

# De-aerators and Hot Wells

## Guidance for Industrial Installations

Ref: BG06



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# TABLE OF CONTENTS:

<b>1</b>	<b>INTRODUCTION</b>	<b>4</b>
1.1	About This Guide	5
1.2	Acknowledgments	5
<b>2</b>	<b>SCOPE</b>	<b>6</b>
2.1	Pressurised De-aerator General Arrangement	7
2.2	Typical Schematic Arrangement	8
<b>3</b>	<b>REASONS FOR DE-AERATORS AND HOT WELLS</b>	<b>9</b>
3.1	De-aerator and Hot Well Design	10
3.2	Materials	12
3.3	Hot Well Capacity and Level Control	12
3.4	Hot well construction	13
3.5	Dealing with Condensate	14
3.6	Cavitation of the boiler feed pump	14
3.7	Connections to the Tank	16
<b>4</b>	<b>HAZARDS</b>	<b>19</b>
<b>5</b>	<b>LEGISLATION</b>	<b>20</b>
5.1	The Management of Health and Safety at Work Regulations 1999 (MHSWR)	20
5.2	The Pressure Equipment (Safety) Regulations 2016 (PER)	21
5.3	The Pressure Systems Safety Regulations 2000 (PSSR)	21
5.4	The Provision and Use of Work Equipment Regulations 1998 (PUWER)	23
5.5	The Water Industry Act 1991	23
5.6	The Construction (Design and Management) Regulations 2015 (CDM)	23
<b>6</b>	<b>DESIGN CONSIDERATIONS</b>	<b>24</b>
6.1	Pressurised De-aerators	24
6.2	Hot Wells	24
6.3	Pipework	25
<b>7</b>	<b>EXAMINATION AND MAINTENANCE</b>	<b>26</b>
<b>8</b>	<b>REFERENCES AND FURTHER READING</b>	<b>28</b>
<b>9</b>	<b>GUIDANCE NOTES ON RELATED TOPICS</b>	<b>30</b>

## 1 INTRODUCTION

**De-aerators and Hot Wells – Guidance for Industrial Installations (Ref: BG06)** is a guidance document intended to provide advice to designers, specifiers, manufacturers, installers and those responsible for the management and operation of steam plant as well as Competent Persons (CP). It is applicable to both new and existing installations of de-aerators and hot wells and addresses the following issues:

- The safe and correct provision of feed water for steam boilers;
- The safe use and operation of de-aerators and hot wells;
- Proper maintenance and inspection of de-aerators and hot wells.

Cover image courtesy of Cochran Ltd, (Main image) de-aerator and (bottom left image) one example of an installation.

The following words convey specific meaning:

**Should:** Compliance with this clause is not essential where supported by risk assessment and/or design calculation.

**Shall:** Compliance with this clause is required in order to claim compliance with this document.

**Must:** Compliance with this clause is a legal requirement within the United Kingdom.

Unless otherwise stated, all pressures refer to gauge pressure.

## 1.1 About This Guide

This comprehensive guide deals with all aspects of feed water provision for industrial steam boilers (shell boilers) and why it is necessary to carefully manage and control the water that is supplied to the boiler. We trust that by studying the contents and following this advice your boiler plant will operate safely and more efficiently, and provide you with a trouble-free system. If in any doubt contact the supplier, the system designer or your boiler water treatment specialist for advice.

It is aimed at the Owner, Operator, Engineer and Manager of the boiler plant to help them understand all aspects that affect the boilers and their water supply arrangements, both from a practical operational performance view and for the legal requirements.

It covers who is responsible for the safe and efficient operation of steam boiler plant, and who is responsible for managing the safe operation of this type of equipment. Ultimately the responsibility lies with the most senior person on site.

With other HSE guidance being withdrawn, and having taken all factors into consideration, The Combustion Engineering Association (CEA) agreed to write this guide with the help of its members.

Within this Guide there are a significant number of legal requirements, regulations and standards highlighted; these regulations and standards are periodically reviewed and they can and do change, but they are as accurate as possible at the time of publication.

CEA cannot accept any liability for the information provided herein; however, be assured that we have consulted widely with our member companies during the compilation of this guide.

## 1.2 Acknowledgments

A special note of thanks must go to CEA Chairman, Adrian Rhodes, for bringing his extensive technical knowledge to bear in writing the bulk of this document, BG06. Thanks also go to other members of CEA for their contributions.

