

ISO 22291:2022-01 (E)

Safety requirements for wetlaid-nonwoven machinery

Contents		Page
Foreword		vi
Introduction		vii
1	Scope	1
2	Normative references	1
3	Terms and definitions	4
4	List of significant hazards	5
5	General safety requirements and/or protective/risk reduction measures	7
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
ISO 22291:2022(E) ISO 22291:2022(E) 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
6	Specific safety requirements and/or protective/risk reduction measures	40
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
ISO 22291:2022(E) 6.6.3 Specific safety requirements		43
7	Verification of conformity with the safety requirements and/or protective/risk reduction measures	44
8	Information for use	44
8.1	General	44
8.2	Instructions handbook	44
8.3	Marking	46
Annex A (normative) AOPD, fence guard, protective devices, tolerable pressure and force by the operator		47
Annex B (normative) Verification of specific subsections of this document		48
Annex C (informative) Wetlaid-nonwoven machinery		49
Annex D (informative) Example of noise emission declaration for wetlaid-nonwoven machinery		53
Bibliography		54