



SAFETY ASSESSMENT  
FEDERATION

# Guidance

For the Competent Person – A  
common approach to the  
thorough examination of power  
presses

HSG 236 — Guidance for the Maintenance and  
Thorough Examination of Power Presses

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## SITUATION

HSG 236 updated and superseded Health and Safety Executive (HSE) Guidance Note PM79. In addition to replicating the information previously detailed in PM79 regarding the mechanical aspects of power press thorough examinations, HSG 236 introduces totally new safety related electrical control system requirements into the scope of such examinations.

As a result the Safety Assessment Federation (SAFed) members have reviewed their thorough examination procedures to produce a common approach to member companies as to the procedures to be adopted to ensure consistent compliance with HSG236 and industry practice.

**Note 1:** This guidance applies to mechanically driven presses or press brakes [hereafter referred to as power press(es)].

**Note 2:** This document should be used in conjunction with relevant guidance and company procedures.

## FORWARD

SAFed has prepared this guidance based on the collective experience of their members. The Guidance is for the use of Competent Persons and assumes a level of competence in examining power presses and their safety devices. It should not be regarded as an authoritative interpretation of the law, however if the guidance it provides is followed and used in conjunction with that provided in HSG 236 it will normally be regarded as sufficient to comply with health and safety law in relation to the thorough examination of power press(es).

**Note:** For the purposes of this Guidance the term Competent Person is used to refer to SAFed member Engineer Surveyors and other competent persons (See Annex B) who carry out thorough examination of power press(es).

### 1. Introduction

The aim of this guidance is to achieve consistency of thorough examination. However the results of the competent persons risk assessment may necessitate variations to the nature of the examinations and tests described and to the frequency with which they are performed.

HSG 236 Power presses: Maintenance and thorough examination introduces new guidance on power press maintenance and provides information on some important additions to the items that are now to be included in the thorough examination and testing of power press(es).

These additions make specific reference to the safety related aspects of the power press electrical control circuits and the need for periodic electrical testing, recording details of modifications and maintaining up-to-date records and circuit diagrams.

### 1.1. Legal Commentary

The Provision and Use of Work Equipment Regulations 1998 (PUWER 98) implements aspects of the Amended Use of Work Equipment Directive. The primary objective of PUWER 98 is to ensure that no work equipment, including power press (es), gives rise to risks to health and safety, regardless of the work equipment's age, condition or origin.

The requirements in Part IV of PUWER 98 apply specifically to power press (es) that are wholly or partly used to work metal. They do not apply when a press is used to work non-metals, hot metals or metal powders.

A list of the types of press that these regulations do not apply to is provided in Schedule 2 of PUWER 98 Part IV and is included at Annex E for convenience.

### 1.2. Responsibility for Ancillary Work Carried Out

The competent person who makes an examination and signs the report assumes responsibility for any documents that may have been accepted as evidence of ancillary work carried out by another body.

### 1.3. The Supply of Machinery (Safety) Regulations 2008 (S.I. 2008/1597)

These regulations came into force on the 29th December 2009 and revoked the whole of the following:

The Supply of Machinery (Safety) Regulations 1992 (S.I.1992/3073).

The Supply of Machinery (Safety) (Amendment) Regulations 1994 (S.I. 1994/2063).

The Supply of Machinery (Safety) (Amendment) Regulations 2005 (S.I. 2005/831).

These regulations make it an offence for a responsible person to supply machinery from the 29th December 2009 unless it is safe, these rules also apply to Safety Components.

The key requirements of the Regulations for machinery and safety components are:

- No responsible person shall place machinery on the market or put into service unless it is safe.
- They satisfy the essential health and safety requirements,
- Have a technical file compiled as per Annex VII (part 7 of schedule 2), part A,
- Have been provided with the necessary information to operate it safely,
- Have been subjected to the appropriate conformity assessment procedures, (Regs. 10, 11 or 12),
- Are issued with an EC declaration of conformity or incorporation in accordance with Annex II (part 2 of schedule 2) section A or B part 1 and a copy accompanies the machine and the original is retained as per Annex II,



- Are visibly, legibly and indelibly marked with the CE mark as per Annex III (part 3 of schedule 2) unless a declaration of incorporation has been issued.

#### **1.4. Refurbished machinery**

When a machine which has been overhauled or reconditioned outside the Community, re-enters the Community it must be regarded as being placed on the market and put into service for the first time in the Community. The Supply of Machinery Regulations therefore applies and CE marking and EC declaration of conformity are required.

The Supply of Machinery (Safety) Regulations 2008 states that the requirements apply in relation to the supply of relevant machinery or a relevant safety component placed on the market or put into service in the Community on or, after 29 December 2009. When used machinery is overhauled and no components are changed or used parts are merely replaced with identical new parts the machinery remains the same and the regulations do not apply.

It is however recognised that reconditioned machinery being sold as “new” will have to comply with the requirements of the Supply of Machinery Regulations although the point at which the machine becomes “as new” is not clear.

If the machine is reconditioned by installing new equipment, which changes the function of that machine, it effectively becomes a new machine supplied to the market for the first time and therefore CE marking and EC declaration of conformity are required.

#### **1.5. Organising the thorough Examination**

Careful organisation, which includes giving adequate notice to the power press user, is required, to ensure that the thorough examination can be carried out on time.

The competent person will need to confirm:

- that the press(es) can be released from production on or before the due date of the thorough examination,
- that, if invasive examination techniques are to form part of the thorough examination process, the facilities required to undertake such work will be available,
- that any necessary information needed on the maintenance history, testing, service conditions and usage of the press will be available for review at the time of the thorough examination.

It is vitally important that when dismantling or supplementary testing is considered necessary at the time of the next thorough examination, reference to this is made on the report of thorough examination to ensure the user receives adequate warning.

If a number of power press (es) are to be examined at one site, it is clearly helpful to develop an organised scheme of work to ensure that the dismantling requirements are staggered so that a proportion of the presses are seen in the dismantled state at each visit.

If the owner/employer does not provide the required documentation, correct access or any necessary dismantlement the thorough examination cannot be completed.

## **2. COMMON APPROACH TO THOROUGH EXAMINATION OF POWER PRESS (ES)**

The scope of thorough examinations under PUWER 1998 will include as a minimum the following considerations:

- Client notification,
- Identification of power press,
- Risk assessment (Safe system of work),
- Thorough examination,
- Reporting.

### **2.1. Client notification**

On arrival, seek evidence of modifications, and any documentation appertaining to electrical inspection and test, circuit drawings and dismantlement (as appropriate).

### **2.2. Identification of power press**

Recording of make, type, capacity, serial and plant numbers for press and guards.

### **2.3. Risk assessment (Safe system of work)**

Assessment of safe access and egress to the press and safe use together with any safe systems of work and communication methods that may be utilised.

### **2.4. Thorough examination**

The thorough examination will consist of:

- Visual examination at rest,
- Visual examination at work – Functional tests.

## 2.5. Reporting

Reports are normally issued as follows:

- Client on site notification,
- Issue of thorough examination report no later than 14 days after the examination.

