



**NFPA Recommended Standard
NFPA/T3.12.10 R2-2000 (R2009)**

Third edition
15 March 2000

AN INDUSTRY STANDARD FOR FLUID POWER

**Air line filter, regulator and/or lubricator – Pressure rating
supplement to NFPA/T2.6.1 R2-2000, Fluid power
Components – Method for verifying the fatigue and establishing the
burst pressure ratings of the pressure containing envelope of a
metal fluid power FRL**

(Revision of NFPA/T3.12.10 R1-1994)

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NATIONAL FLUID POWER ASSOCIATION, INC.

3333 N. Mayfair Road / Milwaukee, WI 53222-3219 USA
PHONE: +1 414 778 3344 / FAX: +1 414 778 3361 / E-mail: nfpa@nfpa.com

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Foreword

This Foreword is not part of NFPA Recommended Standard *Air line filter, regulator and/or lubricator – Pressure rating supplement to NFPA/T2.6.1 R2-2000, Fluid power components – Method for verifying the fatigue and establishing the burst pressure ratings of the pressure containing envelope of a metal fluid power FRL*, NFPA/T3.12.10 R2-2000.

This project was initiated on 11 February 1997 and the TSP was approved on 10 April 1997. The first draft was an update to coordinate the document with the updated NFPA/T2.6.1 R2. Both were issued for general review on 30 December 1998. Comments were reviewed at the T2.6 committee meeting of 9 February 1999, and proposed changes were reviewed by the T3.21 committee at its meeting of 18 May 1999. The ballot draft was prepared by NFPA headquarters on 2 August 1999. There were no negative ballots and the Technical Board granted final approval on 18 November 1999.

Project Group Members who developed this standard:

John Berninger

Project Chairman and T2.6 Chairman
Parker Hannifin Corp.

James Rosenbury

Section Chairman
Ingersoll-Rand Co.

Clifford Allen

Vice Chairman
Lexair Inc.

Paul Schacht

Technical Auditor
Bosch Automation Technology

June M. VanPinsker

Technical Coordinator
National Fluid Power Association

Shirley C. Seal*

Manager of Standards Development –
Industry/National
National Fluid Power Association

Dale Bauer

Rexroth Corp.

Jim Dietvorst

Wilkerson Corp.

John Pousma

NORGREN

* Retired

/jmv

Introduction

In fluid power systems, power is transmitted and controlled through a fluid (liquid or gas) under pressure within an enclosed circuit. During operation, filters, regulators and lubricators (FRLs) in a system may be loaded from internal pressure, gravity, inertia, thermal variations and external forces. The nature of these loads can vary from a single static application, to continuously varying amplitudes, repetitive loadings and even shock.

It is important to know how well FRLs can withstand these loads but this standard addresses only the loading due to internal pressure.

There are many ways in which internal pressure loads are imposed upon FRLs. This standard considers a broad range of waveforms but within prescribed time limits, temperatures, environmental conditions and only upon certain metals. It is anticipated that these limitations could still provide sufficient common ground for comparing products. This rating method, therefore, provides the system designer with certain information to assist in a selection of FRLs for an application. The designer still has the responsibility to consider the other loading characteristics described above and to determine how they might affect FRLs ultimate pressure retaining capability.

There may be other standards in existence for pressure rating FRLs and this standard is not intended to displace them. Furthermore, it is recognized that most FRL products use materials for various parts of the pressure containing envelope that are outside the scope of this standard. However, for those parts that do use applicable materials, this standard provides a fatigue verification method for pressure rating those elements of the product.

This standard serves as a universal "verification test" to give credibility to the many in-house and other methods of determining FRL pressure ratings. The credibility is based upon the fundamental nature of fatigue of metals with its statistical treatment and use of the pressure rating verification theory developed in NFPA/T2.6.1 R2. Nevertheless, design knowledge of the FRL population and its representative samples, including consistency in materials, shapes, fabrication techniques, etc., is necessary to maximize accuracy in the verification method.

This standard describes specific methods for testing FRLs, verifying their fatigue pressure ratings and establishing static burst ratings. It also provided specific means to determine some of the optional parameters.

This standard is a supplement to the basic pressure rating standard, NFPA/T2.6.1 R2. It follows the provisions of that document but is more specific to FRLs. Application of this pressure rating method will require use of both documents.

This version of NFPA/T3.12.10 R2 replaces earlier editions and utilizes the same basic theory. Products rated under the first (1976) edition may not be rated to the same values under this edition. See clause 11 for the differences in rating identification.

Air line filter, regulator and/or lubricator – Pressure rating supplement to NFPA/T2.6.1 R2-2000, Fluid power components – Method for verifying the fatigue and establishing the burst pressure ratings of the pressure containing envelope of a metal fluid power FRL

1 Scope

1.1 This standard provides:

- test and statistical methods for generating fatigue distribution data;
- test and statistical methods for conducting a verification of the pressure ratings on FRLs;
- common requirements and an industry-wide philosophy in judging one type of pressure capability for FRLs;
- uniform methods of product comparison.

1.2 This standard limits conditions as follows:

- constant amplitude, pressure-induced loading of the elements that constitute or maintain the pressure containing envelope;
- product life of at least 100,000 cycles;
- defined conditions for pressure levels and pulse durations;
- temperatures from the charpy impact transition temperature to the threshold of creep sensitivity;
- environments which are chemically compatible with the materials of the pressure containing envelope;
- materials that are aluminum, magnesium, steel, iron, copper based alloys, cobalt, titanium, stainless steels, nickel steels and monel. Specifically excluded are creep sensitive materials such as: zinc, plastic, rubber and sealing devices;
- pressure gauges are specifically excluded.

1.3 This standard encourages manufacturers to use this common method to enhance the credibility of their pressure ratings.