



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 16092-4:2018**  
**01-november-2018**

---

**Varnost obdelovalnih strojev - Stiskalnice - 4. del: Varnostne zahteve za pnevmatske stiskalnice (ISO/DIS 16092-4:2018)**

Machine tools safety - Presses - Part 4: Safety requirements for pneumatic presses (ISO/DIS 16092-4:2018)

Werkzeugmaschinen Sicherheit - Pressen - Teil 4: Pneumatische Pressen (ISO/DIS 16092-4:2018)

Sécurité des machines outils - Presses - Partie 4: Exigences de sécurité pour les presses pneumatiques (ISO/DIS 16092-4:2018)

**Ta slovenski standard je istoveten z: prEN ISO 16092-4**

---

**ICS:**

25.120.10	Kovaški stroji. Stiskalnice. Škarje	Forging equipment. Presses. Shears
-----------	--	---------------------------------------

**oSIST prEN ISO 16092-4:2018**

**en,fr,de**



# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 16092-4

ISO/TC 39/SC 10

Secretariat: SNV

Voting begins on:  
2018-08-28Voting terminates on:  
2018-11-20

---

---

## Machine tools — Safety for presses —

### Part 4: Pneumatic presses

*Machines-outils — Sécurité des presses —**Partie 4: Presses pneumatiques*

ICS: 25.080.01

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

[SIST EN ISO 16092-4:2021](https://standards.iteh.ai/catalog/standards/sist/4ad19c7c-2554-4d8b-8f8a-7e867c72ba71/sist-en-iso-16092-4-2021)

<https://standards.iteh.ai/catalog/standards/sist/4ad19c7c-2554-4d8b-8f8a-7e867c72ba71/sist-en-iso-16092-4-2021>

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

This document is circulated as received from the committee secretariat.

**ISO/CEN PARALLEL PROCESSING**



Reference number  
ISO/DIS 16092-4:2018(E)

© ISO 2018

# iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN ISO 16092-4:2021

<https://standards.iteh.ai/catalog/standards/sist/4ad19c7c-2554-4d8b-8f8a-7e867c72ba71/sist-en-iso-16092-4-2021>



## **COPYRIGHT PROTECTED DOCUMENT**

© ISO 2018

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

<b>Contents</b>	<b>Page</b>
<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 List of significant hazards</b> .....	<b>2</b>
<b>5 Safety requirements and/or measures</b> .....	<b>2</b>
<b>5.1 General</b> .....	<b>2</b>
<b>5.2 Basic design considerations</b> .....	<b>2</b>
<b>5.3 Mechanical hazards in the tools area</b> .....	<b>2</b>
<b>5.4 Control and monitoring system</b> .....	<b>4</b>
<b>5.5 Tool-setting, trial strokes, maintenance and lubrication</b> .....	<b>26</b>
<b>5.6 Mechanical hazards-other</b> .....	<b>26</b>
<b>5.7 Slips, trips and falls</b> .....	<b>26</b>
<b>5.8 Protection against other hazards</b> .....	<b>26</b>
<b>6 Verification of the safety requirements and/or measures</b> .....	<b>26</b>
<b>7 Information for use</b> .....	<b>28</b>
<b>7.1 General</b> .....	<b>28</b>
<b>7.2 Marking</b> .....	<b>28</b>
<b>7.4 Instruction handbook</b> .....	<b>28</b>
<b>Annex A (informative) Significant hazards, hazardous situations and protective measures</b> .....	<b>30</b>
<b>Annex B (normative) Calculation of minimum distances</b> .....	<b>31</b>
<b>Annex C (informative) Examples and principles of pneumatic press and power interlocking</b> .....	<b>32</b>
<b>Annex ZA (informative) Relationship between this European Standard and the essential requirements of EU Directive 2006/42/EC aimed to be covered</b> .....	<b>36</b>
<b>Bibliography</b> .....	<b>37</b>

## ISO/DIS 16092-4:2018(E)

### Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

The committee responsible for this document is ISO/TC 39, Machine tools, Subcommittee SC 10, *Safety*.

**A list of all parts in the ISO 16092 series can be found on the ISO website.**

## Introduction

This document is a “Type C” standard as stated in [ISO 12100](#).

It is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance etc.)

Others can be affected by the level of machinery safety achieved by the above-mentioned stakeholder groups by means of this document :

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.”

This document is intended to be applied in addition to [ISO 16092-1](#)

<https://standards.iteh.ai/catalog/standards/sist/4ad19c7c-2554-4d8b-8f8a-7e867c72ba71/sist-en-iso-16092-4-2021>





# Machine tools safety — Presses — Part 4: Safety requirements for pneumatic presses

## 1 Scope

This document, in addition to ISO 16092-1, specifies the technical safety requirements and measures to be adopted by persons undertaking the design, manufacture and supply of pneumatic presses which are intended to work cold metal or material partly of cold metal.