Note: Where a defect (or defects) has been reported to the user, which require rectification, either immediately, or within a specified time period, a copy of the report containing the information must also be sent to the local enforcing authority.

## 3. POWER PRESS (ES) — THOROUGH EXAMINATION AND TEST

Regulation 32 of PUWER 98 part IV, Safe use of power press (es) requires the thorough examination of a power press by a competent person in three circumstances:

- Initial thorough examination,
- Periodic examination,
- After exceptional circumstances.

### 3.1. Initial thorough examination — Requirements and Objectives

An initial thorough examination of a power press will be required for a new power press, a second hand power press new to a premises or an existing power press moved and reassembled at the same location. Enclosed tools also require an initial thorough examination on any power press to determine that its operation is safe.

The competent person will need to review all third party documentation that is made available. SAFed Guidance CAC01 on the acceptance of third party documentation is given at Annex C.

Note: Where the required documentary evidence is not available or is unsatisfactory, then the competent person cannot start the initial thorough examination or issue such a report.

#### 3.1.1. Initial thorough examination — At Rest

An initial thorough examination of a power press along with guards and protection devices should include the following:

- Identify the power press by plant number and/or maker's serial number and check that the press and guards/protection devices are correctly marked,
- Isolation and dissipation of all energy sources such as electrical, pneumatic and hydraulic services from the power press,



- Visual examination of the power press, including the press frame and all fixed/moving associated parts,
- A confirmation that the flywheel speed and direction are correctly marked,
- Examination of normally enclosed parts and any supplementary testing where appropriate,
- Visual examination of the electrical control circuit and with control panel doors open and where required covers removed,
- Visual examination of wiring, conduit, junction boxes, glands and review the integrity of wiring insulation, seals, etc,
- Establish that the guard/protection device is suitable for the type of power press and that the entire guarding system is effective.

### 3.1.2. Initial thorough examination — at work — Functional tests

Once the competent person has established that the power press is safe to operate, a suitable functional test of the power press along with the guards and protection devices should include the following:

Note 1: The first powered stroke (or trial stroke) of the power press should be initiated by the clients appointed person.

- All parts concerned with the actuation and/or control of the slide and ram,
- Establish that the entire guarding system is effective,
- A suitable functional test should be carried out to confirm that the guard/or protection device is working correctly and gives no indication of a fault,
- A functional check of each safety related switch/position monitoring device,
- Confirmation that the sequencing of all devices is correct,
- Lamps, indicators and displays are working correctly and that they actually provide their designated information,
- Confirm that all modes of operation are functioning correctly, including the “Inch” mode of operation (See Note 3).

Note 2: It should be confirmed that all cam boxes, control panels, mode selection switches etc, are locked and that the keys are placed with the authorised person.

Note 3: It should be ensured that the “Inching” movement is a graduated/incremental movement to permit a maximum of 6mm of inching step.

### 3.2. Periodic thorough Examination

The periodic thorough examination of a power press along with its guards/protection devices in position is required:

- Twelve monthly where fixed guards/enclosed tools are employed,
- Six monthly in all other cases.

#### 3.2.1. Periodic thorough Examination — Modifications

The competent person will initially have to ascertain from the owner of the power press whether any modifications have been carried out on the power press or the electrical control system since the previous thorough examination. If modifications have been undertaken the competent person should treat the examination as an initial thorough examination.

Note: If any electrical tests have been conducted between periodic examinations the electrical test report containing this information should be provided to the competent person. For the thorough examination to continue the results of such tests must be satisfactory. Where there is any doubt about the results, the competent person should refer this to their relevant specialist for confirmation that the thorough examination can proceed.

#### 3.2.2. Periodic thorough Examination — at Rest

If no modifications have been completed the competent person should carry out the periodic thorough examination consisting of:

- Identify the power press by plant number and/or maker's serial number and check that the press and guards/protection devices are correctly marked and that the daily inspection by the appointed person has been completed and recorded,
- Isolation and dissipation of all energy sources such as electrical, pneumatic and hydraulic services from the power press,
- Visual examination of the power press, including the press frame and all fixed/moving associated parts,
- A confirmation that the flywheel speed and direction are correctly marked,
- Examination of normally enclosed parts and any supplementary testing where appropriate,
- Visual examination of the electrical control circuit and with control panel doors open and where required covers removed,
- Visual examination of wiring, conduit, junction boxes, glands and review the integrity of wiring insulation, seals, etc,

- Establish that the guard/protection device is suitable for the type of power press and that the entire guarding system is effective.

### 3.2.3. Periodic thorough Examination - at Work - Functional test

Once the competent person has established the power press is safe to operate, a suitable functional test of the power press along with the guards and protection devices should include the following:

Note 1: The first powered stroke of the power press should be initiated by the clients appointed person.

- All parts concerned with the actuation and/or control of the slide/ram,
- Establish that the entire guarding system is effective,
- A suitable functional test should be carried out to confirm that the guard/or protection device is working correctly and gives no indication of a fault,
- A functional check of each safety related switch/position monitoring device,
- Confirmation that the sequencing of all devices is correct,
- Lamps, indicators and displays are working correctly and that they actually provide their designated information,
- Confirm that all modes of operation are functioning correctly,
- Establish if any dismantlement of normally enclosed parts is required in order to complete the thorough examination.

Note 2: It should be confirmed that all cam boxes, control panels, mode selection switches etc, are secured and that any keys are placed with the authorised person.

### 3.3. Exceptional circumstances thorough Examination

Each time that exceptional circumstances have occurred which are liable to jeopardise the integrity and safe operation of a power press or its guards/protection devices the competent person will need to complete a thorough examination, regardless of the twelve or six month thorough examination being due or not.

For the purpose of this guidance, exceptional circumstances would include:

- Major modifications, refurbishment or major repair work,
- Known or suspected serious damage,
- Substantial change in the nature of use or function.

Note: Further guidance on exceptional circumstances can be found in HSG 236 Appendix 8.



## 4. PREPARATION AND EXAMINATION/TEST SCHEDULE FOR FULL REVOLUTION CLUTCH POWER PRESS (ES)

### 4.1. Principle

Prior to the examination being carried out the competent person shall identify the power press by plant number and/or makers serial number. The examination shall commence with the flywheel stationary and the energy sources isolated from the press and dissipated where required so that the following parts can be examined:

- Clutch mechanism,
- Clutch operating controls,
- Brake,
- Flywheel Bearing,
- All other parts liable to effect safety at the tools.

The examination may then identify the need for supplementary testing followed by functional tests as required.

#### 4.1.1. Clutch Mechanism

- Clutch key/dog and back up pawl where necessary,
- Operating spring,
- Clutch key extractor and associated equipment,
- Flywheel driving insert.

#### 4.1.2. Clutch operating Controls

- Operation of single stroke device – if fitted,
- Foot treadle and linkages/cables/hoses.

#### 4.1.3. Brake

- Condition of lining/shoes,
- Security,

- Condition of springs,
- Provision for adjustment and locking.

#### **4.1.4. Flywheel Bearing**

- Extent of wear,
- Provision of lubrication.

