

MÄRGMEETODIT KASUTAVATE LAUSRIIDEMASINATE  
OHUTUSNÕUDED

Safety requirements for wetlaid-nonwoven machinery  
(ISO 22291:2022)

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 22291:2022 sisaldab Euroopa standardi EN ISO 22291:2022 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 22291:2022 consists of the English text of the European standard EN ISO 22291:2022.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 16.03.2022.	Date of Availability of the European standard is 16.03.2022.
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EUROPEAN STANDARD

EN ISO 22291

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English Version

## Safety requirements for wetlaid-nonwoven machinery (ISO 22291:2022)

Exigences de sécurité pour les machines de production  
de non tissé par voie humide (ISO 22291:2022)

Sicherheitsanforderungen an Nassvliesmaschinen (ISO  
22291:2022)

This European Standard was approved by CEN on 30 December 2021.

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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

## European foreword

This document (EN ISO 22291:2022) has been prepared by Technical Committee ISO/TC 72 "Textile machinery and accessories" in collaboration with Technical Committee CEN/TC 214 "Textile machinery and accessories" the secretariat of which is held by SNV.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2022, and conflicting national standards shall be withdrawn at the latest by September 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For the relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

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## Endorsement notice

The text of ISO 22291:2022 has been approved by CEN as EN ISO 22291:2022 without any modification.

# Contents

Page

Foreword.....	vi
Introduction.....	vii
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>1</b>
<b>3 Terms and definitions.....</b>	<b>4</b>
<b>4 List of significant hazards.....</b>	<b>5</b>
<b>5 General safety requirements and/or protective/risk reduction measures.....</b>	<b>7</b>
5.1 General.....	7
5.2 Safety requirements for the different “phases of life” of wetlaid-nonwoven machines.....	7
5.3 Safety requirements for design/risk minimization.....	7
5.4 Safety requirements for fitting of parts.....	9
5.5 Workplaces, means of access, walkways, passageways/access to elevated operating positions and servicing points.....	9
5.6 Measures for the escape and rescue of trapped persons.....	11
5.7 Start-up warning device.....	11
5.8 Emergency stop device and braking system.....	12
5.9 Isolation and energy dissipation, prevention of unexpected start-up.....	13
5.10 Electric drive system and power transmission elements.....	14
5.11 Specific safety requirements for starting and stopping.....	14
5.12 Control system and actuators.....	16
5.13 Electrical equipment.....	17
5.14 Hydraulic equipment.....	18
5.15 Pneumatic equipment.....	18
5.16 Special operation.....	18
5.16.1 General.....	18
5.16.2 Specific safety requirements.....	18
5.17 Mobile machines, handling devices, operational parts.....	20
5.17.1 General.....	20
5.17.2 Specific hazards.....	20
5.17.3 Specific risks.....	20
5.17.4 Specific safety requirements.....	20
5.18 Floor-mounted and overhead rails (tracks).....	21
5.18.1 General.....	21
5.18.2 Specific hazard.....	21
5.18.3 Specific risk.....	21
5.18.4 Specific safety requirements.....	21
5.19 Equipment and measures for cleaning and removal of broke.....	21
5.19.1 General.....	21
5.19.2 Crosswalks.....	24
5.20 Noise.....	24
5.20.1 General.....	24
5.20.2 Risk.....	24
5.20.3 Safety requirements.....	24
5.21 Hot surfaces.....	25
5.21.1 General.....	25
5.21.2 Risk.....	25
5.21.3 Safety requirement.....	25
5.22 Static electricity.....	26
5.22.1 Hazard.....	26
5.22.2 Safety requirement.....	26
5.23 Machine integrated lighting.....	26

