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Ergonomic design of control centres — Part 5: Displays and controls

*Conception ergonomique des centres de commande —
Partie 5: Dispositifs d'affichage et commandes*



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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.

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 11064-5 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction*.

ISO 11064 consists of the following parts, under the general title *Ergonomic design of control centres*:

- *Part 1: Principles for the design of control centres*
- *Part 2: Principles for the arrangement of control suites*
- *Part 3: Control room layout*
- *Part 4: Layout and dimensions of workstations*
- *Part 5: Displays and controls*
- *Part 6: Environmental requirements for control centres*
- *Part 7: Principles for the evaluation of control centres*

Introduction

This part of ISO 11064 presents principles and processes to be adopted when designing the human-system interface of a control centre. These interface considerations are relevant for operators, supervisors and maintainers of systems. It is intended for use by individuals such as project managers, purchasers, systems designers, specifiers and those developing operator interfaces.

The purpose of this part of ISO 11064 is to maximize the safe, reliable, efficient and comfortable use of displays and controls in control centre applications. To this end, rules and recommendations based upon ergonomic findings are established for

- selecting the appropriate display and control types,
- structuring and presenting information on screens and shared off-workstation displays, and
- establishing control and dialogue procedures.

This part of ISO 11064 focuses on the main principles for the selection, design and implementation of controls, displays and human-system interactions for control room operation and supervision. The wide range of control and displays used in control rooms and the fast changes in technology make it impracticable to provide requirements meeting all situations. The approach adopted here is to identify general principles of good practice that will need to be supported by information accessed from human factors publications and other ergonomics standards.

The use of displays and controls in control centres differs from that typically found in offices and other non-control situations. Control centre activities are characterized by:

- being driven by externally controlled events occurring within the process;
- requiring an appropriate human response in real time — human reactions that are inadequate or too late can cause environmental damage, serious personal injury (e.g. safety-critical situations), equipment damage, lost production, decreased output quality or pollution of the environment;
- controlling the dynamic behaviours of high-energy or hazardous physical and chemical processes;
- involving information derived from a variety of sources;
- including the monitoring of many complex process variables typically presented via multiple parallel visual and auditory devices;
- involving team work with resources both within and outside the control room.

For these reasons, the standards required in a control environment can need to be more stringent than those of the typical office environment (i.e. as covered by ISO 9241).

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This part ISO 11064 defines principles and specifies requirements to be applied when determining the most appropriate displays and controls for control room functions. Thus, the application of this part of ISO 11064 ought to be of benefit to operators, operating companies, equipment purchasers, interface designers, manufacturers and engineering firms as outlined below.

— Operators and operating companies

Communication between operators and equipment will be more uniform across plants to which the standard is applied. This can reduce training burdens and facilitate job rotations. Operator stress, and situation-induced operator errors, can be reduced, thus improving operator efficiency and job satisfaction.

— Purchasers of equipment

The buyer has standard criteria to use in judging and selecting any man-machine interface under consideration and the material can be included in procurement requirements. Tighter control of procurement offers project managers a reduction of risk.

— Manufacturers of displays and controls

This part of ISO 11064 provides an agreed baseline from which manufacturers can develop and/or offer products.

— Engineering firms

Engineering firms or departments can reference a common set of guidelines and principles in the selection and application of displays and controls to fit their particular needs. This part of ISO 11064 also offers engineers and product developers advice in the design of displays and controls.