#### **4.1.5. All other parts liable to effect safety at the tools, parts would include**

- Crankshaft,
- Slide/ram counter balance arrangements,
- Gravity and/or overrun safety device(s),
- Pitman ball and screw assembly,
- Electrical control systems,
- Lubrication system,
- Foundation fixings.

#### **4.1.6. Supplementary Testing**

The competent person may as a result of his visual examination, at his discretion, with reference to users records and HSG 236, request that the clutch and/or brake unit be dismantled for detailed examination and any other components the competent person deem to be safety critical.

Note: Examples of safety critical components are flywheel bearings, crankshaft and pitman assemblies.

#### **4.1.7. Functional Tests**

On completion of 4.1.1 to 4.1.6, the competent person can, providing no major defects affecting the safe use of the power press have been detected carry out a functional test of the power press and its safety devices.

Note: The first powered stroke should be completed by the client's appointed person.

## 5. PREPARATION AND EXAMINATION/TEST SCHEDULE FOR PART REVOLUTION CLUTCH POWER PRESS (ES). (TO INCLUDE: HYDRAULIC, WET CLUTCHES AND SIMILAR UNITS)

### 5.1. Principle

Prior to the examination being carried out the competent person shall identify the power press by plant number and/or makers serial number. The examination shall commence with the flywheel stationary and the energy sources isolated from the press and dissipated where required so that the following parts can be examined:

- Clutch mechanism,
- Clutch operating controls,
- Brake,
- Flywheel Bearing,
- All other parts liable to effect safety at the tools.

The examination may then identify the need for supplementary testing followed by functional tests as required.

#### 5.1.1. Clutch Mechanism

- Friction drive assembly,
- Return springs condition.

#### 5.1.2. Clutch operating Controls

- Hydraulic/pneumatic control valves,
- Key control switches,
- All operating buttons,
- All other mechanisms/devices.

#### 5.1.3. Brake

- Condition of linings/shoes,
- Security,



- Condition of springs,
- Provision of adjustment and locking,
- All other mechanisms/devices.

#### **5.1.4. Flywheel Bearing**

- Extent of wear,
- Provision of lubrication.

#### **5.1.5. All other parts liable to effect safety at the tools, parts would include**

- Crankshaft,
- Slide/ram counter balance arrangements,
- Gravity and/or overrun safety device(s),
- Pitman ball and screw assembly,
- Electrical control systems,
- Lubrication system,
- Foundation fixings.

#### **5.1.6. Supplementary Testing**

The competent person may as a result of his visual examination, at his discretion, with reference to users records and HSG 236, request that the clutch and/or brake unit be dismantled for detailed examination and any other components the competent person deem to be safety critical.

Note: Examples of safety critical components are flywheel bearings, crankshaft and pitman assemblies.

#### **5.1.7. Functional Tests**

On completion of 5.1.1 to 5.1.6 the competent person can, providing no major defects affecting the running/operation of the power press carry out a functional test of the power press and its safety devices.

Note: The first powered stroke should be completed by the client's appointed person.

## 6. PREPARATION AND THOROUGH EXAMINATION/TEST SCHEDULE FOR GUARDS AND/OR PROTECTION DEVICES

### 6.1. Guards and/or protection devices - At rest

The thorough examination of a guarding system, once in position on the power press on which it is to be used should include the following:

- Identify the guarding system by plant number and/or maker's serial number and check that it is correctly marked,
- Isolation and dissipation of all energy sources such as electrical, pneumatic and hydraulic services from the guarding system,
- Visual examination of the guarding system, including all fixed/moving associated parts,
- Visual examination of wiring, conduit/trunking/enclosures, junction boxes, glands and review the integrity of wiring insulation, seals, etc,
- Establish that the guarding system is suitable for the type of power press and that the entire guarding system is effective.

### 6.2. Guards and/or protection devices thorough examination — At work — Functional tests — General requirements — Guard and/or protection devices

Once the competent person has established the guarding system is safe to operate, a suitable functional test of the guarding system should include following:

Note: The first powered stroke of the power press should be initiated by the clients appointed person.

- A suitable functional test should be carried out to confirm that the guarding system is working correctly and gives no indication of a fault,
- A functional check of each safety related switch and monitoring device,
- Confirmation that the sequencing of all devices is correct,
- Lamps, indicators and displays are working correctly and that they actually provide their designated information,
- Confirm that all modes of operation are functioning correctly.

### 6.3. Specific Guarding Requirements

#### 6.3.1. Enclosed Tools

- Suitability and integrity of the closed tool,
- No secondary trapping points,
- Clear marking of maximum permissible stroke of machine.

#### 6.3.2. Fixed Guards

- Construction and security,
- Ability to prevent access to danger areas not protected by other devices,
- Fixings requiring a tool for removal,
- Apertures – correct dimensions and distance from trap area,
- Secondary interlock systems working correctly.

#### 6.3.3. Interlocking guards

- Construction and security,
- Machine interface arrangements,
- Integrity of interlocking, scotching and control mechanisms,
- Test to ensure failure to safety,
- Satisfactory condition of component parts e.g. cross members, linkages, taper pegs, washers, cotter pins, rollers etc.

#### 6.3.4. Automatic guards

- Construction and security,
- Compatibility of guard with machine stroke/speed data,
- Integrity of guard screen,



- Drive arrangements,
- Compliance with guidance appertaining to height and reach over distances,
- No secondary trapping points.

#### **6.3.5. Electro sensitive protective equipment (AOPD's/photo—electric guards)**

- Total guard system is effective and correctly interfaced,
- Overall stopping performance is satisfactory,
- Muting mode and mute indicator work correctly,
- Separation distance is set within limits,
- Associated devices and control circuits are operating correctly and in good condition,
- Cam boxes, control panels, mode selection switches etc. are secured and that any keys are placed with the authorised person.

Reference documents PM41 (1984 to 1999) and subsequently HSG180 list the requirements to be fulfilled.

#### **6.3.6. Pressure Sensitive Mats**

See Annex A — Technical information (informative).

#### **6.3.7. Programmable Laser Scanners**

See Annex A — Technical information (informative).

#### **6.4. Examination and test of laser actuated AOPD moving with the machine beam**

See Annex A — Technical information (informative).

#### **6.5. Two hand controls — Safeguarding risk assessment**

See Annex A — Technical information (informative).

#### **6.6. Periodic Dismantling of Clutch/Brake Units**

See Annex A — Technical information (informative).

## 7. SUPPLEMENTARY TEST(S) REQUIRED AS PART OF THE THOROUGH EXAMINATION

The competent person will decide whether supplementary testing is necessary.

The nature of the test method(s) and frequency will be at the discretion of the competent person based on condition and usage of the press and existing guidance (See HSG 236).

The tests required may include one or more of the following:

- Electrical,
- Mechanical,
- Non Destructive.

Whenever possible, an owner should be notified in advance of an examination and of any supplementary test(s) required.

Note: If any of the documentation or test(s) are incomplete or unsatisfactory, then the thorough examination cannot be undertaken or a report of thorough examination issued.

