

# SVENSK STANDARD

## SS-ISO 7919-3:2009

Fastställt/Approved: 2009-02-09

Publicerad/Published: 2009-03-10

Utgåva/Edition: 2

Språk/Language: engelska/English

ICS: 17.140.20; 17.160

---

### **Vibration och stöt – Bedömning av vibrationer genom mätning på roterande axlar – Del 3: Kopplade industrimaskiner (ISO 7919-3:2009, IDT)**

### **Mechanical vibration – Evaluation of machine vibration by measurements on rotating shafts – Part 3: Coupled industrial machines (ISO 7919-3:2009, IDT)**

This preview is downloaded from [www.sis.se](http://www.sis.se). Buy the entire standard via <https://www.sis.se/std-68847>

# Hitta rätt produkt och ett leveranssätt som passar dig

## Standarder

Genom att följa gällande standard både effektiviserar och säkrar du ditt arbete. Många standarder ingår dessutom ofta i paket.

## Tjänster

Abonnemang är tjänsten där vi uppdaterar dig med aktuella standarder när förändringar sker på dem du valt att abonnera på.

På så sätt är du säker på att du alltid arbetar efter rätt utgåva.

e-nav är vår online-tjänst som ger dig och dina kollegor tillgång till standarder ni valt att abonnera på dygnet runt. Med e-nav kan samma standard användas av flera personer samtidigt.

## Leveranssätt

Du väljer hur du vill ha dina standarder levererade. Vi kan erbjuda dig dem på papper och som pdf.

## Andra produkter

Vi har böcker som underlättar arbetet att följa en standard. Med våra böcker får du ökad förståelse för hur standarder ska följas och vilka fördelar den ger dig i ditt arbete. Vi tar fram många egna publikationer och fungerar även som återförsäljare. Det gör att du hos oss kan hitta över 500 unika titlar. Vi har även tekniska rapporter, specifikationer och "workshop agreement".

Matriser är en översikt på standarder och handböcker som bör läsas tillsammans. De finns på [sis.se](http://sis.se) och ger dig en bra bild över hur olika produkter hör ihop.

## Standardiseringsprojekt

Du kan påverka innehållet i framtida standarder genom att delta i någon av SIS ca 400 Tekniska Kommittéer.

# Find the right product and the type of delivery that suits you

## Standards

By complying with current standards, you can make your work more efficient and ensure reliability. Also, several of the standards are often supplied in packages.

## Services

Subscription is the service that keeps you up to date with current standards when changes occur in the ones you have chosen to subscribe to. This ensures that you are always working with the right edition.

e-nav is our online service that gives you and your colleagues access to the standards you subscribe to 24 hours a day. With e-nav, the same standards can be used by several people at once.

## Type of delivery

You choose how you want your standards delivered. We can supply them both on paper and as PDF files.

## Other products

We have books that facilitate standards compliance. They make it easier to understand how compliance works and how this benefits you in your operation. We produce many publications of our own, and also act as retailers. This means that we have more than 500 unique titles for you to choose from. We also have technical reports, specifications and workshop agreements.

Matrices, listed at [sis.se](http://sis.se), provide an overview of which publications belong together.

## Standardisation project

You can influence the content of future standards by taking part in one or other of SIS's 400 or so Technical Committees.

Den internationella standarden ISO 7919-3:2009 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 7919-3:2009.

Denna standard ersätter SS-ISO 7919-3, utgåva 1.

The International Standard ISO 7919-3:2009 has the status of a Swedish Standard. This document contains the official English version of ISO 7919-3:2009.

This standard supersedes the Swedish Standard SS-ISO 7919-3, edition 1.

! © Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

! © Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), tel +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

SIS Förlag AB, SE 118 80 Stockholm, Sweden. Tel: +46 8 555 523 10. Fax: +46 8 555 523 11.  
E-mail: [sis.sales@sis.se](mailto:sis.sales@sis.se) Internet: [www.sis.se](http://www.sis.se)

## SS-ISO 7919-3:2009 (E)

### 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 7919-3 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration, shock and condition monitoring*, Subcommittee SC 2, *Measurement and evaluation of mechanical vibration and shock as applied to machines, vehicles and structures*.

