consumed by the main production system includes various energy consumed in the entire production process from raw materials, semi-finished products, finished products, inspection to packaging and delivery.

**6.1.1.3** The energy consumed by the auxiliary production system includes the various energy consumed by the auxiliary facilities such as heating, power supply, water supply, gas supply, heating and ventilation, storage, fire protection, safety, environmental protection, logistics, etc. configured for the main production system.

**6.1.1.4** The energy consumed by the subsidiary production system includes the various energy consumed by the production command system specially configured for the production system and the office buildings, laboratories, operation rooms, lounges and other facilities within the factory boundary that serve the production.

**6.1.1.5** The recycled waste heat and waste energy for internal use shall no longer be included in the energy consumption. If it is exported to the outside, it shall be deducted from the total energy consumption according to the actual external supply.

**6.1.1.6** The tyre output is the mass of qualified tyre products that meet the requirements of GB 9743, GB 9744 and GB/T 1190 during the statistical reporting period. The mass of tyre products of various specifications is calculated in tons according to the actual measured mass.

**6.1.1.7** The calorific value of solid fuel shall be measured in accordance with the requirements of GB/T 213 and GB/T 30727, the calorific value of liquid fuel shall be measured in accordance with the requirements of GB/T 384, and the calorific value of gas fuel shall be measured in accordance with the requirements of GB/T 12206.

**6.1.1.8** When primary energy such as coal, natural gas, and biomass is used as input energy, it shall be calculated according to the measured calorific value. If there is no measured calorific value, the calculation of coal equivalent conversion coefficient is shown in Annex B; the calculation of coal equivalent conversion coefficient of purchased heat and electricity is shown in Annex B; the calculation of coal equivalent conversion coefficient of air, nitrogen, and water is shown in Annex C.

**6.1.1.9** The calculation of coal equivalent conversion coefficient of gasoline, diesel, liquefied petroleum gas, acetylene, and calcium carbide consumed in the auxiliary production system is shown in Annex B and Annex C.

**6.1.1.10** Tyre product production enterprises shall be equipped with energy metering instruments in accordance with the requirements of GB 17167 and GB/T 21367.

**6.1.1.11** When a tyre production enterprise has a carbon black production line, the tyre production unit is used as the dividing boundary; all input vapor and electricity are included in the comprehensive energy consumption of tyre production.

## **6.1.2 Energy consumption per unit production of carbon black**

**6.1.2.1** The statistical scope of comprehensive energy consumption of carbon black includes various energy consumed in the complete production process of carbon black production enterprise from the storage of fuel and raw materials (including pretreatment) to the delivery of carbon black finished products, including various energy actually consumed by reaction, quenching, collection, granulation (drying), refining, packaging, and wastewater, waste gas, waste residue recovery and dust recovery, but does not include various energy consumed by the comprehensive utilization of tail gas, and the construction of projects such as infrastructure and technical transformation.

**6.1.2.2** When sharing auxiliary and/or subsidiary production systems outside the boundary with other facilities, the energy consumed and lost by the carbon black facilities shall be apportioned according to the physical energy consumption.

**6.1.2.3** The waste heat and waste energy recycled within the boundary area shall not be included in the energy consumption if used within the boundary area; if used outside the boundary area, it shall be deducted from the energy consumption according to the actual external supply.

**6.1.2.4** The carbon black output is the total mass of all qualified carbon black products produced by the facilities during the statistical reporting period.

**6.1.2.5** During the statistical reporting period, the calorific value of various energy shall be measured according to the method specified in GB/T 384 or GB/T 12206 and converted into coal equivalent. If there are no actual measurement conditions, the coal equivalent conversion coefficient of energy and energy-consuming medium given in Annex B and Annex C can be referred to.

## **6.2 Calculation methods**

### **6.2.1 Comprehensive energy consumption of tyre**

The comprehensive energy consumption of tyre is calculated according to formula (1):

$$E_t = \sum_{i=1}^n (E_i \times P_i) \quad \dots\dots\dots (1)$$

where:

$E_t$  - comprehensive energy consumption of tyre, in kilogram coal equivalent (kgce);

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Contact: Wayne Zheng, [Sales@ChineseStandard.net](mailto:Sales@ChineseStandard.net)

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

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