

# Teknisk specifikation

## SIS-ISO/TS 20646:2014

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**Ergonomisk vägledning för optimering av muskuloskeletal  
arbetsbelastning**  
**(ISO/TS 20646:2014, Corrected version 2014-02-15, IDT)**

**Ergonomics guidelines for the optimization of musculoskeletal  
workload**  
**(ISO/TS 20646:2014, Corrected version 2014-02-15, IDT)**

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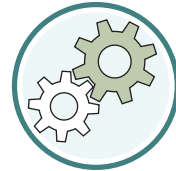
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## Foreword

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. [www.iso.org/directives](http://www.iso.org/directives)

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 159, *Ergonomics*, Subcommittee SC 3, *Anthropometry and biomechanics*.

ISO/TS 20646 cancels and replaces ISO/TS 20646-1:2004, of which it constitutes a technical revision.

This corrected version of ISO/TS 20646:2014 incorporates the following corrections: the title has been changed from *Ergonomic procedures for the improvement of local muscular workloads* to *Ergonomics guidelines for the optimization of musculoskeletal workload*.

## **Introduction**

The onset of work-related musculoskeletal disorders, such as low back pain and upper and lower limb disorders, is becoming a great ergonomic concern in both industrialised and industrialising countries. The high incidence of work-related musculoskeletal disorders is an important problem to be solved not only to improve workers' health and the quality of working life, but also to improve productivity.

In order to solve the problem of work-related musculoskeletal disorders, it is important to work out primary preventive measures, through improving working conditions and providing adequate health guidance and training, as well as to establish measures for secondary prevention, treatment, and reassignment of the workers after a long sick leave.

Above all, the establishment of primary preventive measures, mainly measures to improve musculoskeletal workloads (MSWL), are considered to be the most cost-effective solution and improve the quality of working life. Various activities to improve MSWL have already been promoted. In addition, regarding ISO/TC 159/SC 3, new standards are developed to improve working conditions relating to the factors causing MSWL. However, in order to improve MSWL, it is indispensable to take a comprehensive work-related perspective and find a solution, in consideration of the aforementioned factors.





# Ergonomics guidelines for the optimization of musculoskeletal workload

## 1 Scope

This Technical Specification provides information and guidelines to properly utilize various ergonomics standards concerning the factors related to musculoskeletal workload (MSWL), and helps develop activities to reduce or optimize MSWL in workplaces and non-professional activities, in an effective and efficient manner. The activities are intended to be based on a risk assessment. This Technical Specification is intended primarily for employers, ergonomics and occupational health-related staff and workers in enterprises, and workers. Prevention of MSWL is not always a matter of reducing the load. The approach to reducing MSWL also involves assessing the work environment and organization as a system to identify how changes can help to safely manage MSWL. Although this Technical Specification provides ideas of effective and efficient measures to reduce or optimize MSWL, it does not certify the complete prevention of health problems caused by MSWL.

## 2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 2.1 musculoskeletal workload

#### MSWL

loads on the musculoskeletal system required for working motions, maintaining working postures, and exerting forces

### 2.2 harm

physical injury or damage to health

[SOURCE: ISO 12100]

### 2.3 hazard

potential source of harm

[SOURCE: ISO 12100]

### 2.4 risk

combination of the probability of occurrence of harm and the severity of that harm

[SOURCE: ISO 12100]

### 2.5 risk assessment

overall process comprising a risk analysis and risk evaluation

[SOURCE: ISO 12100]

### 2.6 risk analysis

combination of the specification of work description, hazard identification, and risk estimation

## **2.7**

### **risk estimation**

defining likely severity of harm and probability of its occurrence

[SOURCE: ISO 12100]

## **2.8**

### **risk evaluation**

judgment on the basis of successive risk analysis of whether the risk reduction objectives have been achieved

[SOURCE: ISO 12100]

## **2.9**

### **work space**

volume of space allocated to one or more persons in the work system to complete a work task

[SOURCE: ISO 9241-5]

## **2.10**

### **workstation**

combination of work equipment for a particular person in a work space

Note 1 to entry: It is possible that several persons share a particular workstation, or that several persons alternate between several workstations within any period of time (i.e. hourly, daily, weekly basis).

[SOURCE: ISO 11064-2]

## **3 General guiding principles**

### **3.1 Basic principles to improve MSWL**

Management should clarify in writing existing and predicted MSWL and possible health- and productivity-related problems, and publish improvement goals and targets, a basic schedule to achieve the targets, and the organization to implement the improvement (see [Annex A](#)).

### **3.2 Basic framework and responsibilities of MSWL-improvement activities**

#### **3.2.1 General**

As organizations draft, implement, and assess MSWL-reduction plans, organizations at the enterprise level and department level, and advisory organizations, should develop activities in a collaborative manner. The participation of workers and/or their representatives is essential.

#### **3.2.2 Enterprise level**

A structure to manage MSWL should be established at the enterprise level, either as part of existing management systems for work design or occupational safety and health, or as a specifically designated project activity. The owner or executive director with overall management authority should be responsible for the establishment and the conduct of this organization.

#### **3.2.3 Department level**

This refers to an organization within an individual department, for which the departmental manager should be responsible. Its function is to draft, implement, and assess the improvement plans for the department.

### 3.2.4 Advisory level

This refers to an organization offering advice concerning the validity of drafting, implementation, and assessment of improvement plans. The organization can be established inside or outside the enterprise.

## 3.3 Processes for MSWL risk assessment including implementation of risk reduction activity

### 3.3.1 General

An MSWL risk reduction plan should not be limited to a few specific factors causing loads. It should be based on MSWL risk assessment in the workplace. On the basis of comprehensive risk assessment using this multi-factorial analysis, specific action targets should be set to eliminate or reduce unacceptable risks. Basic processes in achieving this target(s) are given in [3.3.1](#) to [3.3.4](#) (see ISO 12100).

### 3.3.2 Risk assessment

#### 3.3.2.1 General

To study necessary activities to reduce the risks of MSWL, risk assessment should be implemented. This includes a risk analysis with work description, hazard identification, and risk estimation as well as a risk evaluation. Priority risks should be addressed immediately, so as to reduce risks or reinforce the ongoing measures.

#### 3.3.2.2 Specification of work situation

To study the characteristics of work, the following items should be described:

- a) production process, contents of work, and tasks to be performed at the workplace;
- b) statistics on occupational accidents, incidence of work-related diseases and other diseases, sick leave, etc.;
- c) work organization and shift systems;
- d) work hours per day, week, month, or year;
- e) operating time per day, continuous operating time, and a rest system;
- f) characteristics of the workers, such as body size, muscle strength, history of injuries and diseases affecting work, work experience, vocational education and training, and age;
- g) characteristics of the work, such as static workload, physical inactivity, repetitive work, and manual handling.

#### 3.3.2.3 Hazard identification

The following factors are the main hazards for MSWL (see [Annex B](#)). They are divided into six sections.

##### 3.3.2.3.1 Checklist section 1 — Work hours and work concentrations

- a) long working shifts more than 8 h a day
- b) frequent and long overtime work
- c) long continuous operating time
- d) insufficient rest breaks
- e) insufficient days off