### 7.1. Circumstances under which supplementary testing may be required

- New,
- Relocated,
- Periodic,
- Modified either mechanically or electrically (Like for like replacement components would not be considered a modification),
- Exceptional circumstances,

Note: Where an existing used press is submitted for thorough examination to a Competent Person, they should review previous inspection reports and any documentary evidence of supplementary testing in line with the guidance given in the annexes of this document. Where no evidence exists or is unsatisfactory, supplementary testing should be called for.

### 7.2. Electrical supplementary testing to be carried out as appropriate

- Visual examination – Prior to the electrical testing, a visual examination of all electrical components should be undertaken both externally and internally beneath removable covers to confirm that they are in a satisfactory condition,
- Earth loop impedance at the incoming supply to the press — Measuring of the earth loop impedance at the main incoming supply point to the press is to be undertaken,

- Earth continuity — Earth continuity tests are to be undertaken from the earth at the main isolator to normally earthed control system components. It is recommended that the maximum acceptable continuity reading should not exceed 0.5 ohm (0.5W ),
- Insulation resistance — Insulation resistance tests are to be carried out on the drive motor and on any other circuits operating at or above normal mains voltage. The value of the insulation resistance must not be less than 1 Mohm (1 MW ).

Note 1: Comprehensive guidance on requirements for electrical supplementary testing and reporting can be found in Annex D and HSG 236.

Note 2: Where a press is connected to the electricity supply by the use of a plug-in system into the bus bars then further electrical testing following press relocation is not required provided the building electrical installation has been checked and documentary evidence made available.

### **7.2.1. Mechanical supplementary testing as appropriate**

#### **7.2.1.1. Full revolution clutch**

A positive key clutch (full revolution) should be checked by:

- Removal (or partial removal) of the flywheel,
- Dismantling of clutch components,
- Visual examination,
- Non Destructive Test [Magnetic Particle Inspection (MPI)] of extractor, clutch components, crankshaft and pitman screw(s) as appropriate,
- Assessment of crankshaft journal and flywheel bush bearings and condition of clutch operating spring(s).

#### **7.2.1.2. Part revolution clutch (to include hydraulic, wet and similar units)**

A friction clutch/brake (part revolution) should be checked by:

- Dismantlement of the clutch and brake unit(s) and flywheel as appropriate,
- Non Destructive Test (MPI) of clutch/brake components and pitman screw(s) as appropriate,
- Assessment/visual examination of parts.



### 7.3. Documentation

- Competency - Qualification requirements of persons carrying out test are contained in Annex B,
- Equipment — As appropriate, equipment used shall have an in-date calibration certificate,
- Test records – any that are required should be evaluated as SAFed Guidance CAC01, shown in Annex C,
- Electrical test records – The example form of report shown in Annex D contains the essential particulars required following the test and examination of the electrical systems on the Power Press. However the form of report may vary from that layout and presentation and may contain additional information or test results.

## ANNEX A — TECHNICAL INFORMATION — GUARDS AND PROTECTION DEVICES

Note: Readers are advised to check on the latest version of any document referenced in this Annex.

### A.1 Pressure sensitive mats

Pressure sensitive mats should only be used as a secondary safeguard unless they incorporate redundant self-checking and monitoring to the same standard as photoelectric devices. The control mechanism (e.g. Reset Button) should be positioned such that the entire hazardous area can be viewed. It should not be possible to reset the machine from within the hazardous area.

### A.2 Programmable Laser Scanners

Programmable laser scanners may be seen in use as a proximity sensing device within the enclosures of automated systems on some machines. They would normally be used in conjunction with other safeguards, e.g. physical barrier or photo-electric light curtains to prevent areas where persons can remain undetected.

These devices are for presence sensing functions only and so would not be subject to a stopping performance test.

Check the suitability, location, security and general condition including cable entry. Test the disablement of the machine movement and that when presence is removed, the machine does not automatically restart. The Control mechanism (e.g. Reset Button) should be positioned such that the entire hazardous area can be viewed. It should not be possible to reset the machine from within the hazardous area.

Where programmable laser scanners are used in conjunction with photo-electric light curtains, used as the primary guard and referred to in 6.3.7, there needs to be an authorised procedure present at the machine to override the scanner in order to carry out a stopping performance test as the scanner often detects the wire on the motion sensor connected to the stop-timer and disables the machine.

### A.3 Examination and test of laser actuated AOPD moving with the machine beam.

The following guidance is provided for competent persons engaged in the thorough examination and test of Laser Safety Systems. This system is currently only being used on Hydraulic Press Brakes but has been included here for reference and guidance purposes.

Due to the diversity of laser safety systems the tests suggested may not always be appropriate to individual installations.

Check that access to the trapping parts is not possible from any direction not protected by the laser device. Side and rear guards should be proved to be in order.

The AOPD manufacturer shall state the maximum bed length of the machine to which the laser can be fitted and any precautions to be taken against thermal influences and optical reflections for laser actuated AOPDs.

Laser actuated AOPDs moving with the machine beam shall conform to the type 4 as per BS EN IEC 61496-1: 2004 and the safety related parts shall conform to BS EN ISO 13849-1: 2006.

Laser actuated AOPDs moving with the machine beam shall pass the following tests using the test piece in figure 1 below. The tests shall be carried out over the full length of the bed with the machine fitted with all the upper tools i.e. maximum weight and at the maximum down stroke speed.

### H1 Test 1

The test piece of 14mm diameter shall be detected between the tip of the upper tool and the laser beam nearest to the upper tool along the full length. This is achieved by running the 14mm test piece along the tip of the upper tool for the complete length.

### H2 Test 2

The down stroke shall stop before the 10mm step section test piece lying on the lower tool would be crushed by the upper tool. In addition at this point after the down stroking beam has been stopped, the 15mm step section of the test piece should pass between the lower and upper tool.

### H3 Test 3

The 35mm step section lying on the lower tool shall not be crushed by the upper tool during the high speed down stroke.

(These tests have to be carried out 10 times by the manufacturer before the machine is placed on the market and once by the user after a change of tools, but at least once a year).

Switching off the laser by the selector switch shall also switch off the indicator lights.

Muting of the protective laser fields during the closing stroke of the press brake shall only be possible if the closing speed is reduced to 10mm/s or less and in conjunction with a 3 position hold-to-run control e.g. a 3 position foot pedal switch, stop, run, stop again. The reduction from high speed to a safe speed shall occur before or at muting of the laser beam as required in the tests above.

For special operations e.g. box bending operations, it shall be possible to mute parts of the protective laser beams which are located in front of or behind the bending line for one stroke if the protective field described in H1 Test 1 above still remains active. Muting of these fields shall only be possible during the closing stroke if the speed is reduced to 10mm/s or less and in conjunction with the 3 position hold-to-run control.

Laser actuated AOPDs moving with the machine beam shall be equipped with a means of selection to allow choice of operating and setting modes. The setting mode shall only be selectable by way of a device e.g. key switch or password. In the setting mode the OSSD's (output signal switching device) has to be in the Off-State.

