



SAFETY ASSESSMENT  
FEDERATION

# Guidance

## Pressure Systems

PSG 04. Guidelines for the Production of Written Schemes of Examination and the Examination of Pressure Vessels Incorporating Openings to Facilitate Ready Internal Access.

**REFERENCE: PEC 08**  
**ISSUE: 01.1**  
**DATE: 08/04/2021**

---

**DOCUMENT INFORMATION:**

---

<b>REFERENCE:</b>	PEC 08
<b>ISSUE:</b>	01.1
<b>DATE:</b>	08/04/2021
<b>PREPARED BY:</b>	Pressure Equipment Committee (TC1)
<b>APPROVED BY:</b>	TC 1 and TSC

---

---

**DOCUMENT HISTORY RECORD:**

---

<b>ISSUE:</b>	<b>DATE:</b>	<b>CHANGE DETAIL:</b>
01.1	08/04/2021	Document review

---

**© The Safety Assessment Federation Ltd**

All rights reserved. Except for normal review purposes, no part of this publication may be reproduced, utilised, stored in a retrieval system or transmitted in any form by any means electronic or mechanical, including photocopying, recording or by any information, storage or retrieval system without the written permission of the publisher.

**CONTENTS**

SITUATION ..... 1

    1. Case 1:..... 1

GUIDANCE..... 2

    2. Case 2:..... 2

GUIDANCE..... 3

## SITUATION

Since the issue of Guidelines for the Production of Written Schemes of Examination and the Examination of Pressure Vessels Incorporating Openings to Facilitate Ready Internal Access (PSG04), SAFed has been made aware of serious instances on site that raise issues that were not included or covered by the original document. It is considered necessary therefore to provide additional guidance to PSG04 to ensure that these potentially serious issues are taken into account by the Competent Person when drawing up the Written Scheme of Examination.

### 1. Case 1:

A worker sustained serious injuries to his right arm. The accident happened when the clamping system on a pressure vessel lid he was operating failed, causing the lid to fly off and hit him.

The company was fined £100,000, split equally between Regulations 11 and 12 of the Pressure Systems Safety Regulations, with £24,474 costs, after they admitted failing to provide workers operating the pressure vessel with adequate and suitable instructions for its safe operation and also failing to ensure the vessel was adequately maintained.

The HSE Inspector, who investigated the incident, said: "Our investigation revealed serious deficiencies in the company's safe systems of work. Opening and closing of the lid was regarded as a simple process, carried out three times a day, but the hazards had been overlooked. Although the clamping system was designed with a substantial margin of safety, it had been allowed to deteriorate to such an extent that the risk of injury became unacceptably high."

In particular, HSE's investigation found that the company had failed to put in place adequate operating procedures to ensure the system was used correctly. For example, clamps were regularly over-tightened, occasionally causing them to break and the system was allowed to operate with less than its full complement of eight clamps.

At the time of the accident, one of the clamps was missing and others showed excessive wear and tear, or inadequate repair. Furthermore, it had become common practice for leaks to be nipped up with the system under pressure because the operating procedures failed to state that the system should be depressurised first.

*"The investigation also revealed that although the company had arranged for an independent competent person to examine the pressure system periodically, this was insufficient due to the frequent operation of the clamps, and the high level of wear and tear they showed. Instead, the firm should have introduced a more frequent system of inspection and maintenance."*



## GUIDANCE

In light of the incident described above the HSE have warned of the need for effective operation, inspection and maintenance regimes to ensure the safe use of pressure equipment.

HSE Guidance Note PM73 “Safety at Autoclaves” and Section 7 of PSG04 clearly outline the responsibilities and duties of the User/Owner in respect of training; operation; maintenance; testing of interlocks and carrying out modifications and repairs.

Comments should be made on the report of examination reminding the User/Owner of these responsibilities.

## 2. Case 2:

2 workers sustained serious injuries when the autoclave door catch mechanism failed causing the door of an autoclave open suddenly and striking the 2 workers.

One of the door locking handles prevents rotation of the door before the vessel is depressurised. This is achieved through a series of linkages from the handle to an exhaust valve which vents the vessel contents. During routine operation of the vessel the opening sequence was followed however the operator was

experiencing difficulty in rotating the door to gain access to the vessel. The operator maintains that the pressure gauge was not indicating that a pressure existed within the vessel at that time.

A colleague went to his assistance and between them were able to move the door. Unfortunately there was a sudden movement of the door which resulted in the two men being thrown through the air and sustaining serious injury due to impact against a wall.

It was noted that two separate issues lead to the incident occurring:

1. It would appear that wear in the linkages of the pressure venting device prevented the device from operating correctly, therefore when the operators went through the door opening sequence there was a pressure build up behind the door. This would also explain why the operators felt that the door was “difficult to open”.
2. When the door did open with pressure still in the vessel a safety latch should have prevented the door opening more than a small distance thereby allowing any residual internal pressure to be released without injury to persons. The hinge pin of this safety latch appears to have failed when the door opened causing the door to open fully causing the injury to the two operators. It was also noted that the latch pin had been previously repaired and that the failure had originated at the repair.

## **GUIDANCE**

PSG04 clearly identifies the types of protective and safety control devices which should be fitted to this type of vessel along with the need to include them within the Written Scheme of Examination and to ensure that those identified devices are subjected to an appropriately detailed examination.

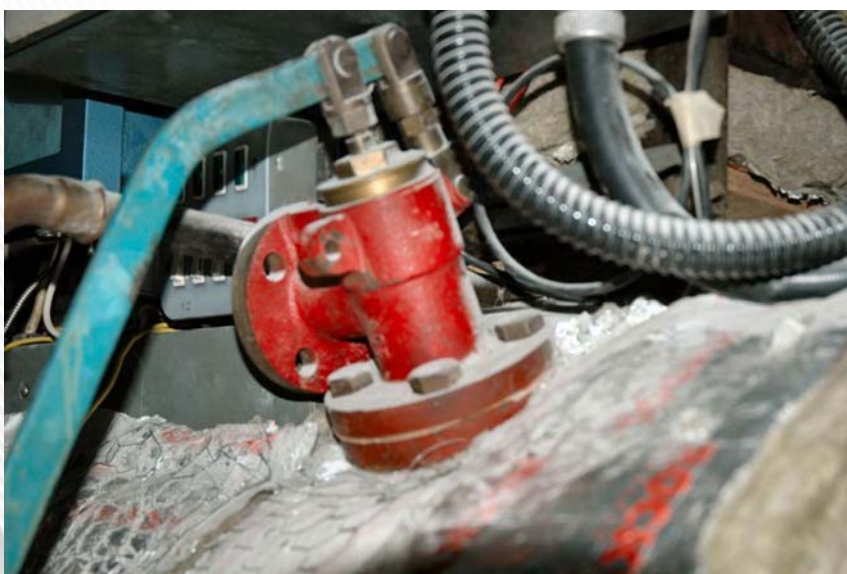
If the Written Scheme of Examination does not include details of any such devices then it shall be deemed inadequate and revised accordingly.



Figure 2: View of Autoclave Door etc



Figure 3: Retaining Latch and Pin (Broken)



Exhaust Valve (showing part linkage)