

ICS 17.040.30

CCS A 57



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

GB/T 43785-2024

**Characterization and measurement of the performance of
optical clocks**

光钟性能表征及测量方法

Issued on: March 15, 2024

Implemented on: October 1, 2024

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

Table of Contents

1 Scope

About this edition

Classification and status

How a Chinese national standard is set out

About this English translation

1 Scope

China's national standard for characterising and measuring the performance of optical clocks. An optical clock counts the oscillations of an atomic transition in the optical rather than the microwave range - hundreds of terahertz rather than nine gigahertz - and since the precision of a clock scales with its frequency, the best optical clocks are two orders of magnitude better than the caesium standards that currently define the second. They would neither gain nor lose a second over the age of the universe. That performance is expected to lead to a redefinition of the second, and it is already useful: a clock this stable measures the gravitational redshift over a height difference of a centimetre, which makes it a geodetic instrument. Characterising one is genuinely difficult, because there is nothing better to compare it against - so the systematic shifts have to be evaluated individually and the stability assessed against another clock of the same class.

Foreword

GB/T 43785-2024 | Characterization and measurement of the performance of optical clocks

57 National Standards of People's Republic of China Optical clock performance
characterization and measurement methods Released on 2024-03-15 2024-10-

01 Implementation State Administration for Market Regulation The National Standardization
Administration issued

About this edition

GB/T 43785-2024 is the current edition. It was issued on 15 March 2024 and has been in force since 1 October 2024.

The interval between issue and effect is the transition period. It exists so that producers, laboratories and buyers can requalify products, revise procedures and use up documentation before the new text becomes the one that applies. The date on this page is the official one from the record of the Standardization Administration.

Classification and status

GB/T 43785-2024 is classified under ICS 17.040.30. ICS is the International Classification for Standards, the same scheme used by ISO and by the national bodies of most countries, which is what allows a Chinese standard to be placed beside its foreign counterparts on subject rather than on number.

Its Chinese Standard Classification code is CCS A 57. CCS is the domestic scheme, a letter for the sector and two digits for the subject within it, and it is the code by which the standard is filed and searched in China.

The GB/T prefix marks a recommended national standard. It is not, in itself, law: it becomes binding when a contract names it, when a regulation or a mandatory standard refers to it, or when a producer declares conformity with it. In practice that covers most of the cases in which it will be read - a purchase specification, an inspection agreement or a certification scheme.

How a Chinese national standard is set out

Chinese national standards are drafted to the rules of GB/T 1.1, which fixes the order in which a standard is set out. The document opens with a foreword recording the issuing bodies, the relationship to any previous edition and the technical committee responsible for it. Clause 1 is the scope. Clause 2 lists the normative references - the other standards that have to be applied together with this one, and without which its requirements cannot be met. Clause 3 gives the terms and definitions. The technical clauses follow: the requirements themselves, the test or measurement methods by which conformity is established, the inspection rules that say how a lot is sampled and judged, and, for a product standard, the provisions on marking, packaging, transport and storage. Annexes, normative or informative, come last.

GB/T 43785-2024 runs to 15 pages in the English translation. What is delivered is the complete document in that order: every clause, every table, every figure and every annex of the Chinese original, with the same numbering, so that a reference to a clause number in a contract or a test report points to the same place in both languages.

About this English translation

The English edition of GB/T 43785-2024 is a full translation of the official Chinese text, not a summary, an abstract or a machine rendering left unchecked. Clause and subclause numbers, table and figure numbers and annex letters are those of the original, because they are what a specification, a purchase order or a test report cites.

Technical terms are translated against the vocabulary standards of the same field, so that a term used in GB/T 43785-2024 reads the same way as in the other Chinese standards it is

used beside. Where a term has an established English form in an ISO or IEC document on the same subject, that form is used; where China's term has no foreign counterpart, it is translated literally and the Chinese is kept alongside it rather than replaced by an approximation.

Quantities, units and symbols are carried over unchanged. Chinese standards use SI, so a value in the translation is the value in the original document, not a conversion, and a limit read from the English text is the limit that will be applied by a Chinese inspection body reading the Chinese one.

This page is compiled from the official publication record: the standard number and both titles, the issuing bodies, the dates of issue and effect, the ICS and CCS classification. The requirements, limits, tables and test conditions are in the document itself.