



Institut luxembourgeois de la normalisation  
de l'accréditation, de la sécurité et qualité  
des produits et services

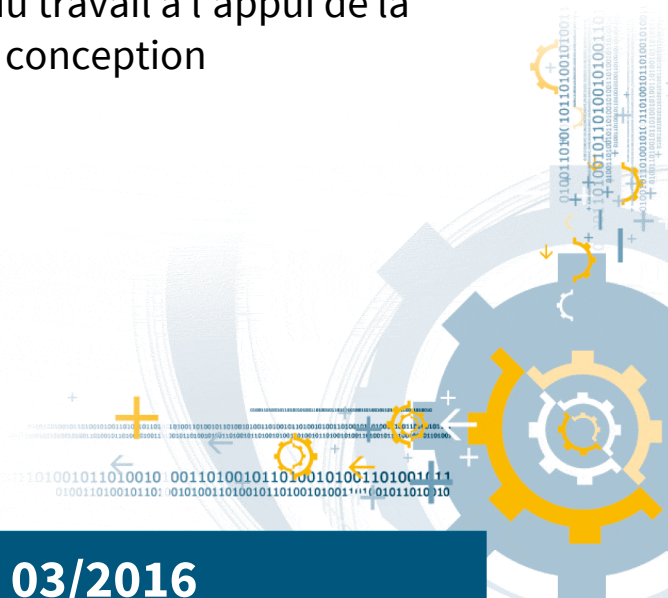
**ILNAS-EN 16710-2:2016**

**Ergonomics methods - Part 2: A  
methodology for work analysis to  
support design**

Verfahren der Ergonomie - Teil 2: Eine  
Methodologie für die Arbeitsanalyse zur  
Unterstützung von Entwicklung und  
Design

Ergonomie - Partie 2: Méthodologie  
d'analyse du travail à l'appui de la  
conception

**03/2016**



## National Foreword

This European Standard EN 16710-2:2016 was adopted as Luxembourgish Standard ILNAS-EN 16710-2:2016.

Every interested party, which is member of an organization based in Luxembourg, can participate for FREE in the development of Luxembourgish (ILNAS), European (CEN, CENELEC) and International (ISO, IEC) standards:

- Participate in the design of standards
- Foresee future developments
- Participate in technical committee meetings

<https://portail-qualite.public.lu/fr/normes-normalisation/participer-normalisation.html>

### **THIS PUBLICATION IS COPYRIGHT PROTECTED**

Nothing from this publication may be reproduced or utilized in any form or by any mean - electronic, mechanical, photocopying or any other data carries without prior permission!

ILNAS-EN 16710-2:2016

EUROPEAN STANDARD **EN 16710-2**

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2016

---

ICS 13.110; 13.180

English Version

**Ergonomics methods - Part 2: A methodology for work  
analysis to support design**

Ergonomie - Partie 2: Méthodologie d'analyse du  
travail à l'appui de la conception

Verfahren der Ergonomie - Teil 2: Eine Methodologie  
für die Arbeitsanalyse zur Unterstützung von  
Entwicklung und Design

This European Standard was approved by CEN on 23 January 2016.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

---

## Contents

Page

European foreword.....	5
Introduction .....	6
1 Scope.....	7
2 Terms and definitions .....	7
3 General requirements in specifying the human components.....	8
3.1 User experience and resultant activity .....	8
3.2 Limitations of the scientific and technical knowledge provided by existing ergonomics standards .....	9
4 Fundamentals.....	9
4.1 Participatory approach.....	9
4.2 Work analysis .....	10
5 Elements of methodology.....	11
5.1 Analysis of overall work situation components.....	11
5.2 The “activity-focused work system” .....	12
5.3 Principles of work activity analysis.....	13
5.3.1 General.....	13
5.3.2 Observation.....	14
5.3.3 Description .....	14
5.3.4 Interpretation.....	14
5.4 Knowledge validation process .....	15
6 The work activity in the design process .....	16
7 Recording the process and reporting the outcomes .....	17
7.1 Traceability .....	17
7.2 Assessment outcome and validation.....	17
7.3 Assessment report.....	17
8 Coherence with other standards .....	18
Annex A (informative) Example of requirements specification to be integrated into tender submission for ergonomics design for work equipment.....	19
A.1 General.....	19
A.2 Example specifications.....	19
A.2.1 EC marking.....	19
A.2.2 Expected performance in terms of: .....	19
A.2.3 Technological options .....	20
A.2.4 Resources.....	21
A.2.5 Means.....	21
A.2.6 Operating instructions.....	24
A.2.7 Transport, delivery.....	24
A.2.8 Unloading.....	24

