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AN INDUSTRY STANDARD FOR FLUID POWER

**Fluid power systems and components – Reliability analysis,
reporting format and database compilation**

Descriptors: fluid power systems components reliability analysis reporting format database compilation recommended practice maintainability availability controlled studies

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Foreword

This Foreword is not part of National Fluid Power Association Recommended Standard *Fluid power systems and components – Reliability analysis, reporting format and database compilation*, NFPA/T2.12.11-1-2001.

The first meeting of the Reliability Criteria Joint Task Force was held on 17 January 1995. The idea behind the project, its feasibility and future work to be done was discussed. The Technical Board approved the Title, Scope and Purpose (TSP) at their 13 April 1995 meeting. At the 23 May 1995 meeting, John Montague (Robert Bosch Fluid Power) agreed to serve as Project Chair. At the 17 September 1996 meeting, draft no. 1 was reviewed. At the 11 February 1997 meeting, the initial draft of the TSP was split into two documents: (part 1) Reliability reporting and (part 2) Reliability testing. Draft no. 1 of (part 1) Reliability reporting was reviewed and it was agreed that it should be sent out for general review.

The revised TSP was approved at the 10 April 1997 Technical Board meeting. The document was sent out for general review on 23 April 1997.

On 29 September 1998, project group members met and discussed comments received on working draft six and working draft seven was distributed and discussed. Various editorial changes were agreed upon. A request to add an example using Weibull analysis methods in an annex was made. Mr. Berninger presented a structure for reliability testing based upon a test document previously distributed to the committee. He agreed to survey NFPA component sections on their interest in developing component-specific documents. Mr. Montague reported that he had contacted filter and cylinder manufacturers and incorporated information received into working draft seven. Additional input on filters was forthcoming and included in the next working draft number eight.

On 9 February 1999, project group members met, and working draft number eight was distributed and reviewed. Changes were discussed and were incorporated into the document. Project group members agreed to a second general review ballot. The second general review ballot was mailed 1 April 1999.

On 21 September 1999, project group members met, reviewed comments received from the final ballot mailed on 27 August 1999 and made corrections to the document. A motion was approved to publish NFPA/T2.12.11.

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Introduction

In fluid power systems, power is transmitted and controlled through a liquid or gas under pressure within an enclosed circuit. Fluid power systems comprise a number of components, which are an integral subsystem of various machines and equipment. Efficient and economic production requires highly reliable machines and equipment.

In a broad perspective, reliability is associated with dependability and availability, successful operation and performance, and the absence of breakdowns or failures. Reliability is a measure of product performance at a given time. Failure occurs because of manufacturing defects, misapplication of product, inadequate maintenance, cumulative wear and degradation, design deficiencies and random chance.

Since reliability is directly impacted by factors such as operating environment, maintenance practices, product design, equipment age, etc., analytical techniques for assessing reliability are useful, but not absolute in their ability to model the real world applications. Hence the need for field reporting of reliability data.

Fluid power systems and components – Reliability analysis, reporting format, and database compilation

1 Scope

1.1 This recommended practice includes:

– guidelines for the collection of data relating to reliability, maintainability, availability and maintenance of fluid power components and systems operating in the field.

1.2 This recommended practice is intended to:

– provide a standard format for collecting field reliability data in controlled studies; and

– provide guidance for analysis and presentation of field reliability data.

2 Normative references

The following standards contain provisions, which, through reference in this test, constitute provisions of this NFPA document. At the time of publication, the editions indicated are valid. All documents are subject to revision, and parties to agreements based on this NFPA document are encouraged to investigate the possibility of applying the most recent editions of the documents listed below. NFPA maintains registers of currently valid NFPA/ANSI, IEC, and ISO standards.

ANSI/B93.2-1986, *Fluid power systems and products – Glossary*.

IEC 60300-3-2 (1993-10), *Dependability management – Part 3: Application guide – Section 2: Collection of dependability data from the field*.

IEC 60050-581 (1978-01), *International electromechanical vocabulary* (Chapter 191:Dependability and quality of service).

IEC 60605-6 (1997-04), *Equipment reliability testing – Part 6: Tests for the validity of a constant failure rate or constant failure intensity assumptions*.

ISO 5598:2000, *Fluid power systems and components – Vocabulary*.

ISO 4406:2000, *Hydraulic fluid power – Fluids – Method for coding the level of contamination by solid particles*.

ISO 8258-2000, *Shewart control charts*.

3 Definitions

For the purposes of this recommended practice, the terms and definitions given in ISO 5598, ANSI/B93.2, IEC 60050-581 and the following apply:

3.1 reliability: The probability that machinery/equipment can perform continuously, without failure, for a specified interval of time when operating under stated conditions.