- Coal Hill Associates
- Energy and Environmental Solutions
- Boilerhouse Safety
- Bosch Thermotechnology

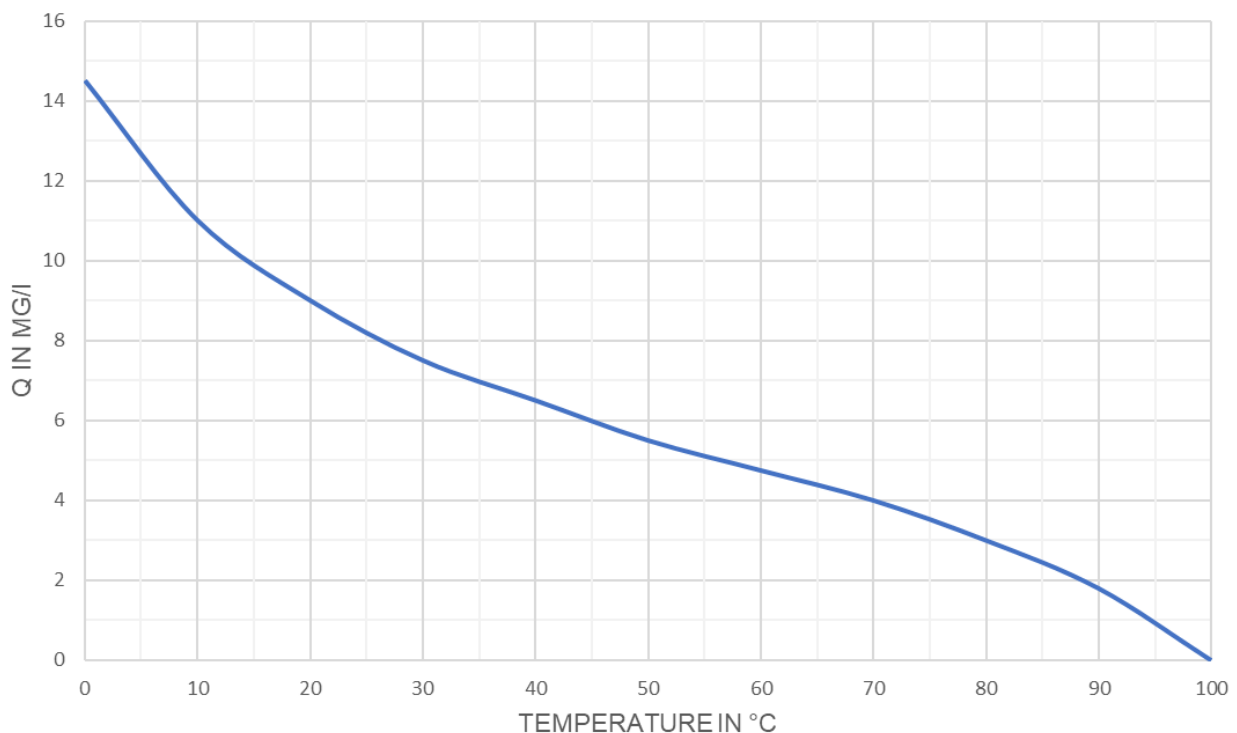
## 2 SCOPE

This guidance applies to feed water arrangements using de-aerators and hot wells of various designs for supplying feed water to steam boilers in commercial and industrial installations. The primary purpose of a hot well or de-aerator is to manage and reduce the amount of dissolved gases in boiler feed water.

Hot wells have been used in steam boiler houses for many years very successfully, but the use of de-aerators is becoming more popular for a number of reasons. Although de-aerators can be more expensive than a conventional hot well and they fall within the PSSR, requiring inspection by a Competent Person, they do have some significant advantages, especially for shell boilers operating at higher pressures.

The temperature within a pressurised de-aerator can be much higher than in a hot well without any detrimental effect to the feed pumps, and the thermal shock as the feed water enters the boiler is therefore greatly reduced, especially in boilers operating at 15 barg and above. Also, because the de-aerator is operating above 100°C the amount of oxygen scavenger required is greatly reduced which has the added benefit of reducing TDS, hence reducing blow down volumes.

Boiler house owners and designers should evaluate the whole life cost of the installation, its operation and maintenance costs, the cost of chemicals and all the other elements that affect the provision of suitably treated water for the boiler in order to arrive at the most effective choice for their particular requirements.



Solubility of oxygen v temperature @1 bara