<b>A.2.9 Location and installation .....</b>	<b>25</b>
<b>A.2.10 Installation, acceptance and commissioning.....</b>	<b>25</b>
<b>A.2.11 General conditions .....</b>	<b>25</b>
<b>Annex B (informative) Some techniques used for work analysis in an ergonomic approach .....</b>	<b>26</b>
<b>B.1 General .....</b>	<b>26</b>
<b>B.2 Analysis techniques (tools) based on objective data.....</b>	<b>27</b>
<b>B.2.1 Review of documents .....</b>	<b>27</b>
<b>B.2.1.1 General .....</b>	<b>27</b>
<b>B.2.1.2 The organization chart .....</b>	<b>27</b>
<b>B.2.1.3 The flow chart .....</b>	<b>27</b>
<b>B.2.1.4 Plans and Drawings .....</b>	<b>27</b>
<b>B.2.1.5 Statistical Indicators.....</b>	<b>28</b>
<b>B.2.2 Metrology.....</b>	<b>28</b>
<b>B.2.2.1 General .....</b>	<b>28</b>
<b>B.2.2.2 Measurement and evaluation of the physical environment .....</b>	<b>29</b>
<b>B.2.2.3 Measurement and evaluation of the effects of physical demands .....</b>	<b>29</b>
<b>B.2.3 Observe a work situation.....</b>	<b>30</b>
<b>B.2.3.1 General and conditions.....</b>	<b>30</b>
<b>B.2.3.2 When to observe? The right choice of moment .....</b>	<b>31</b>
<b>B.2.3.2.1 General .....</b>	<b>31</b>
<b>B.2.3.2.2 What and how to observe? .....</b>	<b>31</b>
<b>B.2.3.3 Different observation modes.....</b>	<b>31</b>
<b>B.2.3.3.1 Preliminary overall observation .....</b>	<b>31</b>
<b>B.2.3.3.2 Systematic detailed observation (direct and indirect).....</b>	<b>32</b>
<b>B.2.3.4 Observation of simulated conditions .....</b>	<b>32</b>
<b>B.3 Technical analysis using subjective data .....</b>	<b>32</b>
<b>B.3.1 Analysis by Questionnaire (survey).....</b>	<b>32</b>
<b>B.3.2 Question by interview.....</b>	<b>33</b>
<b>B.3.2.1 Why conduct an interview?.....</b>	<b>33</b>
<b>B.3.2.2 What question/interview? .....</b>	<b>33</b>
<b>B.3.2.3 The timing of the interview.....</b>	<b>33</b>
<b>B.3.3 The interview techniques.....</b>	<b>34</b>
<b>B.3.3.1 Confrontation.....</b>	<b>34</b>
<b>B.3.3.2 The structured interview.....</b>	<b>34</b>
<b>B.3.3.3 The semi-structured interview.....</b>	<b>34</b>
<b>B.3.3.4 The non-directive (open) interview .....</b>	<b>34</b>

<b>Annex C (informative) The approach and ergonomic analysis applied to design: Stages and processes.....</b>	<b>36</b>
<b>Bibliography.....</b>	<b>39</b>

## European foreword

This document (EN 16710-2:2016) has been prepared by Technical Committee CEN/TC 122 “Ergonomics”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2016, and conflicting national standards shall be withdrawn at the latest by September 2016.

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

EN 16710 consists of the following parts under the general title *Ergonomics methods*:

- *Part 1: Feedback method - A method to understand how end users perform their work with machines* (Technical Report)
- *Part 2: A methodology for work analysis to support design*

These present independent methods that can be used to support the implementation of ergonomics principles, for example as advocated in EN ISO 12100 and the EN 614 series.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

The ergonomic design approach involves considering human capabilities, skills, limitations and needs. It is developed on the basis of a decision process, which calls upon not only scientific and technical knowledge data provided by existing standards but also expression of the “know-how” capitalised by the intended user population. Know-how and other knowledge data provided by standards can only become meaningful when based on preliminary analysis of real-work.

Ergonomics design focuses on the actual activity of operators. The methodology described in this European Standard therefore increases the effectiveness and efficiency of the machinery or system being designed; improves human working conditions; and reduces adverse effects on health, safety and performance.

This methodology can lead to one or more suitable solutions embracing situations to be confronted by future users. Applying this will raise productivity, improve work quality, reduce technical support, maintenance and training needs, and will enhance user/operator satisfaction.

Application of this methodology will be most effective when management is closely involved (adoption, communication, etc.).

Extensive ergonomics knowledge exists in relation to organizing and establishing an efficient design process. Applying this knowledge, this present European Standard structures a user-based approach and proposes corresponding requirements for project managers. This approach complements existing design methods and requires reference to ergonomists.

This process concerns both established, as described by EN ISO 12100, and emergent risks and their association with the independent evolution of any system, user variability and conditions of equipment usage.

In this respect, the methodology for work analysis presented in this document is based on the resultant design being at least partly determined by anticipated future developments, especially those indicated by the client.

This is a shared procedure, in which the client provides specifications detailing the knowledge helpful to a design suited to the needs and expectations of users. Examples of the contribution of an ergonomics design approach to preparing specifications are included in informative Annex A.

Design based on an ergonomics process is necessary to meet any “performance obligation” (i.e. obligation of result).

This European Standard complements knowledge generated by work activity analysis to enhance the quality of references and other solutions validated within a participative framework. This is indeed the case when a compromise solution cannot be found in relation to a specific point because the underlying knowledge cannot be validated. This European Standard facilitates orientation towards a shared final decision.