Laser actuated AOPDs moving with the machine beam shall be equipped with indicators to show the mode of operation and for the muting if active.

The laser position settings shall be lockable against interference.

It shall not be possible to initiate or run the machine at speeds faster than 10mm/s when any part of the body e.g. finger is interrupting the protective laser field or if the field is muted.



The means of resetting the system shall be positioned so that there is a clear view of the danger zones. There shall be only one reset control device for the system.

An automatic over-run monitoring device shall be fitted and be tested at least at each power on and at subsequent intervals of at least 3 months and at each thorough examination.

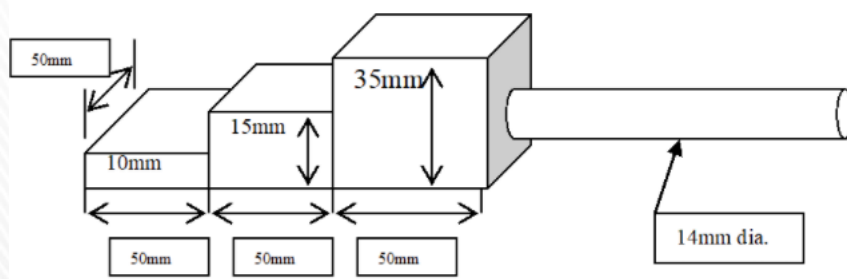
The laser muting function shall only be deactivated after each stroke before or at next TDC. Any muting shall require the deliberate confirmation by the operator for each stroke.

Initiation of the press brake stroke shall not be possible by using the laser i.e. breaking the beam.

The laser components transmitter, receiver etc and any moving parts shall not introduce trapping hazards to fixed parts of the machine.

The optical design of the laser shall be such that no optical bypassing can occur on mirror like surfaces.

**Figure 1 – Test Piece**



Quoting from Lazersafe

“The stopping distance test is integral in our controller. Unlike the others we do a stopping distance test every start up, every time there is a stop from high speed and every 24 hours after continuous operation. This is described in our manual. Our system has been designed to overcome the need for operator test or even those such as you wish because if the machine does not positively pass this test it will not be allowed to operate. The other systems (Fiessler) do not have this test routine and hence the need for a physical test which is often not undertaken and hence the machine may not be in a suitable safe operating condition. In our case this cannot happen, if any component e.g. the encoder or a component in the dual channel control results in either a mismatch of calculation or a failure of the test the machine will not run. In essence our system is regularly self-checking many times a day and has a fail-safe situation of not letting the machine run.

You can apply the tool test from EN12622 (the Fiessler tool) however with our FULLY CERTIFIED LZS-003SS6, SS4 and HS systems they will not pass the second step of the test as they cater for machines with short stopping distances which may have less than the required 15-10mm=5mm clearance. Thus our product with its certification covers the very point you raise. All LZS systems MEASURE the STOPPING DISTANCE using the encoder input.”

#### A.4 Two hand controls — Safeguarding risk assessment

Current UK regulations do not allow for two handed controls (2HC) to be the sole safeguard on any type of press or pressbrake whether mechanical, hydraulic or pneumatic, with the exceptions of those hydraulic presses conforming to BS EN 693:2001+A2:2011 and as stated in A.4.1.

Note: In response to this situation SAFed TC 7 have produced guidance PPC02, which follows this additional guidance.

The safeguarding should be selected by using the 'Hierarchy of Protective Measures' as per PUWER regulation 11 and following a risk assessment.

##### A.4.1 Two-handed controls are acceptable

- for machine actuation on a guarded machine,
- as a sole safeguard, when the slide/ram closing speed is slower than 10mm per second,
- in a 'hold to run' control situation. (for setting/ micro inching needs only),
- Where a machine is used with a 6mm maximum safe gap.
- For a hydraulic press conforming to BS N 693:2001+A2:2011.

##### A.4.2 Two-handed controls should be configured and operate as follows:

- the two separate hand controls should be positioned and protected to prevent inadvertent operation and to discourage deliberate circumvention,
- it should not be possible to span both controls with one hand only or to operate the controls with one hand and another part of the body,
- the descent of the machine slide should be stopped if either one or both of the controls is released,
- It should only be possible to engage the press clutch when both controls are operated within 0.5 seconds of each other. Further operation should only be possible after both controls have been released and re-operated,
- If one control is released during descent of the press slide, it should only be possible to restart the machine by releasing the second control and then re-operating both controls simultaneously.

## ANNEX A — TECHNICAL INFORMATION

Number: SAFed — PPC02 - 2 Hand Controls (Power Presses)

Prepared by: Power Press Committee (TC7)

Status: Issue 01

Date: 19/10/05

Approved by: TSC

### 8. REFERENCE

The Supply of Machinery (Safety) (Amendment) Regulations 2008 (S.I. 2008/1597), BS EN 574: 1996+A1:2008, BS EN 692: 2005+A1:2009, BS EN 693: 2001+A2:2011, BS EN ISO 13855:2010, BS EN 12622:2009 BS EN ISO 12100:2010.

### 9. SITUATION

BS EN 692: 2005+A1:2009 — Machine tools — Mechanical presses — Safety — Was published allowing the use of two hand controls. UK to propose amendment to standard in line with EN693.

BS EN 693:2001+A2:2011 — Machine tools — Safety — Hydraulic presses — Two hand control allowable provided guarding as per BS EN 693:2001+A2:2011 including additional requirements.

BS EN 12622:2009 — UK to propose amendment to standard in line with EN693.

### 10. INTERPRETATION

With the current UK action on two hand controls, and on-going revisions to current standards, SAFed wishes to draw attention to the fact that where the term 'relevant standard' is used, this applies to EN 692, EN 693 and EN 12622, and this can lead to misinterpretation.

- Initiation of a press stroke, for any mode of operation via a two hand control must satisfy all the relevant standards, including the application of slow speed, hold to run and incremental movement,
- Whilst the relevant standards allows the provision for a two hand control to be the sole safe guard for the operator, this arrangement will provide no protection for third parties and the requirement of regulation 12 of the Supply of Machinery (Safety) Regulations is not satisfied.



## 11. REPORTING

A two hand control device used as the primary safe guard at any press only provides protection for the person who actuates it. Provision for third party protection should be in place, where this is not the case, action should be taken as follows:-

- In the case of Part IV mechanical presses, an immediate defect notice should be issued to the owner of the press and a copy of the report of thorough examination forwarded to the local enforcing authority,
- In the case of all other presses, an immediate defect notice should still be issued to the owner but there is no requirement to forward a copy of the report of inspection to the local enforcing authority.

NOTE: The above references were current at time of writing but readers are advised to check on the latest version of any document referenced in this Annex.

### A.5 Periodic Dismantling of Clutches & Clutch/Brake Units.

The following is given to outline the current guidance and requirements regarding the periodic dismantling of clutches and clutch/brake units, (hereinafter all referred to as 'clutches'). This is in order to achieve a level of consistency in the reports of thorough examination.

This guidance is mainly aimed at the periodic dismantling of clutches on existing presses.

