

TECHNICAL SPECIFICATION

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Evaluation methods for microprocessor- based instruments

*Méthodes d'évaluation des instruments
à microprocesseur*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

EVALUATION METHODS FOR MICROPROCESSOR-BASED INSTRUMENTS

FOREWORD

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- The subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

IEC 62098, which is a technical specification, has been prepared by subcommittee 65B: Devices, of IEC technical committee 65: Industrial-process measurement and control.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
65B/388/CDV	65B/401/RVC

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annex A forms an integral part of this technical specification.

Annexes B, C, D and E are given for information only.

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

- transformed into an International Standard;
- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

INTRODUCTION

Rationale

An evaluation of an instrument or a process controller is a supportive tool for assessing the cost of ownership for a measurement or a control function in a plant over the lifetime of that plant. The cost of ownership then comprises all costs for investments (including replacements over plant lifetime), engineering, installation, maintenance, energy and material consumption.

New instruments for process control and measurement are often equipped with microprocessors, thereby utilising digital data processing methods and artificial intelligence. This makes them more complex, and the existing standardised evaluation methods are not always sufficient to show the instrument capabilities.

An evaluation can consist in its most extended form of the following activities:

- design review (hardware and software);
- performance (functional) testing;
- study of testing for reliability, maintainability;
- safety study and testing for safety;
- field testing.

The evaluation methods described herein mainly treat aspects related to performance and reliability testing. This Technical Specification can be seen as an expansion on IEC 61298. Methods mentioned therein that are still valid for microprocessor-based instruments are mentioned here for completeness but are not repeated in full. When relevant, that publication shall be consulted.

Some considerations on the evaluation of microprocessor-based instruments in this technical specification are based on ideas brought forward in IEC 61069.

In the future, microprocessor-based instruments will increasingly be integrated in digital communication systems. Therefore the communication aspect and its possible influence on real-time operation and further performance of the instruments will also be considered.

EVALUATION METHODS FOR MICROPROCESSOR-BASED INSTRUMENTS

1 General

1.1 Scope

This Technical Specification aims at providing background information for developing evaluation methods for microprocessor-based instruments.

An evaluation starts with analysis of the instrument in terms of the external and internal information flows from and to the process, the human operator and external systems. Main function blocks in the instrument are then identified. By using the checklists given in 4.2 and 4.3, the functions and properties that may be embedded in the function blocks of the instrument to be evaluated can be identified.

Subclause 4.4 gives a checklist for identification of the relevant influencing conditions for the instrument to be evaluated.

Depending on the application of an instrument, the user of this technical specification may have to define further functions and properties or influencing conditions.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this Technical Specification. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this Technical Specification are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to, applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050-351, *International Electrotechnical Vocabulary (IEV) – Part 351: Automatic control*

IEC 60546 (all parts), *Controllers with analogue signals for use in industrial-process control systems*

IEC 60770-1, *Transmitters for use in industrial-process control systems – Part 1: Methods for performance evaluation*

IEC 61069 (all parts), *Industrial-process measurement and control – Evaluation of system properties for the purpose of system assessment*

IEC 61298 (all parts), *Process measurement and control devices – General methods and procedures for evaluating performance*