SVENSK STANDARD SS-EN 62364

Fastställd	Utgåva	Sida	Ansvarig kommitté
2014-08-20	1	1 (1+74)	SEK TK 4

Vattenturbiner – Vägledning beträffande hydro-abrasiv erosion i Kaplan-, Francis- och Peltonturbiner

Hydraulic machines – Guide for dealing with hydro-abrasive erosion in Kaplan, Francis and Pelton turbines

Som svensk standard gäller europastandarden EN 62364:2013. Den svenska standarden innehåller den officiella engelska språkversionen av EN 62364:2013.

Nationellt förord

Europastandarden EN 62364:2013

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 62364, First edition, 2013 - Hydraulic machines - Guide for dealing with hydro-abrasive erosion in Kaplan, Francis and Pelton turbines**

utarbetad inom International Electrotechnical Commission, IEC.

ICS 23.100.10; 27.140.00

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62364

August 2013

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English version

Hydraulic machines - Guide for dealing with hydro-abrasive erosion in Kaplan, Francis, and Pelton turbines

(IEC 62364:2013)

Machines hydrauliques - Guide relatif au traitement de l'érosion hydro-abrasive des turbines Kaplan, Francis et Pelton (CEI 62364:2013)

Wasserturbinen - Leitfaden für den Umgang mit hydroabrasiver Erosion in Kaplan-, Francis- und Pelton-Turbinen (IEC 62364:2013)

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Ref. No. EN 62364:2013 E

SEK Svensk Elstandard

Foreword

The text of document 4/279/FDIS, future edition 1 of IEC 62364, prepared by IEC TC 4 "Hydraulic turbines" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62364:2013.

The following dates are fixed:

– latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2014-05-01
– latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2016-08-01

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Endorsement notice

The text of the International Standard IEC 62364:2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated :

IEC 60193:1999	NOTE	Harmonised as EN 60193:1999 (not modified).

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HYDRAULIC MACHINES – GUIDE FOR DEALING WITH HYDRO-ABRASIVE EROSION IN KAPLAN, FRANCIS, AND PELTON TURBINES

FOREWORD

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International Standard IEC 62364 has been prepared by IEC technical committee 4: Hydraulic turbines.

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

FDIS	Report on voting
4/279/FDIS	4/283/RVD

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

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

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

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

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

Many owners of hydroelectric plants contend with the sometimes very aggressive deterioration of their machines due to particle abrasion. Such owners must find the means to communicate to potential suppliers of machines for their sites, their desire to have the particular attention of the designers at the turbine design phase, directed to the minimization of the severity and effects of particle abrasion.

Limited consensus and very little quantitative data exists on the steps which the designer could and should take to extend the useful life before major overhaul of the turbine components when they are operated under severe particle abrasion service. This has led some owners to write into their specifications, conditions which cannot be met with known methods and materials.

HYDRAULIC MACHINES – GUIDE FOR DEALING WITH HYDRO-ABRASIVE EROSION IN KAPLAN, FRANCIS, AND PELTON TURBINES

1 Scope

This Guide serves to:

a) present data on particle abrasion rates on several combinations of water quality, operating conditions, component materials, and component properties collected from a variety of hydro sites;

b) develop guidelines for the methods of minimizing particle abrasion by modifications to hydraulic design for clean water. These guidelines do not include details such as hydraulic profile shapes which should be determined by the hydraulic design experts for a given site;

c) develop guidelines based on “experience data” concerning the relative resistance of materials faced with particle abrasion problems;

d) develop guidelines concerning the maintainability of abrasion resistant materials and hard facing coatings;

e) develop guidelines on a recommended approach, which owners could and should take to ensure that specifications communicate the need for particular attention to this aspect of hydraulic design at their sites without establishing criteria which cannot be satisfied because the means are beyond the control of the manufacturers;

f) develop guidelines concerning operation mode of the hydro turbines in water with particle materials to increase the operation life;

It is assumed in this Guide that the water is not chemically aggressive. Since chemical aggressiveness is dependent upon so many possible chemical compositions, and the materials of the machine, it is beyond the scope of this Guide to address these issues.

It is assumed in this Guide that cavitation is not present in the turbine. Cavitation and abrasion may reinforce each other so that the resulting erosion is larger than the sum of cavitation erosion plus abrasion erosion. The quantitative relationship of the resulting abrasion is not known and it is beyond the scope of this guide to assess it, except to recommend that special efforts be made in the turbine design phase to minimize cavitation.

Large solids (e.g. stones, wood, ice, metal objects, etc.) traveling with the water may impact turbine components and produce damage. This damage may in turn increase the flow turbulence thereby accelerating wear by both cavitation and abrasion. Abrasion resistant coatings can also be damaged locally by impact of large solids. It is beyond the scope of this Guide to address these issues.

This guide focuses mainly on hydroelectric powerplant equipment. Certain portions may also be applicable to other hydraulic machines.