The requirements for the dismantling of clutches on presses that are presented for their first examination remain the same i.e. they will require dismantling or documentary evidence of previous dismantling by another SAFed member or reputable service provider or in the case of some friction clutches (dry or wet) verifiable evidence of maintenance/monitoring checks, see below, before a thorough examination can be completed.

In addition clutches may require dismantling for the examination of enclosed parts after an 'exceptional circumstance' has taken place, as defined in the ACOP to PUWER Part IV Safe use of power presses.

The guidance is from information published by the HSE, SAFed and company internal technical information and whilst not exhaustive covers most commonly met situations.

The requirement to dismantle clutches etc as part of the thorough examination process has been in place for many years but was formalised with the introduction of PM79 and latterly HSG 236 and the following, in part, reiterates this guidance.

#### A.5.1 Positive key clutches.

On a positive key clutch press (now referred to as a full revolution clutch press), the condition of the clutch key, crankshaft & keyway, extractor, key spring, flywheel journal, flywheel bearings and driving bush/insert etc will need to be ascertained. This will necessitate, from time to time, removal or partial removal of the flywheel, to verify that potentially dangerous defects such as hairline cracks, undue wear in keys/keyways and bearings etc are not present.

It is also usual to have the Pitman exposed at the same time for convenience.

The competent person should decide on the frequency at which these parts need to be exposed. However, it is recommended that this should be done at intervals not exceeding 2 years for presses used regularly for single stroke work on 1 shift per day.

The interval may be varied, either to reduce or extend the period, depending upon:

- the number of clutch applications. A machine used for occasional single stroke work or used mainly on automatic stroke work will result in fewer clutch applications, which may extend the time interval before dismantling is required;
- the manufacturer's service information, and in particular the recommendation, where available, as to the intervals between dismantling of the clutch unit;
- the user's maintenance record (the examination may take into account dismantling carried out by another person on behalf of the user, provided this can be confirmed by documentation);
- the condition of enclosed parts at previous dismantling;
- the working environment of the press;
- general condition of the press;
- the standard of maintenance applied to the press.

Power presses permanently fitted with fixed guards or closed tools may be dismantled at the discretion of the competent person having taken account of the condition of the press at the thorough examination and the associated risks.

#### **A.5.2 Friction clutches (Dry and wet types).**

On a friction clutch press (now referred to as a part revolution clutch press), at every thorough examination, after the removal of guards or covers, a close examination should be made of all parts, including an assessment of the function and condition of clutch and brake plates, plate travel, springs and drive teeth as necessary.

If there is excessive noise, debris, oil, undue wear, sluggishness of movement, dragging or other cause for concern, the clutch should be dismantled.

It should also be dismantled if the examination reveals that it is nearing the limit of its adjustment, or an excessive number of adjustments have been made since the last dismantling.

Where dismantled, the condition of drive hubs, drive plates, brake discs, clutch/brake drive pins, piston assemblies, crankshafts, keyways etc will need to be ascertained.

The design of some clutches is complex and may require special tools and procedures to dismantle them. In such cases the manufacturer's instructions should be consulted first.

Some manufacturer's do not recommend the routine dismantling of their clutches as this may shorten the life expectancy and in these cases provided their maintenance procedures have been followed, and clear verifiable documentary evidence of such maintenance including clearances, wear tolerances, oil changes etc are made available and the clutch does not exhibit any causes for concern, then it is not necessary to request dismantling. (Aida and Bruderer, amongst others, do not recommend periodic dismantling and they and Ortlinghaus can perform checks/monitoring on their clutches to ascertain the performance and condition).

It is not necessary that the oil from wet clutches has to be sampled for wear debris at each oil change, however where there is no history of oil changes but no other cause for concern, and other maintenance records produced, then before requesting the clutch be dismantled, it is advisable to have the oil changed and the old oil sampled and then again change the oil after a period, 3-6 months, and sample it once again and compare the readings. This will then assist in deciding if the clutch needs to be dismantled.

Again for presses used regularly for single stroke work on 1 shift per day, the clutch should be dismantled at appropriate intervals depending on the foregoing and:

- the number of clutch applications. A machine used for occasional single stroke work or used mainly on automatic stroke work will result in fewer clutch applications, which may extend the time interval before dismantling is required;
- the manufacturer's service information, and in particular the recommendation, where available, as to the intervals between dismantling of the clutch unit;
- the user's maintenance record (the examination may take into account dismantling carried out by another person on behalf of the user, provided this can be confirmed by suitable and adequate documentation);
- the condition of enclosed parts at previous dismantling;
- the working environment of the press;
- general condition of the press;
- the standard of maintenance applied to the press;
- the type of guarding being used.
- deterioration in stopping time performance, where ESPE/AOPD guards fitted.

There is no prescribed interval for the dismantling of friction clutches/brakes and this is left to the reasoned engineering judgement of the competent person at the time of the thorough examination, taking into account the aforementioned causes for concern, the condition and usage of the press.



### A.5.3 Toggle clutches

Clutches operated by toggle linkages present particular problems due to the nature of the design. Wear in these parts produces a gradual progression towards a condition in which the toggles lock into the drive position. The competent person should ensure that the toggle linkages are visually examined for wear at each thorough examination. The competent person should ensure that upon isolation of the air supply that the toggle clutch unit is positively disengaged and that the brake is positively engaged.

### A.5.4 Hydragrip Clutches

The clutch operating cylinders should be stripped at regular interval to expose the friction pads, thrust plates and seals. It should be ensured that only the specified manufacturers friction pads, thrust plates and seals are fitted and that the friction pads are examined for wear and condition. The fitting of non-manufacturers parts to the clutch cylinder and/or excessive wear to the friction pad has the potential to cause an uncovenanted stroke or a repeat stroke.

### A.5.5 Clutch/Brake Dual Monitoring Valves

It should be ensured that the monitoring function of the Dual Monitoring valve is tested at every Thorough Examination regardless of the type of guarding fitted as the valve forms an essential part of the safety of the press. Where the testing of the valve is not possible due to the location or design of the valve a supplementary test of the valve should be completed and documented within the periodicity of the last Thorough Examination.

### A.5.6 General.

None of the above precludes the competent person from requiring the clutch to be dismantled, where there are justifiable concerns over its condition and therefore continued safe use.

## 12. ANNEX B — DEMONSTRATION OF COMPETENCE

### B.1 Demonstration of competence

It is the responsibility of the owner of a press to ensure that any person carrying out any examination, test or repair is qualified and competent to do so.

Dependant on the exact requirement of the examination, test or repair being carried out will determine the actual level of qualification and competence required.

#### B1.1 The Competent Person

The Competent Person is someone selected to carry out the thorough examination and tests of the power press, its guard(s) or protection device(s). They are usually employed by specialist inspection organizations and need sufficient practical or theoretical knowledge and experience to detect defects or weaknesses and decide how far these will affect the safe operation of the press. It is also important that they are sufficiently independent and impartial to be able to make an objective assessment of the press.

When selecting a competent person it is necessary to check that they understand what is meant by a thorough examination and what the law requires.

