INTERNATIONAL STANDARD

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Cranes and related equipment — Accuracy requirements for measuring parameters during testing

Grues et équipements correspondants — Exigences relatives à la précision des mesures de paramètres pendant les essais

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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Cranes and related equipment — Accuracy requirements for measuring parameters during testing

1 Scope

This International Standard specifies the principal requirements for instruments and measurement systems of test loads, distances, time and other relevant parameters when testing cranes and related equipment. It gives recommended limit values of relative errors in measurement during testing.

2 Principal requirements for instruments and measurement systems

2.1 Instruments, measuring devices and measurement systems shall have calibration accuracy sufficient for the purposes of achieving the measurement accuracy which is required to evaluate basic relative errors as indicated in 3.1 and other relevant International Standards or product specifications.

2.2 Instruments and measuring equipment shall be calibrated at recommended intervals or prior to taking measurements, as required for the particular device to be used.

3 Allowable basic relative error in measurement during testing

3.1 Where no variation is expected in the measurements, only one measurement is sufficient and the relative error need not be determined.

3.2 A basic relative error expressed as a percentage of the parameter's actual value shall be established as a measure of accuracy for measuring test loads, distances, time and other related parameters.

The basic relative error, δ, shall be calculated using the following method and formulae:

— for between two and five measurements:

$$\delta' = 100 \left| \frac{x - \mu}{\mu} \right|$$

— for over five measurements:

$$\delta'' = \frac{100}{\mu} \sqrt{\frac{N\left(\sum_{i=1}^{N} x_i^2\right) - \left(\sum_{i=1}^{N} x_i\right)^2}{N(N-1)}}$$

where

μ is the arithmetic mean:

$$\mu = \frac{1}{N} \sum_{i=1}^{N} x_i$$

x is the extreme value;

x_i is the value of the ith measurement;

N is the number of measurements of the x_i;

δ' and δ'' are the relative errors, in percent.

3.3 Examples of recommended limit values of relative error during measurements of main parameters are given in table 1.