



SLOVENSKI STANDARD
oSIST prEN 16230-1:2011
01-september-2011

Gokarti za prosti čas - 1. del. Varnostne zahteve in preskusne metode za gokarte

Leisure karts - Part 1: Safety requirements and test methods for karts

Freizeitkarts - Teil 1: Sicherheitstechnische Anforderungen und Prüfverfahren für Karts

Karts de loisir - Partie 1: Exigences de sécurité et méthodes d'essai relatives aux karts

Ta slovenski standard je istoveten z: prEN 16230-1

<https://standards.iteh.ai/catalog/standards/sist/70a3e6ef-05fb-4127-a84d-c44e2f8f595e/sist-en-16230-1-2014>

ICS:

43.160	Vozila za posebne namene	Special purpose vehicles
97.220.01	Športna oprema in pripomočki na splošno	Sports equipment and facilities in general

oSIST prEN 16230-1:2011

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 16230-1

January 2011

ICS 43.100

English Version

Leisure karts - Part 1: Safety requirements and test methods for karts

Karts de loisir - Partie 1: Exigences de sécurité et méthodes d'essai relatives aux karts

Freizeitkarts - Teil 1: Sicherheitstechnische Anforderungen und Prüfverfahren für Karts

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 354.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

<https://standards.cen.eu/catalog/standards/sist/70a3e6ef-05fb-4127-a84d-c44e2f8f595c/sist->

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	6
3 Terms and definitions	6
4 Classification.....	8
5 List of significant hazards	9
6 Safety requirements and/or protective measures	13
7 Verification of the safety requirements and/or protective measures.....	23
8 Information for use	23
9 Requirements for karting facilities.....	25
Annex A (normative) Measurement methods for kart all round protection system	27
Annex B (normative) Crash test protocol.....	29
Annex C (normative) Brake system performance tests.....	32
Annex D (normative) Noise emission test.....	38
Annex E (informative) Vibration test methods	43
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC	48
Bibliography.....	49

Foreword

This document (prEN 16230-1:2011) has been prepared by Technical Committee CEN/TC 354 "Ride-on, motorized vehicles intended for the transportation of persons and goods and not intended for use on public roads - Safety requirements", the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 16230-1:2014

<https://standards.iteh.ai/catalog/standards/sist/70a3e6ef-05fb-4127-a84d-c44e2f8f595c/sist-en-16230-1-2014>

Introduction

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

The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are covered are indicated in the scope of this document.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 16230-1:2014

<https://standards.iteh.ai/catalog/standards/sist/70a3e6ef-05fb-4127-a84d-c44e2f8f595c/sist-en-16230-1-2014>

1 Scope

The vehicles covered by this European Standard are not intended to be used on public roads.

They are only intended to be used on tracks designed for karting activities.

This European standard is applicable for karts according to 3.1.

This European standard applies to:

- Leisure karts only
- Karts propelled by a combustion engine, including LPG combustion engines,
- uses on indoor and outdoor tracks, permanent or temporary
- uses on tracks designed for leisure karting, with a sealed ground (such as asphalt, concrete, ice or snow) but which:
 - excludes competition organised by and under the responsibility of the CIK-FIA and/or ASN, ensuring through the granting of licenses by an ASN or one of it's affiliated members as defined in the International Sporting code, compliance with the safety, sporting, disciplinary and technical rules of the CIAK-FIA and/ or ASN.
 - takes place under the responsibility of the legal entity providing the services, and is managed by it's personnel or personnel acting under it's responsibility.

This European Standard does not apply to:

- cross country karts
- karts with two or more seats
- vehicles intended exclusively for competition and toys
- karts used on tracks not mentioned above (such as mud, earth)
- vehicles in amusement parks.

The requirements related to the electrical hazards are not covered in this European standard.

Considering safety in karting activities also involves the facilities, general requirements about them are included in this document.

This European standard specifies appropriate measures to eliminate or reduce the risks arising from significant hazards, hazardous situations and events (see clause 4) during operation and maintenance of the vehicles, when carried out in accordance with the specification as intended by the manufacturer.

