

THE ENGINEERING EQUIPMENT AND MATERIALS USERS ASSOCIATION

**Guide for establishing
Operating Periods of
Safety Valves**

PUBLICATION 188

Edition 2

Copyright © 2009 The Engineering Equipment and Materials Users' Association.
A company limited by guarantee. Registered in England. Company number 477838.

ISBN 0 85931 171 6

Imprint reference 05-2009

Registered and Trading Address
10-12 Lovat Lane London EC3R 8DN
Telephone: +44 (0)20 7621 0011
Fax: +44 (0)20 7621 0022
E-mail: sales@eemua.org
Website: www.eemua.org



ENGINEERING EQUIPMENT AND MATERIALS USERS' ASSOCIATION

The Engineering Equipment and Materials Users' Association, more commonly known as EEMUA, is a European non-profit membership Association helping companies that own or operate industrial facilities - the *users* of engineering equipment and materials.

EEMUA aims to improve the safety, environmental and operating performance of industrial facilities in the most cost-effective way, thereby demonstrating and pursuing leadership in asset management.

EEMUA Members pursue these aims through collaboration for mutual benefit, sharing engineering experiences and expertise and by promoting their distinct interests as the users of engineering products.

Specifically, the aims of EEMUA Member companies are achieved by:

- providing the organisation within which networking, information sharing and collaboration on non-competitive technical matters can take place;
- influencing the way written regulations are interpreted and applied in practice;
- presenting and promoting Members' views, and encouraging the application of good, sound engineering practices;
- developing user guides, specifications, training and competency schemes;
- facilitating Members' participation in national and international standards making;
- influencing relevant national and European legislation and regulations.

Formed in 1949 as the Engineering Equipment Users Association, and re-named in 1983 (as a result of taking over the materials association, OCMA), EEMUA has for more than fifty years given companies that own and operate process plants, power stations and other significant industrial facilities, a collaborative voice in addressing technical and engineering related issues that impact on good integrity management and asset management practices. The Association is open to companies of all sizes that meet its 'engineering user' criteria. Further details of current Members of EEMUA is available on the Association's website, www.eemua.org.

EEMUA activities often lead to the production of publications. These are prepared for Members' use and are often offered for sale as well.

A list of EEMUA publications for sale is given at the end of this Publication. The full list is also on the Association's website, including details of on-line shopping facilities.

To enquire about corporate Membership, write to enquiries@eemua.org or call +44 (0)20 7621 0011.

ABOUT THIS PUBLICATION

Legal Aspects

All rights, title and interest in this Publication shall belong to EEMUA. All rights are reserved. No part of this Publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means: electronic, mechanical, photocopying, recording or other, without the express prior written agreement of the EEMUA Executive Director.

Infringement of copyright is illegal and also reduces the Association's income thereby jeopardising its ability to fund the production of future publications.

It has been assumed in the preparation of this Publication that: the user will ensure selection of those parts of its contents appropriate to the intended application; and that such selection and application will be correctly carried out by appropriately qualified and competent persons for whose guidance this Publication has been prepared. EEMUA and the individual members of the Work Group that prepared this EEMUA Publication do not, and indeed cannot, make any representation or give any warranty or guarantee in connection with material contained herein. EEMUA and the individual members of the Work Group that prepared this EEMUA Publication expressly disclaim any liability or responsibility for damage or loss resulting from the use or reliance on this Publication. Any recommendations contained herein are based on the most authoritative information available at the time of writing and on current good engineering practice, but it is essential for the user to take account of pertinent subsequent developments and/or legislation.

Any person who encounters an inaccuracy or ambiguity when making use of this Publication is asked to notify EEMUA without delay so that the matter may be investigated and appropriate action taken.

Consultation and Feedback

EEMUA encourages constructive comments on this Publication from both Members of the Association and others.

Comments should be sent on the standard feedback form, a copy of which is provided towards the end of this Publication. An electronic version of the feedback form is available from EEMUA - e-mail your request for a copy to enquiries@eemua.org, telephone your request to +44 (0)20 7621 0011, or download the form from the EEMUA website at www.eemua.org. Submit comments by e-mail (preferred) or post.

Comments will be considered by the relevant EEMUA Technical Committee and may be incorporated in future editions of this Publication. New editions will be publicised on the EEMUA website.

Table of Contents

Foreword	1
1. Scope	3
2. Introduction	5
3. Operating and Design Philosophies	7
3.1 Plant Operating Philosophy	7
3.2 Pressure Relieving System Design Philosophy	7
4. Establishing Safety Valve Operating Periods.....	9
4.1 General Considerations	9
4.2 Empirical Approach	10
4.3 Risk-Based Approach.....	10
5. Management Procedures and Record Systems	13
5.1 General	13
5.2 Procedures	13
5.3 Records: Categorisation of Data.....	13
5.4 Recorded Information.....	14
6. References and Bibliography	17
6.1 Standards and Codes	17
6.2 Other Publications.....	17
6.3 Bibliography.....	17
Appendix.....	19
A1. Set Pressure Definitions.....	19
A2. Effect of Relief System Design	19
A3. Guidelines for accepting new Safety Valves prior to Use	19
A4. Removal, Inspection and Re-installation.....	20
A5. Workshop Maintenance.....	20
A6. Fluid Categorisation and Plant Operating Environment	22
A7. Factors to be Considered in the Review Process	23
A8. In-situ Testing and Checking	23
A9. Action to be taken when a Safety Valve lifts	26

Table of Figures

Figure 1 Model for Reviewing Safety Valve Operating Periods	5
--	----------

Foreword

This Guide sets out the issues to be considered in determining and reviewing operating periods for safety valves. This is a crucial area for operators of pressure containing plants because it impacts upon both the safe operation of pressure systems and the cost of safety and environmental compliance.