This document deals with all significant hazards relevant for pneumatic presses, when they are used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4). All the phases of the lifetime of the machinery as described in ISO 12100:2010, 5.4. have been taken into consideration.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13849-1:2015, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 16092-1:2017 *Machine tools safety — Presses — Part 1: General safety requirements*

ISO 4413:2010: *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 13851:2002 *Safety of machinery — Two-hand control devices — Functional aspects and design principles*

ISO 14119: 2013 *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100:2010, ISO 13849-1:2015, ISO 16092-1:2017 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <http://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

## ISO/DIS 16092-4:2018(E)

### 3.1

#### restraint valve

device which protects against a gravity fall of the slide/ram

### 3.2

#### closing time

time from the initiation of signal to start the movement TDC to BDC

## 4 List of significant hazards

This clause contains all the significant hazards, hazardous situations and events identified by risk assessment as significant for the machines defined in the scope and which require a specific action to eliminate or reduce the risk.

These hazards are listed in ISO 16092-1:2017, Annex A. Additional hazards are listed in Annex A Table A.1.

## 5 Safety requirements and/or measures

### 5.1 General

Pneumatic presses shall comply with the safety requirements and/or protective/risk reduction measures of this clause. In addition, the machine shall be designed according to the principles of ISO 12100 for relevant but not significant hazards which are not dealt with by this document.

### 5.2 Basic design considerations

#### 5.2.1 Hydraulic and pneumatic systems — Common features

ISO 16092-1: 2017, 5.2.1 shall apply.

#### 5.2.2 Pneumatic systems

ISO 16092 1: 2017, 5.2.2 shall apply.

#### 5.2.3 Hydraulic systems

In addition to requirements given in ISO 16092-1:5.2.3, the following shall apply-

5.2.3.1 Where a pneumatic press is fitted with a pneumatic/hydraulic intensifier, the general requirements in ISO 4413 shall be followed in designing the hydraulic system.

#### 5.2.4 Electric systems

ISO 16092 1: 2017, 5.2.4 shall apply.

### 5.3 Mechanical hazards in the tools area

#### 5.3.1 Major danger zone

ISO 16092-1: 2017, 5.3.1 shall apply.

#### 5.3.2 Safeguarding measures

ISO 16092-1: 2017, 5.3.2 shall apply

### 5.3.3 Other safety requirements

ISO 16092-1: 2017, 5.3.3 shall apply.

### 5.3.4 Release of trapped persons between the tools

ISO 16092-1: 2017, 5.3.4 shall apply.

### 5.3.5 Release of persons trapped inside enclosed areas

ISO 16092-1:2017, 5.3.5 shall apply.

### 5.3.6 Prevention of gravity fall during maintenance or repair

In addition to requirements given in ISO 16092-1: 2017, 5.3.6, the following shall apply.

On presses with an opening stroke length of more than 500 mm and a depth of table of more than 800 mm a mechanical restraint device shall be permanently fixed and integrated with the press. It can be manually operated.

If an integrated device, when active, cannot be easily seen from the operator's position, an additional clear indication of the position of the device shall be provided.

### 5.3.7 Prevention of unintended gravity fall during production (down-stroking press)

**5.3.7.1** Measures shall be provided to prevent unintended gravity fall of the slide/ram in the production mode with manual or automatic feed or removal (see Tables 1 and 2). Such a fall can be due to a failure of the pneumatic system, mechanical failure or a failure of the electrical control system.

In this case,

- a mechanical restraint device, or
- a pneumatic restraint device, as defined in 5.3.7.2, or
- a combination of the two

shall be provided.

The restraint devices shall operate automatically and shall be effective whenever the tool is stopped and operator access to the tools is possible.

**5.3.7.2** The restraint device shall consist of one or more of the following measures, provided that they are capable of holding up the slide/ram:

- a) return spring;
- b) clamping device;
- c) one, or if necessary, for flow consideration, two restraint valves fitted to the cylinder outlet. (See Tables 1 and 2)

NOTE 1 See also ISO 16092-1:\_, 5.4.1.3 and 5.4.1.4 for the control system requirements to prevent unintended strokes.

## ISO/DIS 16092-4:2018(E)

### 5.4 Control and monitoring system

#### 5.4.1 Control and monitoring functions

In addition to requirements given in ISO 16092-1: 2017, 5.4.1, the following control and monitoring functions shall apply.

**5.4.1.1** For presses pneumatically controlled (see Figures C.4 and C.5) with a stroke length equal or less than 30 mm, and a maximum press force equal or less than 1000 N, minimum distance shall be calculated with an overall response time  $t$ , where  $t = 3 \times$  maximum overall closing time (see also annex B)

NOTE The factor 3 is intended to compensate the type of two hand control device selected.