5.24	Ergonomic principles.....	26
	5.24.1 Hazard.....	26
	5.24.2 Safety requirement.....	26
5.25	Materials and chemical substances, hazardous substances.....	27
5.26	Laser.....	27
5.27	Radiation.....	27
5.28	Fire.....	27
	5.28.1 Hazard.....	27
	5.28.2 Risk.....	27
	5.28.3 Safety requirements.....	28
5.29	Machine elements and their combinations.....	28
	5.29.1 Power transmission enclosures.....	28
	5.29.2 Particularly dangerous machine elements.....	28
	5.29.3 Machine elements which normally do not require safeguarding.....	29
5.30	Rolls and rotating shafts.....	30
	5.30.1 Rolls.....	30
	5.30.2 Rotating shafts.....	36
5.31	Doors and lids.....	36
	5.31.1 Hazards.....	36
	5.31.2 Risks.....	37
	5.31.3 Safety requirements.....	37
5.32	Entry into machines or items of installation.....	37
	5.32.1 Hazards.....	37
	5.32.2 Risks.....	37
	5.32.3 Safety requirements.....	37
5.33	Cutting units.....	37
	5.33.1 Hazards.....	37
	5.33.2 Risks.....	37
	5.33.3 Safety requirements.....	38
5.34	Machine specific tools.....	39
5.35	Whole body access to confined spaces.....	39
5.36	Tail and web threading equipment.....	39
	5.36.1 Manual web threading.....	39
	5.36.2 Automatic web threading equipment.....	40
5.37	Felts and wires, clothing, fabrics.....	40
<b>6</b>	<b>Specific safety requirements and/or protective/risk reduction measures.....</b>	<b>40</b>
6.1	Headbox.....	40
	6.1.1 Specific hazards.....	40
	6.1.2 Specific risks.....	40
	6.1.3 Specific safety requirements:.....	41
6.2	Wire section and jet head.....	41
	6.2.1 Specific hazards.....	41
	6.2.2 Specific risks.....	41
	6.2.3 Specific safety requirements.....	41
6.3	Hydroentangling unit.....	42
	6.3.1 Specific hazards.....	42
	6.3.2 Specific risks.....	42
	6.3.3 Specific safety requirements.....	42
6.4	Through-air dryer.....	42
	6.4.1 Specific hazards and risks.....	42
	6.4.2 Specific safety requirements.....	42
6.5	Quality control system (QCS).....	42
	6.5.1 Specific hazards.....	42
	6.5.2 Specific risks.....	43
	6.5.3 Specific safety requirements.....	43
6.6	Winder.....	43
	6.6.1 Specific hazards.....	43
	6.6.2 Specific risks.....	43

6.6.3	Specific safety requirements.....	43
<b>7</b>	<b>Verification of conformity with the safety requirements and/or protective/risk reduction measures.....</b>	<b>44</b>
<b>8</b>	<b>Information for use.....</b>	<b>44</b>
8.1	General.....	44
8.2	Instructions handbook.....	44
8.3	Marking.....	46
<b>Annex A</b>	<b>(normative) AOPD, fence guard, protective devices, tolerable pressure and force by the operator.....</b>	<b>47</b>
<b>Annex B</b>	<b>(normative) Verification of specific subsections of this document.....</b>	<b>48</b>
<b>Annex C</b>	<b>(informative) Wetlaid-nonwoven machinery.....</b>	<b>49</b>
<b>Annex D</b>	<b>(informative) Example of noise emission declaration for wetlaid-nonwoven machinery.....</b>	<b>53</b>
<b>Bibliography</b>	.....	<b>54</b>

## 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 of 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 [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 72, *Textile machinery and accessories*, Subcommittee SC 8, *Safety requirements for textile machinery*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 214, *Textile machinery and accessories*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).



## Introduction

This document was prepared simultaneously by ISO/TC 72 and CEN/TC 214, and adopted under the Vienna Agreement in order to obtain identical standards on technical safety requirements for the design and construction of wetlaid-nonwoven machinery.

This document is a type-C standard as stated in ISO 12100.

This document 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);
- machine designers;
- systems integrators;
- health and safety bodies (regulators, accident prevention organisations, market surveillance, etc.).

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

- 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.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope 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.

For machines or machine equipment not dealt with in this document, the designer performs a risk assessment according to ISO 12100 and provides means for reducing the risk from significant hazards. These risk reduction measures that need to be identified by the designer/manufacturer of the machinery by risk assessment are outside the scope of this document.

This document contains a summary of general safety requirements and/or protective/risk reduction measures for frequently occurring hazards of wetlaid-nonwoven machinery (see [Clause 5](#)) which apply whenever referred to in this document.

Specific hazards and corresponding specific safety requirements and/or protective/risk reduction measures for certain machine elements (e.g. winders) and their combination of wetlaid-nonwoven machines are also described (see [Clause 6](#)).

# Safety requirements for wetlaid-nonwoven machinery

## 1 Scope

This document specifies safety requirements and means of verification for wetlaid-nonwoven machinery.

This document applies to wetlaid-nonwoven machines, including approach flow system, headbox, wire section and jet head, hydroentangling unit, dryer, finishing, quality control system (QCS), winder, drives and control system. [Annex C](#) illustrates general wetlaid-nonwoven machinery and their components.

It deals with all significant hazards, hazardous situations and hazard events relevant to wetlaid-nonwoven machines, when used as intended and under the conditions foreseeable by the manufacturer.

This document does not deal with pressure hazards in steam-heated drying cylinders and does not apply to equipment under pressure.

This document does not apply to machines which are intended for use in explosive atmospheres.

This document does not apply to wetlaid-nonwoven machines which have been manufactured before the date of publication of this document.

