

DIN EN 16990:2020-08 (E)

Light motorized vehicles for the transportation of persons and goods and related facilities and not subject to type-approval for on-road use - Side by Side Vehicles - Safety requirements and test methods

Contents		Page
European foreword		6
Introduction		7
1	Scope	8
2	Normative references	8
3	Terms and definitions	10
4	List of hazards	14
5	Safety requirements and/or protective measures	14
5.1	General Requirements	14
5.2	Mechanical hazards	14
5.2.1	Speed control pedal	14
5.2.2	Braking devices	15
5.2.3	Steering system	17
5.2.4	Moving parts	18
5.2.5	Sharp edges	19
5.2.6	Safety Belts and their anchorages	19
5.2.7	Roll Over Protective Structures (ROPS)	23
5.2.8	Fuel and hydraulic systems	23
5.2.9	Operator's seat	24
5.2.10	Passenger seat and handhold(s)	24
5.2.11	Suspension	24
5.2.12	Drive Train controls	24
5.2.13	Electric starter interlock	25
5.2.14	Reversing indicator and warning	25
5.2.15	Access systems to the operator's station, passenger accommodation and maintenance points	25
5.2.16	Foot controls	25
5.2.17	Lighting Equipment (headlamps, tail lamps and stop lamps)	26
5.2.18	Tilt Table Stability Tests (Lateral and Longitudinal)	26
5.2.19	Tyres	26
5.2.20	Maximum design speed	27
5.2.21	Engine stop switch	27
5.2.22	Manual clutch control	27
5.2.23	Unauthorised use	28
5.2.24	Acoustic/audible warning	28
5.3	Electrical Hazards - General	28
5.3.1	Grounding	28
5.3.2	Capacity and over-current protective devices	28
5.3.3	Routing and Installation	28
5.3.4	Electrical Energy Storage Systems	29
5.3.5	Protection against accidental by-passing of the starter security	29
5.4	Hot surfaces	29
5.4.1	General	29
5.4.2	Temperature limits for touchable surfaces	30

5.5	Noise control	30
5.5.1	Noise control at source by design	30
5.5.2	Noise control by protective measures	31
5.5.3	Noise reduction by information	31
5.6	Vibration hazards	31
5.7	Material/substance hazards	31
5.8	Storage provisions	31
5.9	Ergonomics	32
5.10	Errors of fitting	32
5.11	Additional Requirements for Electric-Powered Vehicles	32
5.11.1	Grounding	32
5.11.2	Electrical Heat-generating	32
5.11.3	Heat test acceptance	32
5.11.4	Movement Modes (Safety Requirements)	32
5.11.5	Charging Requirements	33
5.11.6	High Voltage Requirements	33
6	Verification of the safety requirements and/or protective measures	34
6.1	Verification methods	34
6.2	Verification of final assembly	35
7	Information for use	36
7.1	General	36
7.2	Signs (pictograms), written warnings	36
7.3	Accompanying documents (in particular the instructions handbook)	36
7.4	Marking	39
Annex A(informative) Examples of Side by Side Vehicles (SbSs)		41
Annex B(normative) Service braking system and service brake performance		45
B.1	Measuring maximum speed	45
B.1.1	Test operator	45
B.1.2	Test conditions	45
B.1.3	Test procedure	45
B.2	Measuring service brake performance	46
B.2.1	Test conditions	46
B.2.2	Test procedure	46
B.2.3	Service brake fade performance	47
B.2.3.1	Test conditions	47
B.2.3.2	Test procedure	47
B.2.3.3	Alternative Test Procedure (Repeated braking)	47
B.2.3.4	Hot Performance	48
B.2.4	Service brake fade recovery performance	48
B.2.4.1	Test conditions	48
B.2.4.2	Test procedure	48
Annex C(normative) Parking Brake/Mechanism Performance		49
C.1	Test conditions	49
C.2	Test Procedure	49
Annex D(normative) Test conditions stability		50
D.1	Tilt table lateral stability tests	50
D.1.1	Test conditions	50
D.1.2	Test vehicle configuration	50
D.1.3	Tilt table test platform requirements	50
D.1.4	Test procedure	50
D.2	Tilt table longitudinal stability tests	51
D.2.1	Test conditions	51
D.2.2	Test procedure	52

Annex E(normative) Determination of hot surfaces	53
E.1 General	53
E.2 Temperature measuring equipment	53
E.3 Determination of temperature of areas to be assessed	53
E.4 Determination of inadvertent accessibility of hot surfaces	54
E.4.1 For distance between the identified hot area and the nearest control in excess of 100 mm	54
E.4.2 For distance between the identified hot area and the nearest control less than or equal to 100 mm	54
E.4.3 Recording of determined inadvertent accessible hot areas	55
Annex F(normative) Noise test code	57
F.1 General	57
F.2 Determination of the A-weighted emission sound pressure level at the operator's station and passenger(s) positions	57
F.2.1 Basic standards and measurement procedure	57
F.2.2 Measurement uncertainty	58
F.3 A-weighted sound power level determination	58
F.3.1 Basic standards and measurement procedure	58
F.3.2 Measurement uncertainty	59
F.4 Test Environment	59
F.5 Operating conditions	60
F.6 Information to be recorded and reported	60
F.6.1 Vehicle under test	60
F.6.2 Acoustic environment	61
F.6.3 Instrumentation	61
F.6.4 Acoustical data	61
F.7 Noise Declaration	61
Annex G(normative) Vibration test method	63
G.1 Background	63
G.2 Coupling the hand and body to the vibration source	64
G.3 Positioning and operating the vehicle during the test	65
G.4 Parameters to be measured	65
G.5 Determination of the vibration values	65
G.6 Information to be recorded	65
G.6.1 General	65
G.6.2 Vehicle under test	65
G.6.3 Measuring equipment	66
G.6.4 Vibration data	66
G.7 Information to be reported	66
Annex H(normative) Test methods applying to safety belt anchorages and safety belts	67
H.1 General	67
H.2 Location of the upper effective safety belt anchorages	67
H.3 Testing provisions	69
Annex I(normative) Heat Generating Components - Heat Test for Electric Powered Vehicles	73
I.1 Test Conditions for Electric Powered Vehicles	73
I.2 Test Procedure	73
Annex J(informative) Pre-delivery form	74
J.1 General	74
J.2 Dealer's declaration	74
J.3 Purchaser's declaration	75

Annex K(informative) Warnings and Pictograms	76
Annex L(informative) Instructions for tyres to be included in the instructions handbook	79
L.1 General	79
L.2 Instructions on use	79
L.2.1 Fitting and removal of tyres	79
L.2.2 Inflation pressure	79
L.3 Tyre and wheel maintenance	79
L.4 Tyre replacement	79
L.5 Tyre ageing	79
Annex M(normative) List of hazards	80
Annex ZA(informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC aimed to be covered	85
Bibliography	88