AS 1375—2013

Australian Standard®

Industrial fuel-fired appliances

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- Australian Petroleum Production and Exploration Association
- Energy Networks Association
- Engineers Australia
- Gas Appliance Manufacturers Association of Australia
- Gas Energy Australia
- Gas Technical Regulators Committee
- Major Commercial/Industrial Gas Equipment Manufacturers
- Major Industrial Gas Installations
- Master Plumbers and Mechanical Services Association of Australia

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Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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PREFACE

This Standard was prepared by the Standards Australia Committee AG-011, Industrial and Commercial Gas Fired Appliances, to supersede AS 1375—1985, *Industrial fuel-fired appliances (known as the SAA Industrial Fuel-fired Appliances Code)* and part of AS 1853—1983, *Automatic oil and gas burners—Mechanical draught.*

In this current edition, the Standard has been completely revised in light of changing international trends in standards as industry experience is consolidated in key areas. The emergence of new technology that enables the key safety features to be adequately managed has been one of the main areas of change in solvent processing equipment. In addition, the inclusion of new research that allows optimisation of safety protection systems has also benefited the changes in this Standard. Every effort has been made to ensure that requirements are not ambiguous and where practical, guidance is provided on the means of compliance.

This edition represents a major revision, the main features of which are as follows:

(a) AS 1853—1983 was a precursor Standard for gas burners that, for the past 14 years, have been covered by AS 3814, *Industrial commercial gas-fired appliances*, and AS 1853 has largely been rendered obsolete. However, oil is still a common fuel in areas remote to reticulated gas and, given that, this Standard covers all fuels. It was natural to expand the scope to include all of the specific requirements for oil systems. AS 1853—1983 has been withdrawn from publication as a result. Specifically, gas systems are now aligned with AS 3814 to remove any ambiguity that may have arisen.

(b) Section 7 is now devoted to liquid fuel firing systems and includes the key elements that were part of AS 1853 with the original liquid systems in this Standard.

(c) The concept of HAZOP has been introduced into the Standard as a vital tool in the safe design process for complex appliances. Guidance is provided in a new Appendix I on its application.

(d) More attention is paid to the appliance control and electrical design and ensuring that, apart from the burner management system, compliance to relevant electrical and machinery standards are complied with. In this regard, PES based safety systems are to be compliant with AS 61508, *Functional safety of electrical/electronic/ programmable electronic safety-related systems*, or AS IEC 61511, *Functional safety—Safety instrumented systems for the process industry sector*. Hazardous areas are to be compliant with the relevant standards as applicable.

(e) The general subject of shutdown in the event of malfunction has received attention to ensure that it is compatible with AS 3814.

(f) The section that deals with non-fuel combustible atmospheres has been substantially revised to remove any ambiguity in the safety requirements for the appliance design.

(g) The addition of an exemption from requiring explosion relief for appliances that operate at very dilute concentrations of solvents is included to streamline the acceptance process for appliances as spray booths with fuel-fired heating apparatus.

(h) The use of flammable gas monitoring technology has been included to allow greater optimization and flexibility without compromising safety on solvent evaporation processes. This is in step with international standards and their wide acceptance on such appliances as printing presses.

(i) The allowance of higher than previous concentrations is based on overseas experience and the inclusion of measures that will maintain the same level of safety without conservative design requirements. A more energy efficient operation of appliances is now possible with the implementation of new measuring and monitoring technology to appropriate standards.

(j) Information on and the treatment of combustible dusts have now been included in the Standard.

(k) Information on solvents properties and combustible dusts has been included and this is now part of the expanded Appendix G. Additional references are also provided.

(l) There has been the inclusion of operating principles that apply to incineration processes. This has been expanded to include the application of high concentrations that may occur with high efficiency low temperature appliances or remediation systems that are designed to treat hydrocarbon waste materials.

(m) Appendix B has been made more comprehensive and it now includes requirements to tailor testing for PES based systems.

(n) Appendix C has been revised in line with current flame safeguard designs and to make applications more consistent with requirements of the applicable standards.

(o) Appendix D has been corrected to ensure that the equations are correct. The application of Case B has been clarified. Appendix D has been expanded, mainly to include an additional option, i.e. using excess air to achieve infinity critical time. This technique has many attractions, notably it avoids the need to depend on very fast-reacting protective systems. Appendix D therefore reflects some change of emphasis.

(p) Appendix E has largely remained unchanged as the techniques for explosion relief are consistent with current practice and provide conservative estimates for relief areas. References to additional material that will allow the calculation of the strength of ducting and appliances have been included. NFPA 68 is an alternative that can be used for appliances that are outside the scope of the methods proposed in the appendix particularly in the application where dusts are encountered such as spray driers and dust collection systems associated with fuel-fired plant. This is consistent with international acceptance of NFPA 68 for explosion relief estimation and protection of appliances.

(q) Appendix F has changed to reflect changing technology in the printing industry and incineration systems. The relationship and the effect of temperature on lower explosive limit (LEL) has now been included in this Appendix as are graphs on allowable operating regions for various applications. Additional examples are now included to assist with the application of temperature correction of LEL and selection of allowable operating concentrations that are above 25% of LEL.

(r) Appendix G has been expanded to include information that is commonly available on the properties of solvents and dusts in particular that can be used in the application of Appendices E and F.

(s) Appendix H has been reviewed and minor changes have been made.

(t) Appendices J through to N are devoted to liquid firing systems that were part of AS 1853 in the consolidation process of the two Standards.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.