- This document is not applicable to vehicles which are manufactured before the date of publication of this European standard by CEN.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN ISO 3744: 2009, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane*

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1 : Basic terminology, methodology (ISO 12100-1:2003)*

ISO 3864-1:2006, *Graphical symbols — Safety colours and visual safety signs — Part 1 : design principles*

ISO 3864-2:2004, *Graphical symbols — Safety colours and safety signs — Part 2: Design principles for product safety labels*

CEN/TR 15172-1:2006, *Whole-body vibration — Guidelines for vibration hazards reduction - Part 1 : engineering methods by design of machinery*

CR 1030-1:1995, *Hand-arm vibration — Guidelines for vibration hazards reduction — Part 1 : Engineering methods by design of machinery*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100-1:2003 and the following apply.

3.1
kart
multilane motor driven sports equipment, with four wheels not set in a straight line, two wheels of which are powered and the other two serving as control, and without suspension

3.2
leisure karting
— organised activity, offering leisure services in karting including leisure competition

3.3
leisure kart
kart intended and designed for leisure karting activities

3.4
all around protection
device made of one or several parts encircling the kart and meant to protect the driver and the kart from external impacts, so as to eliminate the risk of wheel to kart contact

3.5
evaluation
assessment of the ability of a person to drive

3.6
training
teaching process by which a driver is brought to an appropriate level of driving standard for the session or event he or she is participating

3.7**slow track**

closed indoor or outdoor track on sealed ground with a number of individual series of successive loops

3.8**fast track**

closed outdoor or indoor track on sealed ground with a number of individual series of successive loops, whose track is wider and has a longer roll out area than a slow track

3.9**Liquified Petroleum Gas (LPG)**

mixture of propane and butane which is suitable as power fuel for combustion engines and fluid at room temperature and overpressure

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 16230-1:2014

<https://standards.iteh.ai/catalog/standards/sist/70a3e6ef-05fb-4127-a84d-c44e2f8f595c/sist-en-16230-1-2014>

4 Classification

Leisure karting covers a wide range of activities on indoor and outdoor tracks, and can be used by drivers of different age, size, weight and experience.

For the purpose of this document, different types of karts have been defined. The Tables 1 and 2 below, defines their restrictions of use.

Table 1 — Type of kart - Manufacturers design parameters

Kart type	Slow track ^a Maximum speed(km/h)	Fast track ^a Maximum speed (km/h)	Reference Size of driver (ergonomy minimum size ranges for given type) (mm)	Weight range (kg)	Maximum Power kW ^e	Reference dummy ^f
Kart type A1 (baby)	30 ^b	30 ^b	1150 (-100 / +100) ^c	22 (-5 / + 10) ^c	3,5	-
Kart type A2 (mini)	45	65	1350 (-150 / +150) ^c	32 (- 10 / + 18) ^c	5,15	5 th percentile female
Kart type B (adult)	70	80	1700 (-250 / +250) ^c	78 (-38 / +23 ^d) ^c	10,3	95 th percentile male
Kart type C1 (adult)	70	90	1700 (-250 / +250) ^c	78 (-38 / +23 ^d) ^c	16,9	95 th percentile male
Kart type C2 (adult)	70	110	1700 (-250 / +250) ^c	78 (-38 / +23 ^d) ^c	22,1	95 th percentile male
^a	Tracks as defined in 3.10 and 3.11					
^b	Training mandatory particular care when going to higher speed					
^c	Range specified according to the 50 percentile					
^d	Upper tolerance specified according to the 95 percentile					
^e	According to method to be defined					
^f	For crash test					

Table 2 — Type of kart – Minimum age / Training and / or evaluation

Kart type	Minimum age years	Training (T) or at least Evaluation (E)
Kart type A1 (baby)	6	T
Kart type A2 (mini)	7	7 – T above 8 E
Kart type B (adult)	11	E
Kart type C1 (adult)	13	E up to 45 km/h T above 45 km/h
Kart type C2 (adult)	15	T

5 List of significant hazards

This clause contains all significant hazards, hazardous situations and events, as far as they are dealt with in this document, and identified by risk assessment as significant for the karts and which require action to eliminate or reduce the risk.

