

Approval Standard

for

Programmable Logic Control (PLC) Based Burner Management Systems

Class Number 7605

December 1999

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Foreword

FM Approvals are intended to verify that the products and services described will meet stated conditions of performance, safety and quality useful to the ends of property conservation. The purpose of FM Approval Standards is to present the criteria for FM Approval of various types of products and services, as guidance for FM Approvals personnel, manufacturers, users and authorities having jurisdiction.

Products submitted for Approval shall demonstrate that they meet the intent of the Approval Standard, and that quality control in manufacturing and/or applications shall ensure a consistently uniform and reliable product or service. FM Approval Standards strive to be performance-oriented and to facilitate technological development.

For examining equipment, materials and services, FM Approval Standards:

- a) must be useful to the ends of property conservation by preventing, limiting or not causing damage under the conditions stated by the Approval listing; and
- b) must be readily identifiable.

Continuance of Approval and Listing depends on compliance with the Approval agreement, satisfactory performance in the field, on successful re-examinations of equipment, materials, and services as appropriate, and on periodic follow-up audits of the manufacturing facility or service/application.

FM Approvals LLC reserves the right in its sole judgement to change or revise its standards, criteria, methods, or procedures.

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1. INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states FM Approval criteria for programmable logic control (PLC) based burner management systems.
- 1.1.2 FM Approval criteria may include, but are not limited to, performance requirements, marking requirements, examination of manufacturing facility(ies), audit of quality assurance procedures, and a follow-up audit program.

1.2 Scope

- 1.2.1 This standard sets Approval requirements for PLC based systems used in conjunction with safety controls for commercial and industrial heating equipment. These systems incorporate programmable electronic components. These electronic components use software and/or electronic hardware to set operating and safety parameters, and to implement the operating and safety logic.
- 1.2.2 The management system shall provide safe start, safe operation, and safe shutdown under normal or abnormal conditions.
- 1.2.3 The system may or may not be supplied with safety controls such as combustion safeguards, flame sensing devices, pressure and temperature limit controls, and combustion airflow interlocks. If safety controls are provided they shall be FM Approved. If controls are not provided, the system input/output modules shall be compatible with FM Approved controls.

Note: If the manufacturer desires to provide currently un-approved safety controls, such equipment shall be required to conform to Approval requirements for that equipment. Approval of such equipment shall be handled as a separate project.
- 1.2.4 The requirements of this Standard shall be used to measure and describe the performance of electronic hardware and software in response to exposure from heat, cold, abnormalities, electromagnetic interference, etc., under controlled laboratory conditions. The results of these controlled exposures shall not be used to describe or appraise actual exposure conditions since such conditions will vary widely.

1.3 Basis for Requirements

- 1.3.1 The requirements of this Standard are based on experience, research and testing, or the standards of other national and international organizations. The advice of manufacturers, users, trade associations, and loss control specialists was also considered.
- 1.3.2 The requirements of this Standard reflect tests and practices used to examine characteristics of the subject equipment for the purpose of obtaining FM Approval. Equipment having characteristics not anticipated by this Standard may be Approved if performance equal, or superior, to that required by this Standard is demonstrated, or if the intent of the Standard is met. Alternatively, equipment which meets all of the requirements identified in this Standard may not be Approved if other conditions which adversely affect performance exist or if the intent of this Standard is not met.

1.4 Basis for FM Approval

FM Approval is based upon satisfactory evaluation of the product and the manufacturer in the following major areas:

1.4.1 Examination and tests on production samples shall be performed to evaluate:

- the suitability of the product
- the performance of the product as specified by the manufacturer and required by FM Approvals; and as far as practical,
- the durability and reliability of the product.

1.4.2 Compliance of the hardware and software to the requirements of IEC 61508 Standard on Functional Safety of Programmable Electronic Systems

1.4.3 An examination of the manufacturing facilities and audit of quality control procedures is made to evaluate the manufacturer's ability to produce the product which was examined and tested, and the marking procedures used to identify the product. These examinations are repeated as part of FM Approvals' product follow-up program.

1.5 Basis for Continued Approval

Continued Approval is based upon:

- production or availability of the product as currently Approved;
- the continued use of acceptable quality assurance procedures;
- satisfactory field experience;
- compliance with the terms stipulated in the Approval Agreement;
- satisfactory re-examination of production samples for continued conformity to requirements; and
- satisfactory Facilities and Procedures Audits (F&PAs) conducted as part of FM Approvals' product follow-up program.

Also, as a condition of retaining Approval, manufacturers may not change a product or service without prior authorization by FM Approvals.

1.6 Effective Date

The effective date of an Approval standard mandates that all products tested for Approval after the effective date shall satisfy the requirements of that standard. Products Approved prior to the publication of this standard shall comply with the standard by the effective date or forfeit Approval.

The effective date of this Standard is the date of publication for compliance with all requirements.