Accreditation by the United Kingdom Accreditation Service (UKAS) to the relevant standard (BS EN ISO/IEC 17020: 2004, which replaces BS EN 45004:1995), is an indication of the level of competence of an inspection body, see HSG 236.

Note: UKAS accreditation is acknowledged by the HSE as one method of demonstrating competence. Engineer Surveyors of such SAFed member companies are deemed to be competent for the purpose of examining power presses.

#### B.1.2 Client In-house electrician/Electrical contractor

Where the owner of the press uses the services of an in-house electrician or external contractor to carry out electrical work or testing, they should ensure that the person who carries out the work and testing has the appropriate qualifications, knowledge and competence. Such competence may be demonstrated by the person holding a nationally recognised electrical qualification; or

- Being employed by a National Inspection Council for Electrical Installation Contracting (NICEIC) or Electrical Contractors Association (ECA) registered company.
- Being employed by a body holding United Kingdom Accreditation Service (UKAS) accreditation to BS EN ISO/IEC 17020: 2004 for the scope of in-service inspection of low voltage electrical installations (See also UKAS RG 105).

### **B.1.3 In house Mechanical Engineer/Mechanical Contractor**

Where the owner of the press uses the services of an in-house mechanical engineer or mechanical contractor, they should ensure that the person who carries out the work has the appropriate knowledge and competence. Such competence may be demonstrated by a person holding a nationally recognised mechanical qualification.

### **B.1.4 In house NDT practitioner / NDT contractor**

Where the owner of the press uses the services of an in-house practitioner or contractor to carry out NDT, they should ensure that the person who carries out the work has the appropriate qualifications, knowledge and competence. Such competence would normally be demonstrated by a person holding a valid ASNT/PCN qualification that can be verified by the British Institute of Non-Destructive Testing (BINDT).

Note: Comprehensive guidance on requirements for NDT personnel, qualifications and certification, can be found in BS EN 473: 2008.

### **B.1.5 Manufacturer**

A person from a manufacturer undertaking maintenance on their own propriety products should be considered to have the appropriate competence. Manufacturer's personnel carrying out NDT work need to satisfy B.1.4 above.



### 13. ANNEX C – DOCUMENTATION

In general, SAFed members will only accept documentation that meets the requirements of SAFed Guidance CAC01 and CAC02.

Note: CAC01 and CAC02 both reference BS EN 45000 which has been Superseded/Withdrawn and replaced by BS EN ISO/IEC 17020:2004.

#### C.1 Electrical supplementary testing

- Should be reported on a Minor works certificate, or similar – See Annex D,
- Up-to date circuit diagrams.

#### C.2 Mechanical supplementary testing

In general, SAFed members will only accept documentation that meets the requirements of SAFed Guidance CAC01 and CAC02.

## SAFed GUIDANCE

Number: CAC01

Prepared by: CONFORMITY ASSESSMENT COMMITTEE

Status: Issue 01 Date: 20/03/01

Reference: In-service inspection procedures – Acceptance of documentation from third parties

## SITUATION

In certain circumstances clients or their sub-contractors may supply information to Inspection Bodies to take into consideration when performing a thorough examination. When such information is utilised as part of the determination of conformity, it will be necessary to demonstrate the measures taken to verify the integrity of such information.

The following guidance has been produced to assist Members in this process. Where the guidance calls for verification, vetting, or auditing of the third party\*, the Competent Person should, in the first instance, ascertain whether their client has completed those activities using appropriately qualified personnel and if so what the results of those activities are. In circumstances where the client has either:

- Not had the appropriate verification activities undertaken, or
- Is unable to provide adequate proof that the appropriate verification activities have been undertaken satisfactorily then the Competent Person should, if they still wish to use the information provided by the third party, arrange for the appropriate verification activity to be undertaken.

## GUIDANCE

- Information supplied by manufacturers\*\* with respect to their work activities on equipment/components manufactured by them will normally be acceptable without further investigation,
- Documentary information relating to inspection or testing will normally be acceptable if it can be verified that the third party has accreditation to the appropriate BS EN45000 or ISO/IEC 17000 series standard where the type of work carried out is within the scope of accreditation,
- Documentary information relating to inspection or testing will normally be acceptable if the third party has been satisfactorily assessed to confirm that it meets with the criteria stipulated in the relevant standard of the ISO/IEC 17000 series (formally BS EN 45000),
- Documentation will normally be acceptable if it can be verified that the third party has appropriate Quality Assurance certification (e.g. BS EN ISO 9001/9002) awarded by an accredited certification body and/or where applicable:

- A. The appropriate experience, qualifications and training of person(s) undertaking a particular activity for which the documentation has been provided have been verified, and
- B. The third party work procedures/instructions have been vetted, and
- C. The tests/examinations performed by the operator(s) of the third party have been audited, and
- D. There is evidence of use of properly maintained and calibrated equipment

Whenever a Competent Person employed by an accredited Inspection Body has witnessed the documented activity of the third party then that documentation can be accepted without further investigation.

The competent person should be prepared to advise clients in advance of any work activity being undertaken of what constitutes suitable and appropriate steps to be taken by the client to help ensure that information supplied by the third party undertaking that activity will be acceptable for use as part of the thorough examination. (Refer to SAFed Guidance CAC02).

\*In this context third party means a party not sub-contracted by the Inspection Body.

\*\*Includes manufacturers registered agents.



## SAFed GUIDANCE

Number: CAC02

Prepared by: CONFORMITY ASSESSMENT COMMITTEE

Status: Issue 01 Date: 20/03/01

Reference: In-service inspection procedures – Acceptance of documentation from third parties – Information to clients

## SITUATION

In undertaking a thorough examination of your plant, Engineer Surveyors occasionally need additional information or supporting material to complete the thorough examination. This could be manufacturer's paperwork relating to the equipment itself, or it could be information from a third party (such as sub contractors). Such information or supporting material could relate to previous or on-going maintenance or alterations made to plant or equipment. Any information or documentation provided must be of an acceptable standard or integrity relating to activities undertaken by an appropriately qualified or approved company or individual. This is because the Engineer Surveyor takes the responsibility for everything which is included in the report of thorough examination. If it is of unacceptable standard or integrity, the Engineer Surveyor may not be able to accept it and therefore may not be able to complete the thorough examination.

The following guidance has been established as a common acceptable standard across engineering inspection bodies by SAFed, the leading trade body for the industry. The guidance is in line with appropriate best practices and it is highly likely that they are already in operation both within your own organisation or within your sub-contractors.

## GUIDANCE

The following guidance provides an outline of the basic requirements to be taken into consideration and applies when third party services are used. It applies not only to third party paperwork, but may also involve the organisation or individual that has supplied it, or has undertaken the activity which it documents. The guidance is the equivalent of best practice, and should not be onerous for any organisation or individual that provides a professional service.

