IEC 62256

Edition 2.0 2017-05

REDLINE VERSION

colour inside

Hydraulic turbines, storage pumps and pump-turbines – Rehabilitation and performance improvement

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 27.140

ISBN 978-2-8322-4433-3

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HYDRAULIC TURBINES, STORAGE PUMPS AND PUMP-TURBINES – REHABILITATION AND PERFORMANCE IMPROVEMENT

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This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 62256 has been prepared by IEC technical committee 4: Hydraulic turbines.

This second edition cancels and replaces the first edition published in 2008. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

– Tables 2 to 23 modified, completed and moved to Annex A;
– 7.3.2:
  - subclauses moved with text changes;
  - new subclauses on temperature, noise, galvanic corrosion, galling and replacement of components without assessment;
– 7.3.3: complete new subclause on residual life;
– Tables 29 to 32 moved to Annex C;
– new Annex B with assessment examples.

The text of this standard is based on the following documents:

FDIS	Report on voting
4/323/FDIS	4/326/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Hydro plant owners make significant investments annually in rehabilitating plant equipment (turbines, generators, transformers, penstocks, gates etc.) and structures in order to improve the level of service to their customers and to optimize their revenue. In the absence of guidelines, owners may be spending needlessly, or may be taking unnecessary risks and thereby achieving results that are less than optimal. This document is intended to be a tool in the optimisation and decision process.

~~IEC TC 4 wishes to thank IEA for providing its document "Guidelines on Methodology for Hydroelectric Francis Turbine Upgrading by Runner Replacement" as a starting point for the writing of this document. IEC TC 4 appreciates this contribution and acknowledges that the IEA document provided a good foundation upon which to build this IEC document.~~

Edition 1 of this International Standard was based on the IEA document *Guidelines on Methodology for Hydroelectric Francis Turbine Upgrading by Runner Replacement*.

HYDRAULIC TURBINES, STORAGE PUMPS AND PUMP-TURBINES – REHABILITATION AND PERFORMANCE IMPROVEMENT

1 Scope ~~and object~~

This document covers turbines, storage pumps and pump-turbines of all sizes and of the following types:

- Francis;
- Kaplan;
- propeller;
- Pelton (turbines only);
- bulb turbines.

This document also identifies without detailed discussion, other powerhouse equipment that could affect or be affected by a turbine, storage pump, or pump-turbine rehabilitation.

The object of this document is to assist in identifying, evaluating and executing rehabilitation and performance improvement projects for hydraulic turbines, storage pumps and pump-turbines. This document can be used by owners, consultants, and suppliers to define:

- needs and economics for rehabilitation and performance improvement;
- scope of work;
- specifications;
- evaluation of results.

This document is intended to be:

- an aid in the decision process;
- an extensive source of information on rehabilitation;
- an identification of the key milestones in the rehabilitation process;
- an identification of the points ~~that should~~ to be addressed in the decision processes.

This document is not intended to be a detailed engineering manual nor a maintenance document.

2 Normative references

There are no normative references in this document.

IEC 62256

Edition 2.0 2017-05

INTERNATIONAL STANDARD

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Hydraulic turbines, storage pumps and pump-turbines – Rehabilitation and performance improvement



IEC 62256:2017-05(en)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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– 7.3.3: complete new subclause on residual life;
– Tables 29 to 32 moved to Annex C;

– new Annex B with assessment examples.

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Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Hydro plant owners make significant investments annually in rehabilitating plant equipment (turbines, generators, transformers, penstocks, gates etc.) and structures in order to improve the level of service to their customers and to optimize their revenue. In the absence of guidelines, owners may be spending needlessly, or may be taking unnecessary risks and thereby achieving results that are less than optimal. This document is intended to be a tool in the optimisation and decision process.

Edition 1 of this International Standard was based on the IEA document *Guidelines on Methodology for Hydroelectric Francis Turbine Upgrading by Runner Replacement*.

HYDRAULIC TURBINES, STORAGE PUMPS AND PUMP-TURBINES – REHABILITATION AND PERFORMANCE IMPROVEMENT

1 Scope

This document covers turbines, storage pumps and pump-turbines of all sizes and of the following types:

- Francis;
- Kaplan;
- propeller;
- Pelton (turbines only);
- bulb turbines.

This document also identifies without detailed discussion, other powerhouse equipment that could affect or be affected by a turbine, storage pump, or pump-turbine rehabilitation.

The object of this document is to assist in identifying, evaluating and executing rehabilitation and performance improvement projects for hydraulic turbines, storage pumps and pump-turbines. This document can be used by owners, consultants, and suppliers to define:

- needs and economics for rehabilitation and performance improvement;
- scope of work;
- specifications;
- evaluation of results.

This document is intended to be:

- an aid in the decision process;
- an extensive source of information on rehabilitation;
- an identification of the key milestones in the rehabilitation process;
- an identification of the points to be addressed in the decision processes.

This document is not intended to be a detailed engineering manual nor a maintenance document.

2 Normative references

There are no normative references in this document.