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

GB/T 20510-2024

Replacing GB/T 20510-2017

Indium tin oxide targets

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1. Structure and drafting rules for standardization documents" Drafting is required. This document replaces GB/T 20510-2017 "Indium Tin Oxide Target". Compared with GB/T 20510-2017, in addition to structural adjustments and In addition to logical changes, the main technical changes are as follows: The scope of application was changed from "applicable to indium tin oxide targets produced with 99.99% metallic indium and tin as raw materials" to "applicable to Indium tin oxide target is produced by mixing In_2O_3 and SnO_2 powder in a certain proportion and sintering by atmospheric pressure process (see Chapter 1, Chapter 1 of the.2017 edition);

a) The definition of "relative density" has been changed (see 3.2, 3.2 of the.2017 edition);

b) The term and definition of "Kelvin bridge" have been deleted (see 3.3 of the.2017 edition);

c) The content of relative density has been changed (see 3.2, 3.2 of the.2017 edition);

d) The classification method has been changed from classification based on relative density to classification based on shape and the ratio of indium oxide and tin oxide (see Chapter 4, 4.1 of the.2017 edition);

e) The requirements for main chemical composition have been changed (see 5.1.1, 4.2.1 of the.2017 edition);

f) The requirements for physical properties have been changed (see 5.2, 4.3 of the.2017 edition);

1 Scope

China's national product standard for indium tin oxide sputtering targets. It specifies the classification, the technical requirements, the test methods, the inspection rules, the marking, packaging, transport and storage, the accompanying documents and the order content, and it applies to ITO targets produced by mixing indium oxide and tin oxide powders in a defined proportion and sintering them at atmospheric pressure, used as the core material for transparent conductive films. Indium tin oxide is the material that makes a screen possible. Every liquid crystal and OLED display, every touch panel and most thin-film solar cells need an electrode that conducts electricity and transmits visible light at the same time, and ITO does both better than anything else in production. The film is deposited by sputtering from a ceramic target, and the target is a consumable: it is eroded

away and replaced, so its quality is transferred directly into every square metre of film made from it. What the standard controls is what the film inherits. The chemical composition and the indium to tin ratio determine the resistivity and the transmission of the deposited layer. The physical properties, above all the density relative to theoretical and the resistivity of the target itself, decide how the target sputters - a target with residual porosity arcs, and an arc ejects particles that become defects in the film and can scrap a whole panel. The internal quality requirement addresses cracks and inclusions invisible from outside, which cause the target to fracture under thermal cycling in the chamber. And the dimensions and their deviations matter because a target must fit and bond to a backing plate whose cooling it depends on. Issued on 29 September 2024 and in force since 1 April 2025, it replaces GB/T 20510-2017.

This document specifies the classification, technical requirements, test methods, inspection rules and standards of indium tin oxide targets (hereinafter referred to as ITO targets). Labels, packaging, transportation and storage, accompanying documents and order contents. This document is applicable to indium tin oxide targets produced by mixing In_2O_3 and SnO_2 powders in a certain proportion and sintering them under normal pressure. As the core material of transparent conductive film.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies. in this document.

GB/T 1551 Determination of resistivity of silicon single crystals - In-line four-probe method and direct current two-probe method

GB/T 3850 Density determination method for dense sintered metal materials and cemented carbides

GB/T 6569 Test method for flexural strength of fine ceramics

GB/T 8170 Rules for rounding off values and expression and determination of limit values

GB/T 13298 Metal microstructure inspection methods

GB/T 16535 Test method for linear thermal expansion coefficient of fine ceramics - Ejector method

GB/T 38389 Chemical analysis method of indium tin oxide target
SL 499 Standard Test Method for Residual Stress Measurement by Hole Drilling Strain Method
YS/T 837 Ultrasonic testing method for sputtering target-backing plate bonding quality

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 bulk density The mass of a substance per unit volume.

3.2 relative density The ratio of the apparent density of ITO target to its theoretical density.
The theoretical density of various grades of ITO target is shown in Table 1. Table

1 Theoretical density of various brands of ITO targets Brand Theoretical density g/cm³
ITO90

7.163 ITO95 7.167