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

ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components*

ISO 9902-1:2001, *Textile machinery — Noise test code — Part 1: Common requirements*

ISO 9902-3:2001, *Textile machinery — Noise test code — Part 3: Nonwoven machinery*

ISO 10218-1:2011, *Robots and robotic devices — Safety requirements for industrial robots — Part 1: Robots*

ISO 11111-3:2005/Amd.2:2016, *Textile machinery — Safety requirements — Part 3: Nonwoven machinery — Amendment 2*

ISO 11111-7:2005, *Textile machinery — Safety requirements — Part 7: Dyeing and finishing machinery*

ISO 11161:2007, *Safety of machinery — Integrated manufacturing systems — Basic requirements*

ISO/TR 11688-1:1995, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning*

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

ISO 13732-1:2006, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces*

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

ISO 13849-2:2012, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation*

ISO 13850:2015, *Safety of machinery — Emergency stop function — Principles for design*

ISO 13851:2019, *Safety of machinery — Two-hand control devices — Principles for design and selection*

ISO 13855:2010, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body*

ISO 13856-1:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 1: General principles for design and testing of pressure-sensitive mats and pressure-sensitive floors*

ISO 13856-2:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars*

ISO 13856-3:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 3: General principles for design and testing of pressure-sensitive bumpers, plates, wires and similar devices*

ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 14118:2017, *Safety of machinery — Prevention of unexpected start-up*

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

ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

ISO 14122-3:2016, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails*

ISO 14122-4:2016, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders*

ISO 14123-1:2015, *Safety of machinery — Reduction of risks to health resulting from hazardous substances emitted by machinery — Part 1: Principles and specifications for machinery manufacturers*

ISO 19353:2019, *Safety of machinery — Fire prevention and fire protection*

IEC 60204-1:2016, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60204-11:2018, *Safety of machinery — Electrical equipment of machines — Part 11: Requirements for HV equipment for voltages above 1 000 V a.c. or 1 500 V d.c. and not exceeding 36 kV*

IEC 60447:2004, *Basic and safety principles for man-machine interface, marking and identification — Actuating principles*

IEC 60825-1:2014, *Safety of laser products — Part 1: Equipment classification and requirements*

IEC 61000-6-2:2016, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity standard for industrial environments*

IEC 61310-1:2007, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals*

IEC 61496-1:2020, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests*

IEC 61496-2:2020, *Safety of machinery — Electro-sensitive protective equipment — Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs)*

IEC 61496-3:2018, *Safety of machinery — Electro-sensitive protective equipment — Part 3: Particular requirements for Active Opto-electronic Protective Devices responsive to Diffuse Reflection (AOPDDR)*

- IEC 61800-1:2021, *Adjustable speed electrical power drive systems — Part 1: General requirements — Rating specifications for low voltage adjustable speed DC power drive systems*
- IEC 61800-2:2021, *Adjustable speed electrical power drive systems — Part 2: General requirements — Rating specifications for low voltage adjustable speed AC power drive systems*
- IEC 61800-3:2017, *Adjustable speed electrical power drive systems — Part 3: EMC requirements and specific test methods*
- IEC 61800-5-1:2016, *Adjustable speed electrical power drive systems — Part 5-1: Safety requirements — Electrical, thermal and energy*
- IEC 61800-5-2:2016, *Adjustable speed electrical power drive systems — Part 5-2: Safety requirements — Functional*
- IEC 62061:2021, *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems*
- EN 349:1993+A1:2008, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*
- EN 614-1:2006+A1:2009, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*
- EN 614-2:2000+A1:2008, *Safety of machinery — Ergonomic design principles — Part 2: Interactions between the design of machinery and work tasks*
- EN 746-1:1997+A1:2009, *Industrial thermoprocessing equipment — Part 1: Common safety requirements for industrial thermoprocessing equipment*
- EN 746-2:2010, *Industrial thermoprocessing equipment — Part 2: Safety requirements for combustion and fuel handling systems*
- EN 894-1:1997+A1:2008, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 1: General principles for human interactions with displays and control actuators*
- EN 894-2:1997+A1:2008, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays*
- EN 894-3:2000+A1:2008, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 3: Control actuators*
- EN 894-4:2010, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 4: Location and arrangement of displays and control actuators*
- EN 1005-1:2001+A1:2008, *Safety of machinery — Human physical performance — Part 1: Terms and definitions*
- EN 1005-2:2003+A1:2008, *Safety of machinery — Human physical performance — Part 2: Manual handling of machinery and component parts of machinery*
- EN 1005-3:2002+A1:2008, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*
- EN 1005-4:2005+A1:2008, *Safety of machinery — Human physical performance — Part 4: Evaluation of working postures and movements in relation to machinery*
- EN 1837:2020, *Safety of machinery — Integral lighting of machines*
- EN 12198-1:2000+A1:2008, *Safety of machinery — Assessment and reduction of risks arising from radiation emitted by machinery — Part 1: General principles*
- EN 12198-3:2002+A1:2008, *Safety of machinery — Assessment and reduction of risks arising from radiation emitted by machinery — Part 3: Reduction of radiation by attenuation or screening*