

DIN EN ISO 20344:2024-06 (E)

Personal protective equipment - Test methods for footwear (ISO 20344:2021 + Amd 1:2024) (includes Amendment :2024)

Contents		Page
European foreword		7
▣ European foreword to Amendment ▣		8
Foreword		9
▣ Foreword to Amendment ▣		11
1 Scope		12
2 Normative references		12
3 Terms and definitions		13
4 General testing parameters		13
4.1 Sampling		13
4.2 Conditioning before and during the test		14
4.3 Prerequisites on the testing procedure		14
4.4 Test report		14
5 Test methods for whole footwear		17
5.1 Specific ergonomic features		17
5.1.1 Sampling and conditioning		17
5.1.2 Test method		18
5.1.3 Test report		18
5.2 Determination of upper/outsole and sole interlayer bond strength		19
5.2.1 Principle		19
5.2.2 Test equipment		19
5.2.3 Sampling and conditioning		19
5.2.4 Test method		19
5.2.5 Test report		23
5.3 Determination of dimensions of toecap		23
5.3.1 Sampling and conditioning		23
5.3.2 Test method		23
5.3.3 Test report		23
5.4 Determination of impact resistance		23
5.4.1 Test equipment		23
5.4.2 Sampling and conditioning		27
5.4.3 Test methods		27
5.4.4 Test report		29
5.5 Determination of compression resistance		29
5.5.1 Test equipment		29
5.5.2 Sampling and conditioning		29
5.5.3 Test method		29
5.5.4 Test report		30
5.6 Behaviour of toecaps (thermal and chemical)		31
5.6.1 Sampling and conditioning		31
5.6.2 Behaviour of toecaps (thermal and chemical)		31
5.7 Determination of leak proofness		32
5.7.1 Test equipment		32
5.7.2 Sampling and conditioning		32
5.7.3 Test method		32
5.7.4 Test report		32
5.8 Dimensions of perforation resistant inserts		32
5.8.1 Sampling and conditioning		32
5.8.2 Test method		33
5.8.3 Test report		33
5.9 Determination of the perforation resistance of footwear with a metallic perforation resistant insert		34
5.9.1 Test equipment		34

5.9.2	Sampling and conditioning.....	34
5.9.3	Test method	35
5.9.4	Test report.....	35
5.10	Determination of the perforation resistance of footwear with a non-metallic perforation resistant insert.....	35
5.10.1	General.....	35
5.10.2	Test equipment.....	35
5.10.3	Sampling and conditioning.....	35
5.10.4	Test method	36
5.10.5	Test report.....	38
5.11	Behaviour of perforation resistant inserts (thermal and chemical).....	39
5.11.1	Sampling and conditioning.....	39
5.11.2	Behaviour of perforation resistant inserts (thermal and chemical).....	40
5.11.3	Test report.....	40
5.12	Determination of the flex resistance of perforation-resistant inserts.....	40
5.12.1	Sampling and conditioning.....	40
5.12.2	Test method	40
5.12.3	Test report.....	40
5.13	Determination of electrical resistance	41
5.13.1	Principle.....	41
5.13.2	Test equipment.....	41
5.13.3	Sampling and conditioning.....	41
5.13.4	Test method	42
5.13.5	Test report.....	42
5.14	Determination of footwear slip resistance	42
5.14.1	Sampling and conditioning.....	42
5.14.2	Test method	42
5.14.3	Test report.....	43
5.15	Determination of insulation against heat.....	43
5.15.1	Test equipment.....	43
5.15.2	Sampling and conditioning.....	44
5.15.3	Test method	44
5.15.4	Test report.....	44
5.16	Determination of insulation against cold	45
5.16.1	Test equipment.....	45
5.16.2	Sampling and conditioning.....	45
5.16.3	Test method	46
5.16.4	Test report.....	47
5.17	Determination of energy absorption of the seat region	47
5.17.1	Test equipment.....	47
5.17.2	Sampling and conditioning.....	49
5.17.3	Test method	49
5.17.4	Test report.....	49
5.18	Determination of resistance to water for whole footwear: trough test.....	49
5.18.1	Principle.....	49
5.18.2	Test equipment.....	49
5.18.3	Sampling and conditioning.....	50
5.18.4	Test method	50
5.18.5	Test report.....	51
5.19	Determination of resistance to water for whole footwear: dynamic test.....	51
5.19.1	Principle.....	51
5.19.2	Test equipment.....	51
5.19.3	Sampling and conditioning.....	51
5.19.4	Test method	51
5.19.5	Test report.....	53
5.20	Determination of impact resistance of a metatarsal protection	53
5.20.1	Test equipment.....	53

