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

GB/T 43675-2024

Reduced recoil rope for marine mooring and towing

船用系泊拖带低回弹缆绳

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1 Scope

The document lays down the classification and designation, the requirements, the test methods, the inspection rules and the marking, packaging, storage and transport of reduced recoil ropes for marine mooring and towing, referred to below as reduced recoil ropes.

It applies to reduced recoil ropes with rope codes from 16 to 96, braided with a reduced recoil component as the rope core and with ultra-high molecular weight polyethylene fibre rope and aramid fibre rope as the load-carrying component.

2 Normative references

After the standard wording on dated and undated references, the clause cites GB/T 8170 on rules of rounding off for numerical values and expression and judgement of limiting values, GB/T 8834 on fibre ropes and the determination of certain physical and mechanical properties, GB/T 21328 on the general requirements for fibre ropes and GB/T 40273 on fibre rope terminology.

3 Terms and definitions

The terms defined in GB/T 40273 and the following terms and definitions apply to the document.

3.1 reduced recoil rope: a rope that can lower the risk of immediate recoil arising from breakage. The note states that the rope undergoes several non-continuous breaks and that the recoil risk produced by the breakage weakens step by step; it adds that a recoil risk still exists when a reduced recoil rope is used.

3.2 load-carrying component: the component that provides the rope with its tensile strength.

3.3 reduced recoil component: the component that can delay the complete breakage of the rope.

3.4 initial break: the breakage of the load-carrying component after the rope is loaded.

3.5 complete break: the breakage of both the load-carrying component and the reduced recoil component after the rope is loaded.

3.6 reserve break force: the maximum tensile force borne by the reduced recoil component when the complete break occurs.

3.7 warning stretch, denoted by the Greek letter delta with the subscript WT: the elongation produced, after the rope is loaded, between the breakage of the load-carrying component and the breakage of the reduced recoil component.

3.8 warning stretch elongation, denoted by Q with the subscript WT: the ratio of the warning stretch to the length of the rope at the moment the load-carrying component breaks.

3.9 minimum warning stretch, denoted by delta with the subscript WT min: the product of the length of the rope at the moment the load-carrying component breaks and the required minimum value of the warning stretch elongation.

3.10 cover jacket: the over-braided layer or other protective layer braided outside the load-carrying component and the reduced recoil component of the rope. The note states that the over-braided layer makes no marked contribution to the strength of the rope.

4 Classification and designation

4.1 Classification: by braid structure the ropes are divided into type TR, twelve-strand with a core, and type CR, over-braided with a core. By the material of the load-carrying component they are divided into UHMWPE, ultra-high molecular weight polyethylene fibre, and PPTA, para-aramid fibre, that is poly-paraphenylene terephthalamide fibre.

4.2 Structure: under 4.2.1, the structure and construction of the rope shall comply with GB/T 21328. Under 4.2.2, the structure of the type TR reduced recoil rope is shown in Figure 1, whose key names item 1 as the reduced recoil component and item 2 as the load-carrying component, and the structure of the type CR reduced recoil rope is shown in Figure 2, whose key names item 1 as the reduced recoil component, item 2 as the load-carrying component and item 3 as the cover jacket.

4.3 Designation: the model of a reduced recoil rope is written as the number of the document followed by four fields separated by hyphens, in the order reduced recoil rope code DT, braid structure, rope code and material of the load-carrying component. The worked example given is a twelve-strand type TR ultra-high molecular weight polyethylene fibre reduced recoil rope with rope code 20, designated GB/T 43675-2024DT-TR-20-UHMWPE.

5 Requirements

5.1 Materials: the materials of the main parts of the reduced recoil rope shall comply with Table 1. The table has three columns, part name, material name and document number, and assigns to the load-carrying component ultra-high molecular weight polyethylene fibre (UHMWPE) and para-aramid fibre (PPTA), to the reduced recoil component polyamide fibre (PA) and polypropylene fibre (PP), and to the cover jacket polyester fibre (PET), blended polyolefin fibre (PP/PE), ultra-high molecular weight polyethylene fibre (UHMWPE) and polyamide fibre (PA); the document number given for all of them is GB/T 21328.

5.2 Appearance quality: the appearance shall be free from broken filaments, free from damage, free from pulled-out yarns or strands, and free from kinks.

5.3 Minimum initial break force and linear density: these shall comply with Table 2 and Table 3. Table 2 covers the type TR rope and Table 3 the type CR rope. Both tables have the same six columns: rope code; the linear density of the load-carrying component in ktex for the UHMWPE reduced recoil rope and for the PPTA reduced recoil rope; the permissible deviation rate in per cent; and the minimum initial break force in kN for the UHMWPE reduced recoil rope and for the PPTA reduced recoil rope, in each case for a rope with spliced eyes at the ends. The permissible deviation rate is ± 5 for every line of both tables. Table 2 runs over the rope codes 16, 18, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 72, 80, 88 and 96, and Table 3 over the rope codes 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 88 and 96. Three footnotes are common to both tables: the rope code corresponds to the approximate diameter of the rope in millimetres; the linear density, expressed in kilotex, corresponds to the net mass per unit length of the rope and is expressed in grams per metre or kilograms per kilometre; and the minimum initial break force is the minimum initial break force of a newly made reduced recoil rope in the dry state.

5.4 Warning stretch elongation: the warning stretch elongation of a reduced recoil rope shall be not less than 0.15.