

THE ENGINEERING EQUIPMENT AND MATERIALS USERS ASSOCIATION

GUIDE FOR HOT TAPPING ON PIPING AND OTHER EQUIPMENT

PUBLICATION No. 185 : 1996

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THE ENGINEERING EQUIPMENT AND MATERIALS USERS ASSOCIATION

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AMENDMENT No 1, DECEMBER, 1997

The amendment listed below is authorised by the EEMUA Piping Systems Technical Committee (PSC).

Page 28 (§9.4): *Delete* first sentence in its entirety ('Agitating welding.')

EEMUA
19.12.97

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FOREWORD

This document has been developed by the EEMUA Piping Systems Technical Committee to give guidance on the various factors, procedures and activities which need to be considered, implemented and executed before a hot-tapping operation can be safely and successfully carried out. As the great majority of hot-tapping operations are performed on piping, the document is written with specific reference to that activity. Nevertheless the principles outlined are generally applicable to hot tapping on other types of equipment, taking due account of obvious differences (for example the absence of fluid flow when hot tapping a storage tank).

Being a guide, the document does not impose mandatory requirements (avoidance of 'shall'). However there are situations in which for reasons of safety it would be inappropriate to carry out a hot tap. In such instances wording such as 'safety considerations would preclude' is used to draw attention to the potential hazard.

Attention is drawn to the need to observe local statutory or other regulatory requirements. These may impose legal obligations on the 'designer' and/or on other persons involved in the operation.

Units

This Guide employs SI units, but additionally includes Imperial units where appropriate to common usage. *Note:* 'bar' signifies bar gauge.

1. INTRODUCTION

1.1 Scope

This Guide applies to hot tapping into metallic piping systems containing process fluids or their residues. Additionally, information is provided for special hot-tapping applications such as on storage tanks. It covers the welding and cutting (drilling/ trepanning) operations and other technical considerations, and gives guidance on how to carry out a safe operation.

1.2 Definition of Terms

1.2.1 Hot Tap

A method of making connections to piping (or other equipment) by attaching a fitting to the system, usually by welding, followed by cutting through the pipe wall at the point of attachment utilising an appropriate ('hot-tapping') machine. This operation is generally carried out on a live ('hot') system without decommissioning or interrupting flow.

1.2.2 Coupon

A disc cut out of the wall of the pipe (or other equipment) during the hot-tapping operation.

1.2.3 Trepanning

The process of cutting into the wall of the pipe (or other equipment) using shell cutters operated by a hot-tapping machine. It is usually carried out on the live system and involves the removal of a coupon of material.

2. BIBLIOGRAPHY

2.1 Publications Referred To in the Text

ASME* Code for Pressure Piping (B31):

- B31.3 — Process Piping[†]
- B31.4 — Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids[‡]
- B31.8 — Gas Transmission and Distribution Piping Systems.

BS 6990: Code of Practice for Welding on Steel Pipes Containing Process Fluids or their Residuals.

EEMUA Pub 149: Code of Practice for the Identification and Checking of Materials of Construction in Pressurised Systems in Process Plants.

* Formerly ANSI.

† New title; was *Chemical Plant and Petroleum Refinery Piping*.

‡ New title (similar to old).

2.2 Other Applicable Publications

API Publ 2201: Procedures for Welding or Hot Tapping on Equipment in Service.

2.3 Abbreviations Used Above

ANSI American National Standards Institute

API American Petroleum Institute

ASME American Society of Mechanical Engineers

BS British Standard

3. SAFETY CONSIDERATIONS

3.1 General

Hot-tapping should be undertaken only when no reasonably practicable alternative is available.

For systems handling flammable and/or toxic fluids, normal procedures require that welding work be carried out only when the system is free of process fluid ('gas free') and open to atmosphere. In some circumstances this requirement may necessitate shutting down a large plant or section thereof, which in itself may introduce hazards for example through the need to remove and store process fluid. In such circumstances there may be justification for giving consideration to hot tapping. This operation, however, introduces its own hazards which demand careful consideration.

3.2 Hazard Assessment and Control

Before undertaking hot tapping, all potential hazards should be identified and assessed, and detailed procedures for their control established.

The principal potential hazards associated with hot tapping are:

- explosion and fire resulting from the effects of heat on the process fluid contained within the system
- burn-through associated with the temporary loss of strength of the pipe wall during welding
- loss of integrity of the pressure envelope at the point of hot tap, for example by corrosion or embrittlement of the pipe wall due to reaction with the contents of the process system
- the release of the system's contents which may be flammable, toxic or asphyxiating
- carrying out welding operations in a Hazardous Area.

For systems that contain or have contained only non-flammable substances reference should also be made to BS 6990.

3.3 Safe System of Work

A written 'safe system of work' or 'safety plan' should be produced. This needs to be fully understood by all those involved with the operation. The document should be based upon expert advice, the guidance given in BS 6990, and any legislative requirements. (In the UK a certificate of exemption is required under Sec. 31 of the Factories Act 1961 before welding is permitted on lines and equipment that are not free of flammable substances.) It should anticipate all reasonably foreseeable events and specify the appropriate emergency services required to be in place. It should also define individual responsibilities.