

THE ENGINEERING EQUIPMENT AND MATERIALS USERS ASSOCIATION

CODE OF PRACTICE FOR THE IDENTIFICATION AND CHECKING OF MATERIALS OF CONSTRUCTION IN PRESSURE SYSTEMS IN PROCESS PLANTS

PUBLICATION N° 149 : 1997



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THE ENGINEERING EQUIPMENT AND MATERIALS USERS ASSOCIATION

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1. FOREWORD

The purpose of this Code of Practice is to outline measures to be taken to minimize the likelihood of in-service failure, primarily of pipework, due to the use of incorrect material and where the consequences of such a failure would be unacceptable. The Code is, however, applicable to other types of equipment. It is not intended necessarily to ensure the complete absence of incorrect materials or the complete conformity of materials to any given specification; where such guarantees are considered necessary, more rigorous measures may be needed.

The original, 1986, issue of this Code of Practice was intended to be applied to new equipment. This 1997 edition has been comprehensively revised by the EEMUA Inspection & NDT Technology Committee to include in-service equipment and the latest available and relevant NDT techniques, and to align the document with the Pressure Systems and Transportable Gas Containers Regulations (1989).

Publications referenced in this document are listed in Appendix II.

2. INTRODUCTION AND SCOPE

Many process plants use a range of ferritic and austenitic alloy steels in addition to plain carbon steels to safely withstand process conditions. Such steels may be required for enhanced strength, increased strength at high temperature, enhanced ductility at low temperatures, resistance to attack by hot hydrogen, resistance to corrosion etc.

It is not possible by visual means alone to distinguish between different ferritic or austenitic alloy steels. Potential therefore exists for materials of different specifications to become mixed up unless a rigorous system of segregation, marking and other necessary controls is in place.

Major failures have occurred when incorrect material has been accidentally fabricated or introduced into pressure systems. Such rogue materials usually survive the final hydrostatic acceptance test, only to reveal themselves in service when the material has been weakened to the point of failure by the operating conditions.

The consequences of failure due to the use of a wrong material are potentially at their worst in systems operating under the more aggressive, environmentally hostile, or similarly demanding process conditions — the very systems that often require special materials. There will also be cases where a higher strength, alloy material is built in error into a carbon steel system. In such cases the consequences are likely to be potentially less damaging. Although not having undergone a pre- and/or post-weld heat treatment, the material may survive, or due to embrittlement may become visibly cracked or even fail the hydrotest.

Experience shows that the greatest number of errors occur in pipework, in particular those systems which include components that are fabricated and assembled on construction sites from bulk issue materials. This Code of Practice therefore addresses itself mainly to pipework and is primarily applicable to pipe, tubing, valves, flanges, other fittings and the welds used to join together or fabricate those components. It covers classification of pipework systems, and material control procedures for identification of materials during manufacture, at stockists or fabricators, during pre-commissioning on site, and in service. Appendix I describes the methods and equipment used for such checking. Many of the recommendations are, however, also applicable to fired heaters, boilers, pressure vessels and other pressure equipment.