This sub-clause applies to presses fitted with protective devices of the following type:

- two hand control devices used for normal operation. They shall at least correspond to type IIIB of ISO 13851;
- interlocking guards (see ISO 16092-1: 2017, 5.4.1), and control guards.

It shall not be possible for the overall closing time to be exceeded by any adjustment.

**5.4.1.2** Power interlocking as defined in ISO 14119:2013, 3.31 may be provided for presses fitted with interlocking guards. The guard interlocking device shall be positively linked with the valve to control directly the flow of fluid to and from the cylinder (see Annex C, Figures C.1, C.2 and C.3).

#### 5.4.2 Muting

In addition to requirements given in ISO 16092-1: 2017, 5.4.2, the following shall apply.

The means for setting the point at which the safeguarding system is muted during the closing stroke shall be:

- a position signal, and
- a pressure signal or suitable alternative signals which will actuate when the tools are closed and the machine begins to apply the force.

#### 5.4.3 Selection devices

ISO 16092-1: 2017, 5.4.3 shall apply.

#### 5.4.4 Position sensors

ISO 16092-1: 2017, 5.4.4 shall apply.

#### 5.4.5 Control devices

ISO 16092-1: 2017, 5.4.5 shall apply.

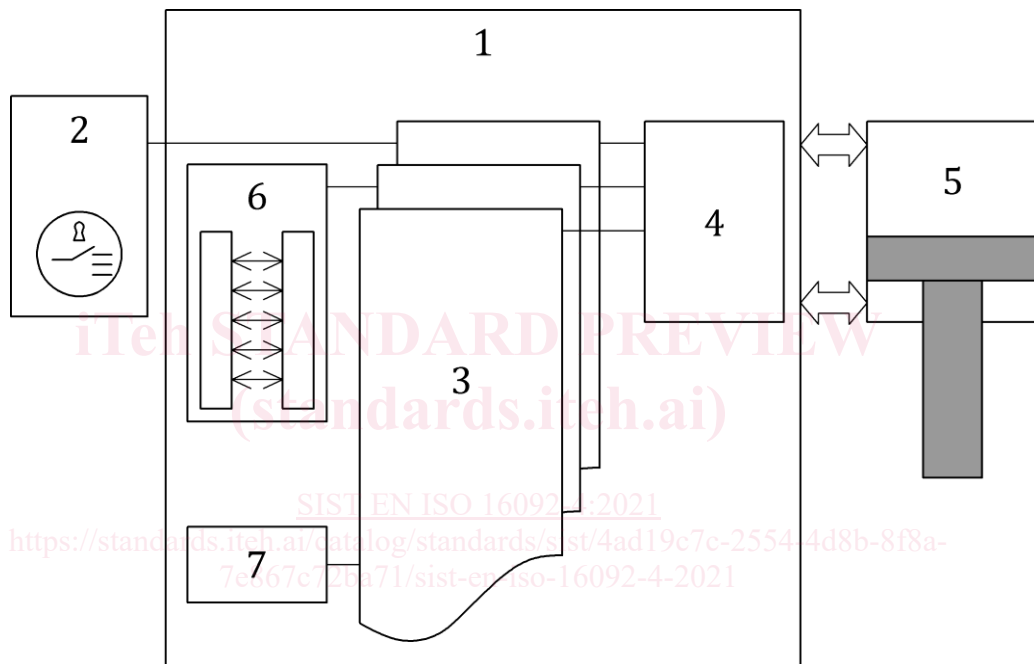
### 5.4.6 Valves

Manual override devices shall not be directly fitted to restraint valves. If manual override devices are incorporated into other valves for test or maintenance purposes, they shall require the use of a tool to operate the override.

This override shall be of the non-locking type.

### 5.4.7 Performance level of safety functions

Safety functions of pneumatic press shall meet the requirements stated in the Tables 1 and 2. Figure 1 shows an example of all relevant parts of control system of pneumatic press with a safety function to stop down stroke of the slide by ESPE using AOPD.



#### Key

- 1 Overall SRP/CS of a safety function "Stop slide down stroke by ESPE using AOPD"
- 2 Selector switch – Modes of operation and mode of safeguarding
- 3 "Logic": control parts (Plausibility check of selection, Logic of AOPD, Logic of muting...)
- 4 Output: pneumatic safety related part
- 5 Pneumatic actuator
- 6 "Input": ESPE using AOPD
- 7 "Input": muting sensors, muting the ESPE during non-hazardous opening stroke

**Figure 1 — Example of a safety function with all relevant safety related parts**

The performance levels in Tables 1 and 2 are the minimum required performance levels and already take the probability of occurrence into account.