SVENSK STANDARD SS-EN 62006

Fastställd	Utgåva	Sida	Ansvarig kommitté
2011-05-04	1	1 (1+110)	SEK TK 4

Vattenkraftmaskiner – Leveransprovning av små anläggningar

Hydraulic machines –
Acceptance tests of small hydroelectric installations

Som svensk standard gäller europastandarden EN 62006:2011. Den svenska standarden innehåller den officiella engelska språkversionen av EN 62006:2011.

Nationellt förord

Europastandarden EN 62006:2011

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 62006, First edition, 2010 - Hydraulic machines - Acceptance tests of small hydroelectric installations**

utarbetad inom International Electrotechnical Commission, IEC.

ICS 27.140

Denna standard är fastställd av SEK Svensk Elstandard,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
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Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

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Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62006

February 2011

ICS 27.140

English version

Hydraulic machines - Acceptance tests of small hydroelectric installations

(IEC 62006:2010)

Machines hydrauliques - Essais de réception des petits aménagements hydroélectriques (CEI 62006:2010)

Hydraulische Maschinen - Abnahmemessungen an Kleinwasserkraft-Anlagen (IEC 62006:2010)

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 62006:2011 E

SEK Svensk Elstandard

Foreword

The text of document 4/254/FDIS, future edition 1 of IEC 62006, prepared by IEC TC 4, Hydraulic turbines, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62006 on 2011-01-02.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2011-10-02
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2014-01-02

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62006:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60994	NOTE	Harmonized as EN 60994.
IEC 61116	NOTE	Harmonized as EN 61116.
IEC 61260	NOTE	Harmonized as EN 61260.
ISO 4373	NOTE	Harmonized as EN ISO 4373.
ISO 5167 series	NOTE	Harmonized in EN ISO 5167 series (not modified)

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60041	1991	Field acceptance tests to determine the hydraulic performance of hydraulic turbines, storage pumps and pump-turbines	EN 60041	1994
IEC 60193	-	Hydraulic turbines, storage pumps and pump-turbines - Model acceptance tests	EN 60193	-
IEC 60308	-	Hydraulic turbines - Testing of control systems	EN 60308	-
IEC 60609	Series	Hydraulic turbines, storage pumps and pump-turbines - Cavitation pitting evaluation	EN 60609	Series
IEC 60651	-	Sound level meters	EN 60651	-
IEC 61362	-	Guide to specification of hydraulic turbine control systems	EN 61362	-
ISO 1680	-	Acoustics - Test code for the measurement of airborne noise emitted by rotating electrical machines	EN ISO 1680	-
ISO 1940-1	2003	Mechanical vibration - Balance quality requirements for rotors in a constant (rigid) state - Part 1: Specification and verification of balance tolerances	-	-
ISO 3746	-	Acoustics - Determination of sound power levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane	EN ISO 3746	-
ISO 4412	Series	Hydraulic fluid power - Test code for determination of airborne noise levels	-	-
ISO 5168	-	Measurement of fluid flow - Estimation of uncertainly of a flow-rate measurement	-	-
ISO 7919-5	-	Mechanical vibration - Evaluation of machine vibration by measurements on rotating shafts - Part 5: Machine sets in hydraulic power generating and pumping plants	-	-
ISO 10816-3	-	Mechanical vibration - Evaluation of machine vibration by measurements on non-rotating parts - Part 3: Industrial machines with nominal power above 15 kW and nominal speeds between 120 r/min and 15 000 r/min when measured in situ	-	-

Publication	Year	Title	EN/HD	Year
ANSI/IEEE 810	-	Hydraulic Turbine and Generator Integrally Forged Shaft Couplings and Shaft Runout Tolerances	-	-

CONTENTS

HYDRAULIC MACHINES – ACCEPTANCE TESTS OF SMALL HYDROELECTRIC INSTALLATIONS

1 Scope

This International Standard defines the test, the measuring methods and the contractual guarantee conditions for field acceptance tests of the generating machinery in small hydroelectric power installations. It applies to installations containing impulse or reaction turbines with unit power up to about 15 MW and reference diameter of about 3 m. The driven generator can be of synchronous or asynchronous type.

This International Standard contains information about most of the tests required for acceptance of the hydraulic turbine such as safety approval tests, trial operating and reliability tests, as well for verification of cavitation, noise and vibration conditions, if required.

This standard represents the typical methods used on smaller hydroelectric installations, and is divided into three classes as follows (see Table 1 for more detail):

Class A	Normal test program (panel measurement) To determine the maximum power output of the installation.	**Default**
Class B	Extended test program To determine the performance characteristics of the installation.	**Recommended**
Class C	Comprehensive test program To determine the absolute efficiency of the installation.	**Optional**

NOTE All classes contain safety tests, trial operating tests, and reliability tests.

This standard gives all necessary references for the contract in order to execute the test, evaluate, calculate and compare the result to the guarantee for all the classes A, B and C.

The manufacturer or consulting engineer is responsible for ensuring that standardized connections are installed for performing these tests. This standard does not cover the structural details of a hydroelectric installation or its component parts.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60041:1991, *Field acceptance tests to determine the hydraulic performance of hydraulic turbines, storage pumps and pump turbines*

IEC 60193, *Hydraulic turbines, storage pumps and pump-turbines – Model acceptance tests*

IEC 60308, *Hydraulic turbines – Testing of control systems*

IEC 60609 (all parts), *Hydraulic turbines, storage pumps and pump-turbines – Cavitation pitting evaluation*

IEC 60651, *Specification for sound level meters*

IEC 61362, *Guide to specification of hydraulic turbine control systems*

ISO 1680 *Acoustics – Test code for the measurement of airborne noise emitted by rotating electrical machinery*

ISO 1940-1:2003, *Mechanical vibration – Balance quality requirements for rotors in a constant (rigid) state – Part 1: Specification and verification of balance tolerances*

ISO 3746, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Survey method using an enveloping measurement surface over a reflecting plane*

ISO 4412 (all parts), *Hydraulic fluid power – Test code for determination of airborne noise levels*

ISO 5168, *Measurement of fluid flow – Procedures for the evaluation of uncertainties*

ISO 7919-5, *Mechanical vibration – Evaluation of machine vibration by measurements on rotating shafts – Part 5: Machine sets in hydraulic power generating and pumping plants*

ISO 10816-3, *Mechanical vibration – Evaluation of machine vibration by measurements on non-rotating parts – Part 3: Industrial machines with nominal power above 15 kW and nominal speeds between 120 r/min and 15 000 r/min when measured in situ*

ANSI/IEEE 810, *Hydraulic Turbine and Generator Integrally Forged Shaft Couplings and Shaft Runout Tolerances*