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**NATIONAL STANDARD OF THE
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Replacing GB/T 18369-2008

Glass fiber roving

玻璃纤维无捻粗纱

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Foreword Foreword

The document was drafted according to the provisions of GB/T 1.1-2020 Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents. It replaces GB/T 18369-2008, of the same title.

Besides structural adjustment and editorial changes, the main technical changes from GB/T 18369-2008 are listed as: a) the kinds of glass were added and the field of application changed; b) the appearance requirement was changed; c) the glass composition requirement was changed; d) a glass density requirement and its test method were added; e) the moisture content requirement was changed; f) the sizing agent requirement was changed; g) a fibre diameter requirement and its test method were added; h) the linear density requirements for chopping-type and non-chopping-type roving were changed; i) an electrostatic property requirement for chopping-type roving and its test method were added; j) the breaking tenacity requirement for chopping-type roving was deleted and that for non-chopping-type roving changed; k) a wet-through rate requirement for non-chopping-type roving and its test method were added, in Annex B; l) the requirement on the mechanical properties of impregnated strand was changed; m) the requirement on the flexural strength of rod-shaped composites and its test method were deleted; n) a requirement on the short beam strength of ring specimens and its test method were added, in Annex D; o) a requirement on the mechanical properties of the unidirectional laminate and its test method were added, in Annex E; p) the inspection rules were changed.

The foreword notes that some content of the document may involve patents and that the issuing body assumes no responsibility for identifying them. The document was proposed by the China Building Materials Federation and falls under the National Technical Committee on Glass Fibre of Standardization Administration of China, SAC/TC 245. The drafting organisations were Nanjing Fiberglass Research and Design Institute Co. Ltd, Jushi Group Co. Ltd, Changzhou Tianma Group Co. Ltd, formerly the No. 253 Building Materials Factory, Taishan Fiberglass Inc., Taishan Fiberglass Zoucheng Co. Ltd, Jiangsu Changhai Composite Materials Co. Ltd, Sichuan Weibo New Material Group Co. Ltd and Chongqing Sanlei Fiberglass Co. Ltd.

The document was first published in 2001, revised a first time in 2008, and this is the second revision.

1 Scope

The document fixes the classification and designation, the technical requirements, the test methods, the inspection rules, the marking, the packaging, the transport and the storage of glass fiber roving, called roving for short in the text.

It applies to single-end, assembled and direct roving drawn from E glass, ECR glass, R

glass and medium-alkali glass, used mainly as reinforcement for polymer matrix composite materials.

2 Normative references

The content of the following documents constitutes indispensable provisions of this document through normative reference in the text. For dated references only the edition corresponding to that date applies; for undated references the latest edition, including all amendments, applies.

GB/T 191 Packaging - Pictorial marking for handling of goods; GB/T 1040.5 Plastics - Determination of tensile properties - Part 5: Test conditions for unidirectional fibre-reinforced plastic composites; GB/T 1458 Test method for mechanical properties of ring of filament-winding reinforced plastics; GB/T 1549 Methods for chemical analysis of textile glass; GB/T 4202 Designation of glass fibre products; GB/T 4550 Preparation of unidirectional fibre reinforced plastic flat panels for test purposes; GB/T 7690.1 Reinforcement - Test method for yarns - Part 1: Determination of linear density; GB/T 7690.3 Reinforcement - Test method for yarns - Part 3: Determination of breaking force and breaking elongation of glass fibre; GB/T 7690.4 Reinforcement - Test method for yarns - Part 4: Determination of stiffness; GB/T 7690.5 Reinforcement - Test method for yarns - Part 5: Determination of the diameter of glass fibre filaments; GB/T 9914.1 Test method for reinforcement products - Part 1: Determination of moisture content; GB/T 9914.2 Test method for reinforcement products - Part 2: Determination of combustible content of glass fibre; GB/T 18374 Reinforcement materials - Terminology and definitions; GB/T 20310 Glass fibre roving - Preparation of impregnated strand specimens and determination of tensile strength; GB/T 36494 Determination of the electrostatic property of glass fibre roving; GB/T 41063 Glass fibre - Determination of density; JC/T 773 Fibre-reinforced plastics - Determination of interlaminar shear strength by the short beam method.

3 Terms and definitions

The terms and definitions given in GB/T 18374 apply to this document.

4 Classification and designation

4.1 Product classification. Products are classified in the following forms. a) By kind of glass: E glass fiber roving; ECR glass fiber roving; R glass fiber roving; medium-alkali glass fiber roving. b) By the process of use: chopping-type roving, for example for spray-up, moulding compound and GMT; non-chopping-type roving, for example for winding, weaving, pultrusion, extrusion compounding and LFT.

4.2 Product designation. The product designation is made up of three parts: the product name, the product code and the number of this document. The product name has to state

the kind of glass and, where necessary, may state the winding forming process, as in direct roving. The product code follows the provisions of GB/T 4202, and the supplementary elements may state the process it suits, the linear density of the strand of an assembled roving and the number of ends.

The first worked example given is an E glass fiber roving of nominal filament diameter 17 μm and linear density 1 150 tex, with T921 sizing, that being a manufacturer's mark, suited to the winding process; its designation is written as E glass fiber roving EC 17-1150 (winding T921) GB/T 18369-2022. The second is a medium-alkali glass assembled roving of nominal filament diameter 13 μm and linear density 4 800 tex, made from strands of 300 tex in 16 ends, with SM433 sizing, suited to the SMC process; its designation is written as medium-alkali glass fiber roving CC13-4800 (moulding compound SM433, 300 by 16) GB/T 18369-2022.

5.1 General requirements

5.1.1 Appearance. The colour is to be uniform and lustrous, free of oil stains, foreign matter, stray yarn, broken ends, missing ends and similar defects. The package is to be wound tight in a regular cylindrical shape, without overall deformation or slackness, and on unwinding the yarn is not to cling together or come off with difficulty.

5.1.2 Glass composition. For E glass fiber roving the mass fraction of alkali metal oxides is to be not more than 0.8 %, or the mass fraction of alkali metal oxides not more than 1.2 % with, at the same time, the combined mass fraction of boron trioxide and fluoride not more than 0.5 %. For ECR glass fiber roving the mass fraction of alkali metal oxides is to be not more than 1.2 %, with the mass fraction of fluoride not more than 0.3 % and the mass fraction of boron trioxide not more than 0.1 %. For R glass fiber roving the mass fraction of alkali metal oxides is to be not more than 1.0 %, with the mass fraction of aluminium oxide not less than 20 % and the mass fraction of fluoride not more than 0.2 %. For medium-alkali glass fiber roving the mass fraction of alkali metal oxides is to be (12.0 $\pm$ 0.4) %.

5.1.3 Glass density. The measured density may not depart from its nominal value by more than $\pm$ 0.03 grams per cubic centimetre.

5.1.4 Moisture content. Unless otherwise agreed, the moisture content is to be not more than 0.15 %.

5.1.5 Sizing agent. A reinforcement-type sizing agent is to be used and it has to be compatible with the resin to be reinforced. Where necessary, the acetone solubility has to be provided. Unless otherwise agreed, the deviation of the measured sizing content, reckoned as combustible content, from the nominal value is to lie within $\pm$ 0.2 % or within $\pm$ 20 % of the nominal value, whichever range is the larger.

5.1.6 Fibre diameter. The mean measured diameter may not depart from the nominal diameter by more than $\pm$ 10 %, and the coefficient of variation is to be not more than 12 %.