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**Ergonomics guidelines for the  
optimization of musculoskeletal  
workload**

*Lignes directrices ergonomiques pour l'amélioration des charges de  
travail musculo-squelettiques*

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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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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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.

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# 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