

Code of practice for

Procedures for ensuring the cleanliness of industrial-process measurement and control equipment in oxygen service

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Industrial-process Measurement and Control Standards Committee (PCL/-) to Technical Committee PCL/1, upon which the following bodies were represented:

- British Coal
- British Gas plc
- British Pressure Gauge Manufacturers' Association
- Department of Energy (Gas and Oil Measurement Branch)
- Department of Trade and Industry (National Weights and Measures Laboratory)
- Energy Industries Council
- Engineering Equipment and Materials Users' Association
- GAMBICA (BEAMA Ltd.)
- Health and Safety Executive
- Institution of Gas Engineers
- Coopted members

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Foreword

BS 6869 has been prepared under the direction of the Industrial-process Measurement and Control Standards Committee. It is related to IEC Publication 877:1986 *“Procedures for ensuring the cleanliness of industrial-process measurement and control equipment in oxygen service”*, which was published by the International Electrotechnical Commission (IEC) as an IEC report.

For ease of reproduction, the text of IEC Publication 877:1986 has been used, with those items of text with which the Technical Committee is at variance deleted, and certain other items of text, which have been agreed as necessary improvements by the Technical Committee, included. These items are as follows.

In Table 1 and Table 2:

- a) carbon tetrachloride is deleted because its use is not recommended;
- b) methylene chloride is deleted because it is not designed for cleaning and is only used for stripping paint;
- c) trichloroethylene is deleted because it is normally used only in commercially available degreasing baths and never for liquid degreasing;
- d) note 4 to Table 1 and the note to Table 2 have been added because the occupational exposure limits (as defined in HSE Guidance Note EH40) should not be exceeded;
- e) a footnote has been added to Sub-clause 2.4 to clarify the meaning of the term “oil-free”.

British Standard codes of practice recommend good, accepted practice for the accomplishment of a defined task or sequence of tasks, as followed by competent practitioners. The word “shall” is not normally used in a code, and where it is found in the text of this British Standard it should be taken to mean “should”.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

BS 6869 describes procedures for cleaning industrial-process measurement and control equipment to be used for oxygen service, verifying this cleanliness and ensuring that the cleanliness of the equipment will be maintained up to the stage where the equipment is installed.

This British Standard does not apply to measurement and control equipment for welding, which is covered by ISO 5171. Oxygen service is defined as equipment or part thereof being in contact with oxygen-rich gas mixtures and other oxydizing gases (e.g. laughing gas).

It is essential that greases, oils, thread lubricants, dirt, water, filings, paints, varnishes, scales, powder, etc. are removed because many of these materials, in particular oils and hydrocarbon greases, can react violently in the presence of oxygen and initiate fires or explosions.

This British Standard consequently covers the cleanliness procedures for the preparation, assembling, inspection, protection during transportation, storage and handling and installation of equipment, accessories or replacement parts intended for oxygen service.

NOTE Many factors can influence the reaction in the presence of oxygen. Those may be:

- a higher oxygen pressure;
- a higher temperature;
- the fact that oxygen flows, or is only present as a static pressure within equipment or part thereof.

2 Procedures

In preparing, cleaning and assembling any equipment, accessory or part for oxygen service, the following procedures shall be explicitly observed.

2.1 Orders for equipment for oxygen service

Each order shall specify that the equipment and/or accessories are to be cleaned, prepared, marked and packed for use in oxygen service. Any order for replacement parts issued separately from the orders for equipment and/or accessories shall also state clearly that the parts so ordered are to be cleaned, prepared, marked and packed for use in oxygen service.

2.2 Cleaning

Prior to cleaning, the materials used in the equipment, accessory or part, and their surface finish shall be checked in order to determine the appropriate manner of cleaning and the suitable cleaning agent. All foreign material such as mill scale, dirt, grit, solid objects and hydrocarbons shall be removed. Removal may be accomplished by grinding, wire brushing, blast cleaning, sweeping, vacuuming, swabbing, etc. All particles resulting from the grinding and wire brushing operations shall be thoroughly removed.

2.2.1 Mechanical cleaning

This type of cleaning may be accomplished by blast cleaning, wire brushing or grinding.

2.2.1.1 Blast cleaning

Blast cleaning may be described as the use of abrasives propelled through nozzles against the surface of pipe, fittings or cavities to remove mill scale, rust, varnish, paint or other foreign matter; when resorted to, blast cleaning forms part of the manufacturing process. The medium propelling the abrasive shall be oil-free unless the oil is to be removed by subsequent cleaning. Specific abrasive materials shall be suitable for performing the cleaning without depositing contaminants that cannot be removed by subsequent cleaning. Care shall be taken when blast cleaning so as to not to remove an excessive amount of parent metal. The blasting medium and residue shall be removed to meet the cleanliness levels suggested herein for oxygen service equipment, accessory or part.

2.2.1.2 Wire brushing or grinding

Accessible surfaces may be wire brushed. Welds may be ground and wire brushed to remove slag, grit or excess weld material. Carbon steel wire brushes shall not be used on aluminium or stainless steel surfaces. Any wire brushes previously used on carbon steel shall not be used on aluminium or stainless steel surfaces.

2.2.1.3 Tumbling

Tumbling can be described as a cleaning method that uses a quantity of hard abrasive material placed in a cavity to clean the internal surfaces. The cavity and the abrasive are energized so as to impart relative motion between the abrasive material and the cavity. This method can also be used to clean the outside surfaces of small components placed inside the container with or without the abrasive material. When resorted to, tumbling forms part of the manufacturing process.