If safety valves are not inspected with sufficient frequency they may not operate when called upon to do so, or they may leak. Conversely, unnecessary shutdowns need to be avoided as plant down-time and maintenance are costly. Ideally, a safety valve will be overhauled immediately before it 'fails'. In practice, plant operators endeavour to have safety valve inspections coincide with plant outages necessary for other reasons, such as pressure vessel examinations.

There is little published guidance to date on establishing valve operating periods and the principal considerations are not widely appreciated. This Guide seeks to provide the important first step in recognising the main issues and suggests how companies might proceed towards a managed system of review.

The information provided reflects good practice. Compliance with this, however, does not imply compliance with any particular legislative requirements. Users should satisfy themselves that they comply with the relevant legislation and statutory regulations relating to pressure systems and the use of safety valves. It should also be noted that in certain countries compliance with particular codes or standards may be mandatory.

In the UK, the governing regulations concerned with in-service pressure systems are The Pressure Systems Safety Regulations 2000, commonly referred to as the 'PSSR'. Although not specifically mentioned in the PSSR, safety valves come under the category of 'protective devices', and their set pressures are dependent on the 'safe operating limits' of the pressure systems and equipment they protect. (The terms in quotation marks in this paragraph are defined in the PSSR.)

The EEMUA Pressure Relieving Safety Systems Technical Committee has developed this Guide from the experience and practices of its member companies in the petroleum, chemical and power industries. The document deals with and expands on issues not fully covered in other publications such as API RP 576 and EI Model Code of Safe Practice Part 12: Pressure vessel examination. This Guide is not intended to be prescriptive.

Publications referred to in this document are listed in Chapter 6.

Note on Terminology

The terms 'relief valve', 'safety valve' and 'safety relief valve' are widely used in industry and have specific meanings in US standards. However only 'safety valve' is defined in international and British standards and is the term used, generically, in this text without the American distinctions.

The term 'safety valve operating period' generally means the period, between successive examinations, in which the valve is in service (precise definitions may vary, see Section 4.1). It is synonymous with 'inspection interval'.

'Plant operating period' is the period between successive overhauls.

Revisions to Second Edition

This second edition revises and updates the original 1999 edition. The changes made clarify and add important points to the existing text and update the references.

Units

This document employs SI units, but additionally uses Imperial units where appropriate to common usage.

1. Scope

This Guide provides guidance on establishing operating periods of safety valves and gives further information, beyond the relatively simple statements contained in national codes, to provide a basis for the review of such operating periods. It covers a number of points which may be used as a basis for user company procedures. The main part offers general guidance, whilst the Appendix gives more detail in certain areas, not necessarily referred to in the main text, such as the effect of relief system design (Appendix A2), acceptance of new valves prior to use (Appendix A3), inspection, maintenance and testing (Appendix A4, A5 and A8), and advice on what should be done if a safety valve lifts (Appendix A9).

This Guide applies to most pressurised fluid systems and safety valves, including thermal relief and pilot-operated valves, but with the exception of pressure-vacuum (tank breather) type valves.

2. Introduction

Safety valves are items critical to ensuring the integrity of pressurised systems and are often the ultimate protection against excessive pressure. As mechanical devices, usually with fine tolerances, they may fail to operate, or to operate properly, for a number of reasons (see Appendix A7). It is therefore necessary that a safety valve undergoes periodic inspection and overhaul to ensure that when required to operate it does so under the conditions and within the limits specified for the particular installation.

Although installed primarily for over-pressure protection, a valve may lift below its set pressure, with detrimental environmental or commercial consequences.

The process of setting the operating period of a safety valve should begin with determining an initial operating period followed by subsequent reviews based on operating experience. It is important to appreciate that the operating period selected should be that which is suitable for each safety valve in its specific location. The overall concept is illustrated in Figure 1.

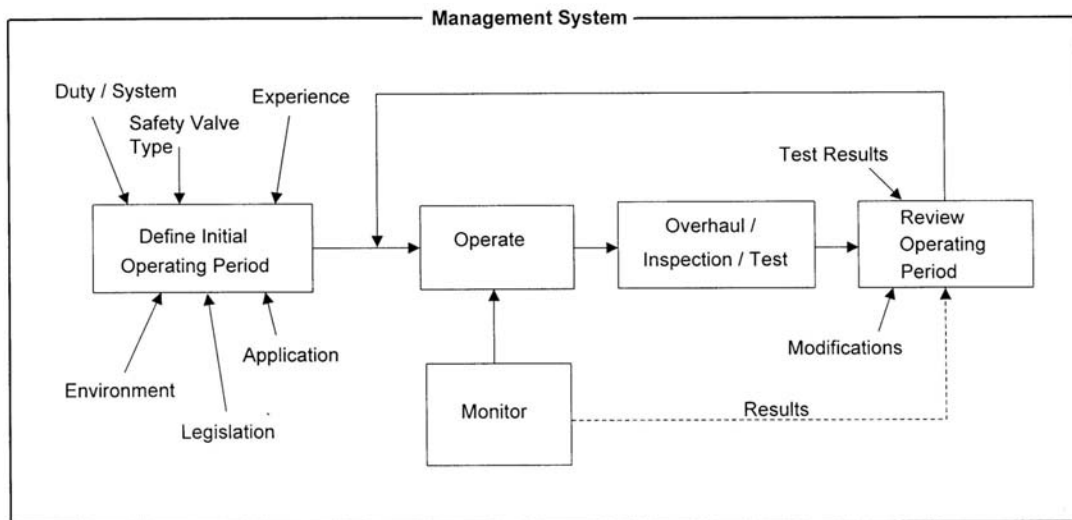


Figure 1 Model for Reviewing Safety Valve Operating Periods