### Your Responsibility

Clients must ensure that one of the following criteria is met with respect to information supplied or to any organisation/individual supplying such information or services that may form part of a thorough examination undertaken on your behalf by an Engineer Surveyor:

- (i) Documentation has been provided by the Manufacturer or their appointed agent (e.g. the repair of an item of plant which may include both parts and site work),
- (ii) Documentation has been provided by an organisation accredited to the appropriate BS EN45000 or ISO/IEC 17000 series standard (e.g. testing undertaken by a body accredited to BS EN45001 or ISO/IEC 17025),

(iii) Where an activity which the Engineer Surveyor must take into account is undertaken by an organisation/individual not holding the appropriate qualifications, then that activity has been assessed by appropriately qualified personnel to ensure it meets with criteria as stipulated in the relevant standard of the BS EN45000 or ISO/IEC 17000 series,

(iv) Documentation has been provided by an organisation that has appropriate Quality Assurance certification (e.g. BS EN ISO 9001/9002) awarded by an accredited certification body,

And/or as appropriate

i. documentation relating to work undertaken by individual(s) has been verified by a suitably qualified person as having the appropriate experience, qualifications, and training.

ii. work where the appropriate procedures/instructions have been vetted by an appropriately qualified person.

iii. tests/examinations have been undertaken by an operator who has been appropriately audited by a properly qualified person.

iv. evidence is supplied that the equipment used in the process has been properly maintained and calibrated.

v. The particular activity relating to the thorough examination was witnessed and deemed acceptable by the competent person.

Further advice may be obtained from the Engineer Surveyor or from the organisation responsible for undertaking your thorough examinations.

**14. ANNEX D — POWER PRESS ELECTRICAL TEST CERTIFICATE**

**Electrical safety requirements in accordance with HSG236**

| Description of Power Press  |                          |           |            |
|---|--------------------------|-----------|------------|
| Make/model:   |                          |           |            |
| Serial No.  |                          | Owners No |            |
| Location/address:   |                          |           |            |
| Date of test:   |                          |           |            |
| Installation Details  |                          |           |            |
| Method of Supply: (swa, conduit, etc.)  |                          |           |            |
| Main Protective device of power press:  | Type BS:                 | Rating:   | A          |
| Earth fault loop impedance Zs at control panel:   |                          |           | Ω          |
| Declaration   |                          |           |            |
| I certify that the following circuits have been inspected and tested in accordance with the requirements of HSG236 and to the best of my knowledge/belief, at the time of the inspection, were found to be: | Satisfactory             |           |            |
|   | Yes                      | No        | Not tested |
|   |                          |           |            |
| Power Circuits  |                          |           |            |
| Control Circuits  |                          |           |            |
| Failed items requiring attention are detailed in the defects section on page 3.   |                          |           |            |
| Name:   | Signature:               |           |            |
|   |                          |           |            |
| For and on behalf of:   | Qualification/ Position: |           |            |
|   |                          |           |            |
| Address:  |                          |           |            |
|   | Date of previous test:   |           |            |
|   | Date:                    |           |            |



| Power Supply — Visual Examination                        |       |           | Satisfactory?        |    |     |
|--|-------|-----------|----------------------|----|-----|
|  |       |           | Yes                  | No | N/A |
| Switchgear   |       |           |                      |    |     |
| Overcurrent protective devices                           |       |           |                      |    |     |
| Enclosures   |       |           |                      |    |     |
| Cables, glands & conduits                                |       |           |                      |    |     |
| Control System   |       |           |                      |    |     |
| Evidence of modifications from original/since last test: |       |           |                      |    |     |
|  |       |           |                      |    |     |
| <b>Comments:</b>   |       |           |                      |    |     |
|  |       |           |                      |    |     |
| Control System — Visual Examination                      |       |           | Satisfactory?        |    |     |
|  |       |           | Yes                  | No | N/A |
| Control circuit drawings — available and up to date      |       |           |                      |    |     |
| Control transformer & earthing arrangements              |       |           |                      |    |     |
| Overcurrent protective devices                           |       |           |                      |    |     |
| Overload protective devices for motors                   |       |           |                      |    |     |
| Abnormal temperature protection                          |       |           |                      |    |     |
| Phase failure/reversal protection                        |       |           |                      |    |     |
| Overspeed protection                                     |       |           |                      |    |     |
| Earth fault/residual current protection                  |       |           |                      |    |     |
| Control functions including failure protection           |       |           |                      |    |     |
| Protection interlocks, cables, glands & conduits         |       |           |                      |    |     |
| Operator control functions as appropriate                |       |           |                      |    |     |
| Test Equipment   |       |           |                      |    |     |
| Make   | Model | Serial No | Last date calibrated |    |     |
|  |       |           |                      |    |     |

| <b>Schedule of Tests</b>                        |  |            |                     |              |
|---|--|------------|---------------------|--------------|
|   | Power Circuits   |            | Control Circuits    |              |
|   | Satisfactory<br>Y/N  | Value      | Satisfactory<br>Y/N | Value        |
| Earth continuity to all metallic parts:         |  | $\Omega$   |                     | $\Omega$     |
| Continuity of safety circuit(s)                 |  |            |                     |              |
| Emergency stop circuit(s)                       |  |            |                     | $\Omega$     |
| Guard circuit(s)                                |  |            |                     | $\Omega$     |
| Run circuit                                     |  |            |                     | $\Omega$     |
| Insulation resistance:                          | * Not to be carried out if electronic components cannot be disconnected or bypassed. |            |                     |              |
| Phase/phase                                     |  | M $\Omega$ |                     |              |
| Phase/neutral                                   |  | M $\Omega$ |                     |              |
| Phase/earth                                     |  | M $\Omega$ |                     |              |
| Neutral/earth                                   |  | M $\Omega$ |                     |              |
| Emergency stop circuit(s)                       |  |            |                     | M $\Omega$ * |
| Guard circuit(s)                                |  |            |                     | M $\Omega$ * |
| Run circuit                                     |  |            |                     | M $\Omega$ * |
| Polarity:                                       |  | N/A        | N/A                 | N/A          |
| RCD operation (if applicable):                  |  |            |                     |              |
| Rated residual operating current $I_{\Delta n}$ |  | mA         |                     |              |
| Failed to trip at $1/2 \times I_{\Delta n}$     |  |            |                     |              |
| Operating time at $1 \times I_{\Delta n}$       |  | mS         |                     |              |
| <b>Defects Requiring Attention</b>              |  |            |                     |              |

**15. ANNEX E — PUWER 98 Part IV — Schedule 2****PUWER 98 Part IV — Schedule 2**

Power presses to which regulations 32 to 35 do not apply

Regulation 31

1. A power press for the working of hot metal.
2. A power press not capable of a stroke greater than 6mm.
3. A guillotine.
4. A combination punching & shearing machine, turret punch press or similar machine for punching, shearing or cropping.
5. A machine, other than a press brake, for bending metal steel sections.
6. A straightening machine.
7. An upsetting machine. (Wheel rim resize machine)
8. A heading machine. (Mechanical fastener machine)
9. A riveting machine.
10. An eyeletting machine.
11. A press-stud attaching machine
12. A zip fastener bottom stop attaching machine.
13. A stapling machine.
14. A wire stitching machine.
15. A power press for compacting of metal powders