

E DIN EN 4709-001:2021-08 (E)

Erscheinungsdatum: 2021-07-02

Aerospace series - Unmanned Aircraft Systems - Part 001: Product requirements and verification; English version prEN 4709-001:2021

Inhalt	Seite
European foreword	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	8
4 Product Requirements and Compliance for Class 0 UAS	14
4.1 MTOM	14
4.1.1 Performance requirements	14
4.1.2 Verification method	15
4.1.3 Pass Criteria	15
4.2 Maximum Speed	16
4.2.1 Performance requirements	16
4.2.2 Verification method	16
4.2.3 Pass criteria	18
4.3 Maximum attainable height	18
4.4 Safely controllable	19
4.4.1 General	19
4.4.2 Pass Criteria	19
4.5 Minimize injury to people	19
4.5.1 Performance and design requirements	19
4.5.2 Verification methods	21
4.5.3 Pass criteria	25
4.6 Power	25
4.6.1 Performance and design requirements	25
4.6.2 Pass criteria	25
4.7 Follow-me mode	25
4.7.1 Performance and design requirements	25
4.7.2 Verification methods	25
4.7.3 Pass criteria	29
4.8 Manufacturer's instructions	29
4.8.1 Requirements	29
4.8.2 Verification method	29
4.8.3 Pass criteria	33
4.9 Information Notice	33
4.9.1 Design requirements	33
4.9.2 Verification method - Requirement (1) - Information notice	34
4.9.3 Pass criteria	34
5 Product Requirements and Compliance for Class 1 UAS	34
5.1 Ground impact	34
5.1.1 80 Joules	34
5.1.2 MTOM	39
5.2 Maximum speed	39
5.3 Maximum attainable height	39
5.3.1 Performance requirements	39

5.3.2	Verification method	40
5.3.3	Pass criteria.....	44
5.4	Safely controllable	45
5.4.1	General.....	45
5.4.2	Pass Criteria	45
5.5	Mechanical strength.....	45
5.5.1	Performance and design requirements	45
5.5.2	Verification methods	47
5.5.3	Pass Criteria	56
5.6	Minimize injury to people	56
5.7	Loss of data link	56
5.8	Sound power	56
5.8.1	General.....	56
5.8.2	Performance and design requirements	57
5.8.3	Verification method	57
5.8.4	Pass Criteria	59
5.9	Power.....	59
5.10	Unique physical serial number	59
5.11	Direct Remote Identification	59
5.12	Geo-awareness	59
5.13	Airspaces limitation function	59
5.14	Battery low level.....	59
5.15	Lights	59
5.16	Follow-me mode	59
5.17	Manufacturer’s instructions.....	59
5.17.1	Requirements	59
5.17.2	Verification method	60
5.17.3	Pass criteria.....	65
5.18	Information notice	66
5.18.1	Design requirements	66
5.18.2	Verification method - Requirement (1) – Information notice	66
5.18.3	Pass criteria.....	66
6	Product Requirements and Compliance for Class 2 UAS	66
6.1	MTOM	66
6.1.1	General.....	66
6.1.2	Pass Criteria	66
6.2	Maximum attainable height	66
6.3	Safely controllable	67
6.3.1	Performance and design requirements	67
6.3.2	Verification method	69
6.3.3	Pass criteria.....	75
6.4	Mechanical strength.....	76
6.5	Tethered UA	76
6.6	Minimize injury to people	76
6.6.1	General.....	76
6.6.2	Performance and design requirements	76
6.6.3	Verification method - Requirement (6) – Speed limit.....	76
6.6.4	Pass Criteria	77
6.7	Command and Control (C2) link	77
6.7.1	Loss of C2 link.....	77
6.7.2	C2 link protection.....	80
6.8	Low speed mode	81
6.8.1	Performance requirements.....	81
6.8.2	Verification method - Requirement (1) – Low speed mode.....	82
6.8.3	Pass criteria.....	82

6.9	Sound power.....	82
6.10	Power.....	82
6.11	Direct Remote Identification.....	82
6.12	Geoawareness.....	82
6.13	Airspace limitation function.....	82
6.14	Battery low level.....	82
6.14.1	Performance requirements.....	82
6.14.2	Test methods.....	83
6.14.3	Pass criteria.....	84
6.15	Lights.....	84
6.16	Manufacturer's instructions.....	84
6.16.1	Requirements.....	84
6.16.2	Verification method.....	85
6.16.3	Pass criteria.....	90
6.17	Information Notice.....	91
6.17.1	Design requirements.....	91
6.17.2	Verification method - Requirement (1) - Information notice.....	91
6.17.3	Pass criteria.....	91
7	Product Requirements and Compliance for Class 3 UAS.....	91
7.1	MTOM.....	91
7.1.1	General.....	91
7.1.2	Pass Criteria.....	91
7.2	Maximum characteristic dimension.....	91
7.2.1	Design requirements.....	91
7.2.2	Verification methods.....	92
7.2.3	Pass Criteria.....	94
7.3	Maximum attainable height.....	94
7.4	Safely controllable.....	94
7.4.1	General.....	94
7.4.2	Pass Criteria.....	94
7.5	Tethered UA.....	95
7.5.1	Performance and design requirements.....	95
7.5.2	Verification methods.....	97
7.5.3	Pass Criteria.....	101
7.6	Loss of data link - Performance requirements.....	102
7.7	Sound power.....	102
7.8	Power.....	102
7.9	Unique physical serial number.....	102
7.10	Direct Remote Identification.....	102
7.11	Geoawareness.....	102
7.12	Airspace limitation function.....	102
7.13	Data link protection.....	102
7.14	Battery low level.....	102
7.15	Lights.....	102
7.16	Manufacturer's instructions.....	102
7.16.1	Requirements.....	102
7.16.2	Verification method.....	103
7.16.3	Pass criteria.....	108
7.17	Information Notice.....	109
7.17.1	Design requirements.....	109
7.17.2	Verification method - Requirement (1) - Information notice.....	109
7.17.3	Pass criteria.....	109
8	Product Requirements and Compliance for Class 4 UAS.....	109
8.1	MTOM.....	109

8.1.1	General.....	109
8.1.2	Pass Criteria	109
8.2	Safely controllable	110
8.2.1	Design and performance requirements.....	110
8.2.2	Verification method	110
8.2.3	Pass criteria.....	116
8.3	Automatic control modes conditions.....	116
8.3.1	Performance requirements.....	116
8.3.2	Verification method	116
8.3.3	Pass criteria.....	117
8.3.4	Test methods	118
8.4	Manufacturer's instructions.....	120
8.4.1	Requirements.....	120
8.4.2	Verification method	120
8.4.3	Pass criteria.....	125
8.5	Information Notice	126
8.5.1	Design requirements	126
8.5.2	Verification method - Requirement (1) - Information notice	126
8.5.3	Pass criteria.....	126
Annex A (informative) Recommendations for the design to reduce the probability and effects of laceration by propellers		127
A.1	Mechanical Safeguards.....	127
A.2	Operational safeguards.....	127
A.2.1	Mechanical Shock Detection.....	127
A.2.2	Emergency Stop	127
Annex B (informative) Verification method for distinguishing UA with different class marks		129
Annex ZA (informative) Relationship between this document and the essential requirements of Delegated regulation (EU) 2019/945 of 12th March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems aimed to be covered		130
Bibliography.....		133