5.20.2	Sampling and conditioning.....	56
5.20.3	Test method.....	57
5.20.4	Test report.....	58
5.21	Determination of the dimension of the ankle protection.....	58
5.21.1	Sampling and conditioning.....	58
5.21.2	Test method.....	58
5.21.3	Test report.....	59
5.22	Determination of the shock absorption capacity of ankle protection materials incorporated into the upper.....	59
5.22.1	Principle.....	59
5.22.2	Test equipment.....	60
5.22.3	Sampling and conditioning.....	61
5.22.4	Test method.....	61
5.22.5	Test report.....	61
5.23	Determination of cutting resistance.....	62
5.23.1	Sampling and conditioning.....	62
5.23.2	Dimension of the cut resistant protective area.....	62
5.23.3	Test method.....	63
5.23.4	Test report.....	63
5.24	Scuff caps.....	63
5.24.1	Sampling and conditioning.....	63
5.24.2	Test method for the abrasion resistance of the scuff caps.....	63
5.24.3	Test report.....	63
5.25	Determination of seam strength.....	64
5.25.1	Sampling and conditioning.....	64
5.25.2	Test method.....	64
5.25.3	Test report.....	64
6	Test methods for upper, lining and tongue.....	64
6.1	Determination of thickness of upper.....	64
6.1.1	Sampling and conditioning.....	64
6.1.2	Test method.....	64
6.1.3	Test report.....	64
6.2	Measurement of the height of the upper.....	64
6.2.1	Sampling and conditioning.....	64
6.2.2	Test method for the complete upper.....	65
6.2.3	Test method for the determination of the area for non-water vapour permeable materials.....	65
6.3	Determination of tear strength of the upper, lining and/or tongue.....	67
6.3.1	Sampling and conditioning.....	67
6.3.2	Test method.....	67
6.3.3	Test report.....	68
6.4	Determination of the tensile properties of the upper material.....	68
6.4.1	Sampling and conditioning.....	68
6.4.2	Test method.....	68
6.4.3	Test report.....	69
6.5	Determination of upper flexing resistance.....	69
6.5.1	Sampling and conditioning.....	69
6.5.2	Test method.....	69
6.5.3	Test report.....	72
6.6	Determination of water vapour permeability (WVP).....	72
6.6.1	Principle.....	72
6.6.2	Sampling and conditioning.....	72
6.6.3	Pre-treatment test method.....	72
6.6.4	WVP measurement.....	72
6.6.5	Test report.....	72
6.7	Determination of water vapour absorption (WVA).....	73
6.7.1	Principle.....	73
6.7.2	Test equipment.....	73

	6.7.3	Sampling and conditioning.....	73
	6.7.4	Test method	73
	6.7.5	Test report.....	75
6.8		Determination of water vapour coefficient (WVC)	75
	6.8.1	Calculation of WVC.....	75
	6.8.2	Test report.....	75
6.9		Determination of pH value.....	75
	6.9.1	Sampling and conditioning.....	75
	6.9.2	Test method	76
	6.9.3	Test report.....	76
6.10		Determination of resistance to hydrolysis of upper.....	76
	6.10.1	Sampling and conditioning.....	76
	6.10.2	Test method	76
	6.10.3	Test report.....	76
6.11		Determination of chromium VI content.....	76
	6.11.1	Sampling and conditioning.....	76
	6.11.2	Test method	76
	6.11.3	Test report.....	77
6.12		Determination of abrasion resistance of lining and insock.....	77
	6.12.1	Principle.....	77
	6.12.2	Test equipment.....	77
	6.12.3	Sampling and conditioning.....	78
	6.12.4	Test method	78
	6.12.5	Test report.....	79
6.13		Determination of water penetration and water absorption for upper.....	80
	6.13.1	Principle.....	80
	6.13.2	Test equipment.....	80
	6.13.3	Sampling and conditioning.....	80
	6.13.4	Test method	80
	6.13.5	Test report.....	81
7		Test methods for insole, insock and footbed.....	82
	7.1	Determination of insole, insock and footbed thickness.....	82
		7.1.1 Sampling and conditioning.....	82
		7.1.2 Test method	82
		7.1.3 Test report.....	82
	7.2	Determination of water absorption and desorption of insole and/or insock.....	82
		7.2.1 Principle.....	82
		7.2.2 Test equipment.....	82
		7.2.3 Sampling and conditioning.....	83
		7.2.4 Test method	83
		7.2.5 Test report.....	84
	7.3	Determination of abrasion resistance of insole.....	84
		7.3.1 Principle.....	84
		7.3.2 Test equipment.....	84
		7.3.3 Sampling and conditioning.....	85
		7.3.4 Test method	85
		7.3.5 Test report.....	86
8		Test methods for outsole.....	86
	8.1	General remarks.....	86
	8.2	Determination of outsole dimensions.....	86
		8.2.1 Sampling and conditioning.....	86
		8.2.2 Determination of the cleated area.....	86
		8.2.3 Outsole thickness and cleat height.....	87
		8.2.4 Determination of cleat design in the waist area.....	89
	8.3	Determination of tear strength of outsole.....	90
		8.3.1 Sampling and conditioning.....	90

8.3.2	Test method	90
8.3.3	Test report.....	90
8.4	Determination of outsole abrasion resistance.....	90
8.4.1	Sampling and conditioning.....	90
8.4.2	Test method	90
8.4.3	Test report.....	90
8.5	Determination of footwear rigidity.....	90
8.5.1	Principle.....	90
8.5.2	Test equipment.....	91
8.5.3	Sampling and conditioning.....	91
8.5.4	Test method	91
8.5.5	Test report.....	93
8.6	Determination of flexing resistance of outsole.....	93
8.6.1	Principle.....	93
8.6.2	Test equipment.....	93
8.6.3	Sampling and conditioning.....	93
8.6.4	Test method	93
8.6.5	Test report.....	95
8.7	Determination of resistance to hydrolysis of outsole.....	95
8.7.1	Sampling and conditioning.....	95
8.7.2	Test method	95
8.7.3	Test report.....	95
8.8	Determination of resistance to fuel oil.....	95
8.8.1	Sampling and conditioning.....	95
8.8.2	Test methods.....	96
8.8.3	Test report.....	96
8.9	Determination of resistance to hot contact.....	97
8.9.1	Test equipment.....	97
8.9.2	Sampling and conditioning.....	99
8.9.3	Test methods.....	99
8.9.4	Test report.....	100
Annex A (informative) Assessment of footwear by the laboratory during testing of thermal behaviour.....		101
Annex B (informative) Footwear sizes		104
Bibliography.....		105