This second edition cancels and replaces the first edition (ISO 7919-3:1996), of which it constitutes a minor revision. It also incorporates the Technical Corrigendum ISO 7919-3:1996/Cor.1:2007.

ISO 7919 consists of the following parts, under the general title *Mechanical vibration — Evaluation of machine vibration by measurements on rotating shafts*:

- *Part 1: General guidelines*
- *Part 2: Land-based steam turbines and generators in excess of 50 MW with normal operating speeds of 1 500 r/min, 1 800 r/min, 3 000 r/min and 3 600 r/min*
- *Part 3: Coupled industrial machines*
- *Part 4: Gas turbine sets with fluid-film bearings*
- *Part 5: Machine sets in hydraulic power generating and pumping plants*

## **Introduction**

This part of ISO 7919 specifies guidelines for measuring transverse shaft vibration on coupled industrial machines. Evaluation criteria, based on previous experience, are given for use as guidelines for assessing the vibratory conditions of such machines.

A general description of the principles that are generally applicable for the measurement and evaluation of shaft vibration of non-reciprocating machines is outlined in ISO 7919-1.



# Mechanical vibration — Evaluation of machine vibration by measurements on rotating shafts —

## Part 3: Coupled industrial machines

### 1 Scope

This part of ISO 7919 gives guidelines for applying evaluation criteria of shaft vibration under normal operating conditions, measured at or close to the bearings of coupled industrial machines. These guidelines are presented in terms of both steady running vibration and any amplitude changes which can occur in these steady values. The numerical values specified are not intended to serve as the only basis for vibration evaluation since, in general, the vibratory condition of a machine is assessed by consideration of both the shaft vibration and the associated structural vibration.

This part of ISO 7919 applies to coupled industrial machines with fluid-film bearings, having maximum continuous rated speeds in the range 1 000 r/min to 30 000 r/min and not limited by size and power, comprising

- steam turbines,
- turbocompressors,
- turbogenerators,
- turbofans,
- electric drives and associated gears, where relevant, and
- rotodynamic pumps (turbo pumps).

The information relating to pumps provided in this part of ISO 7919 complements that given in ISO 10816-7. In particular, the conditions for *in-situ* operation, performing acceptance tests and the influence of bearing clearance given in ISO 10816-7 shall be taken into account when evaluating the shaft vibration of pumps

This part of ISO 7919 is neither applicable to land-based steam turbine-generator sets for power stations with outputs greater than 50 MW (see ISO 7919-2), nor machine sets in hydraulic power generating and pumping plants with outputs of 1 MW or greater (see ISO 7919-5).

### 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.

ISO 7919-1, *Mechanical vibration of non-reciprocating machines — Measurements on rotating shafts and evaluation criteria — Part 1: General guidelines*

## SS-ISO 7919-3:2009 (E)

### 3 Measurement procedures

The measurement procedures to be followed and the instrumentation which shall be used are specified in ISO 7919-1.

In industrial machines, shaft vibration relative to the bearing is normally measured. Therefore, unless stated otherwise, this part of ISO 7919 always refers to relative vibration displacement. In view of the relatively high rotational speeds involved with industrial machines, measuring methods using non-contacting transducers are most common and are generally preferred on rotor elements with operating speeds of 3 000 r/min and above. For monitoring purposes the measuring system shall be capable of covering overall vibration up to a frequency equivalent to 2,5 times the maximum service speed. However, it should be noted that for diagnostic purposes it might be desirable to cover a wider frequency range.

### 4 Evaluation criteria

The criteria for vibration magnitude, changes in vibration magnitude and operational limits are given in Annex A.

The vibration magnitude is the higher value of the peak-to-peak displacement measured in two selected orthogonal measurement directions. The values presented are the result of experience with machinery of this type and, if due regard is paid to them, acceptable operation can be expected. If only one measuring direction is used, care should be taken to ensure that it provides adequate information (see ISO 7919-1).

The criteria are presented for the specified steady-state operating conditions at the rated speed and load ranges. They apply for normal slow changes in load but do not apply when different conditions exist or during transient changes, for example during start-up and shut-down and when passing through resonance ranges. In these cases alternative criteria are necessary.

It should be noted that overall judgement of the vibratory state of a machine is often made on the basis of both shaft relative vibration as defined above and of measurements made on non-rotating parts (see ISO 10816-3)<sup>[2]</sup>.