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Fibre ropes—Electrostatic surface potential measuring method

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In the event of any doubts arising as to the contents,
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Foreword

This Japanese Industrial Standard has been established by the Minister of Economy, Trade and Industry, through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Act.

This **JIS** document is protected by the Copyright Act.

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Fibre ropes—Electrostatic surface potential measuring method

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 20615:2018**, Edition 1, with some modifications of the technical contents.

The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JA.

1 Scope

This document specifies a method for measuring the surface potential of fibre ropes generated by tribocharging. The measuring method specified in this Standard is only applicable to fibre ropes of diameter between 12 mm and 20 mm.

This Standard is not intended to be used to evaluate the safety of ropes for use in explosive atmospheres.

NOTE The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 20615:2018 *Fibre ropes—Electrostatic surface potential measuring method* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS G 3101 *Rolled steels for general structure*

NOTE Corresponding International Standard: ISO 630-1 *Structural steels—Part 1: General technical delivery conditions for hot-rolled products*

JIS L 0219 *Glossary of terms used in ropes*

NOTE Corresponding International Standard: ISO 1968 *Fibre ropes and cordage—Vocabulary*

JIS L 1930 *Textiles—Domestic washing and drying procedures for textile testing*

NOTE Corresponding International Standard: ISO 6330 *Textiles—Domestic washing and drying procedures for textile testing*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS L 0219** apply.

4 Principle of measurement

A fibre rope specimen shall be cut to a designated length and both ends spliced by the short splice method (7.3) to make an endless loop. The rope specimen loop shall be mounted in a rope driving apparatus and passes around friction cylinders. As the rope makes contact with the friction cylinders, loading rollers and drive pulleys, it becomes electrostatically charged. The resulting surface potential shall be measured by the non-contacting electrostatic voltmeter.

5 Test atmosphere

The atmosphere for conditioning and testing shall be a temperature of $23\text{ °C} \pm 2\text{ °C}$ and a relative humidity of $(25 \pm 5)\%$. A different temperature and/or relative humidity may be used as appropriate, but in any case, the temperature and/or relative humidity shall be included in the test report specified in Clause 9.

6 Apparatus

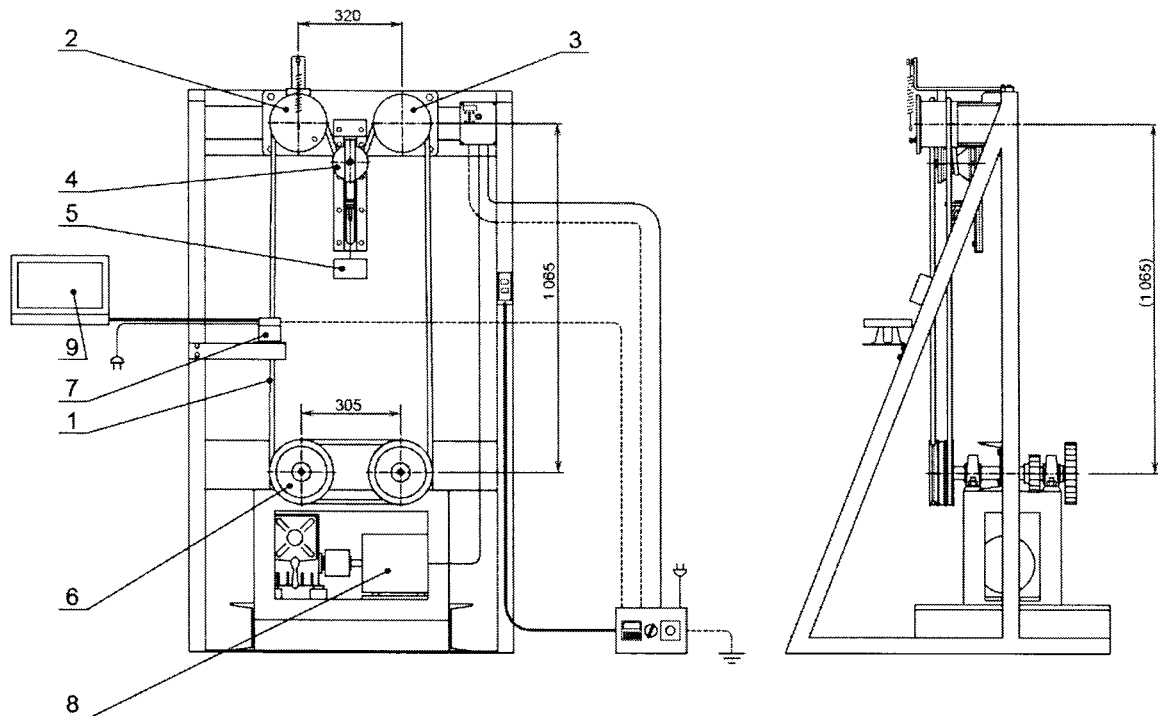
6.1 Measuring apparatus

The apparatus (see Figure 1 and Figure 2) shall be capable of measuring surface potential of fibre rope generated by tribocharging and shall be as follows.

The apparatus should be earthed by the designated method, and tolerances on each of the following dimensions shall be $\pm 4\text{ mm}$.

- Distance between the centres of friction cylinder and driving pulley: 1 065 mm
- Distance between the centres of friction cylinders: 320 mm
- Distance between the centres of driving pulleys: 305 mm

Unit: mm



- | | |
|-----------------------------------|--|
| 1 rope specimen | 6 driving pulley |
| 2 friction cylinder (no rotation) | 7 electrostatic potential measuring instrument |
| 3 friction cylinder (no rotation) | 8 motor |
| 4 loading roller | 9 recording device |
| 5 load | |

Figure 1 Example of test apparatus

6.1.1 Friction cylinders, consisting of two friction cylinders (see Figure 1, items 2 and 3). The dimension of each cylinder shall be $140 \text{ mm} \pm 3 \text{ mm}$ in diameter. The material shall be SS 400 specified in **JIS G 3101** and polishing roughness is an arithmetic mean roughness of $6.3 \mu\text{m}$.

6.1.2 Loading roller, hanging freely in the rope path (Figure 1, item 4) and loaded with a mass of $2.4 \text{ kg} \pm 0.3 \text{ kg}$. The diameter of the roller shall be $46 \text{ mm} \pm 3 \text{ mm}$. The material of roller surface shall be chloroprene rubber.

6.1.3 Driving pulley, for driving the rope specimen in this testing apparatus along the rope path (Figure 1, item 6). The material shall be the same as the friction cylinder material.

6.1.4 Electrostatic potential measuring instrument, non-contacting electrostatic voltmeter as shown in Figure 2, which may be either an electrostatic field meter calibrated to read surface voltage of fibre rope phase using the shape of rope, or a direct reading electrostatic voltmeter (e.g. vibrating reed type) and which satisfies the following requirements.

- Measuring range: 0 kV to 20 kV, both positive and negative polarity
- Response time (0 % to 90 % full scale): $\leq 10 \text{ ms}$