Table 3 — List of significant hazards

Clauses / Sub clauses	Danger zone or source of hazard	Type of hazard	Fig / subfigure	Relevant clause of this standard
5.1	Mechanical hazards			
5.1.1	Protection of the kart / Roll bar	Wheel to wheel, or plastic/metal to wheel contact leading to a "lauching" type of roll over NOTE Most leisure(rental) karts have all around protection that eliminates this case ; occurrence would be medium to high otherwise		6.3.1 <i>kart protection</i>
		Karts "climbing" one on the other NOTE Most leisure(rental) karts have all around protection designed to prevent such case ; occurrence would be medium to high otherwise		6.3.1 <i>kart protection</i>
		Crash situations leading to high forces on the driver		6.3.1 <i>kart protection</i>

Table 3 (continued)

Clauses / Sub clauses	Danger zone or source of hazard	Type of hazard	Fig / subfigure	Relevant clause of this standard
5.1.2	Seat	falling on the side under centrifugal forces		6.3.2 <i>seat</i>
		Non efficient braking due to bad position of the driver NOTE Of particular importance for children		
		Lack of control due to bad driving position NOTE comment : of particular importance for children		
		Falling aside under lateral crash		
5.1.3	Brake system mechanical Brake system hydraulic	Crash situation resulting from a failure of brake systems		6.3.3 <i>brake system performance</i> 6.4.1 <i>brake system controls</i>
5.1.4	steering system	Crash situation resulting from a failure of steering system		
	Tie- rods	Crash situations resulting from a failure of the tie rods		6.10.1 <i>steering tie-rods</i>
	Steering wheel	projection of the driver against the steering wheel, resulting from a frontal crash		6.4.2 <i>steering wheel</i>
5.1.5	Stub axle	Crash situation resulting from a failure of a stub axle NOTE Crash situations resulting from failure of control systems (steering, brake) see 1.2.1		6.5.1 <i>protection against break up during operation – stub axle</i>
5.1.6	Sharp edges (whole kart)	Injuries due to sharp edges under: - normal situations - crash situations NOTE In case of crash situations sharp edges do not aggravate the injuries – they can create an additional injury		6.6 <i>protection against sharp and edges angles</i>
5.1.7	Rotating elements	Hair entanglement in moving parts, especially in rear axle		6.7 <i>protection against rotating parts</i>
	Rear axle Transmission	Loose (floating) clothes entanglement in rotating parts		
	Brake disk	Risk of inadvertent contact of the body of the driver (ex hand) with rotating parts		

Table 3 (continued)

Clauses / Sub clauses	Danger zone or source of hazard	Type of hazard	Fig / subfigure	Relevant clause of this standard
5.1.8	Stability	Flip over of the kart resulting from excessive grip		6.11 <i>wheels and tyres</i>
5.2	Electrical hazards			
	Starter batteries and/or 2nd systems (not propulsion), if any	Fire caused by short circuits		Not covered in this European standard.
		Electrical risks of the power source (charger) NOTE Power supply is not part of the kart ; the safety devices of the power supply are either in the charger, or in the electrical system of the facility		Not covered in this European standard.
5.3	Thermal hazard			
	All high temperature components	Burns due to inadvertent contacts with hot parts		6.8 <i>protection against hot surfaces</i>
5.4	Noise			
	Whole kart	Risk for the driver, due to close source of noise		6.14 <i>noise</i>
		Risk for other persons than the driver due to fleet of karts NOTE As stated in text of 1.5.8 what is at stake is a commitment to reduce noise using state of the art techniques		6.14 <i>noise</i>
5.5	Vibrations hazards			
	Whole kart	Risk for the driver, due to sources of vibration		6.15 <i>vibrations hazards</i>
5.6	Material / substance hazards			6.2 <i>materials and products</i>
5.6.1	Fuel system	Fire or explosion due to damage on fuel system after impacts		6.13.1 <i>fuel tank</i>
	Fuel tank Fuel line	Fire or explosion due to filling		6.13.2 <i>fuel lines</i>
5.6.2	LPG system	Fire or explosion due to filling		6.12 <i>specific requirements for LPG karts</i>
	LPG tank LPG line	Fire or explosion due to damage on fuel system after impacts		6.12 <i>specific requirements for LPG karts</i>

Table 3 (end)

Clauses / Sub clauses	Danger zone or source of hazard	Type of hazard	Fig / subfigure	Relevant clause of this standard
5.6.3	Starter batteries and/or 2nd systems (not propulsion), if any	Electrolyte of batteries spilled or projected due to battery failure NOTE Power supply is not part of the kart ; the safety devices of the power supply are either in the charger, or in the electrical system of the facility		6.17 <i>Batteries</i>
5.6.4	Indoor facilities. Requirements on karts is an open question	Risk for the driver when exposed to gas emissions , in particular to carbon monoxide		6.16 <i>Gas emission</i>
		Risk for the other persons than driver when exposed to gas emissions , in particular to carbon monoxide		6.16 <i>Gas emission</i>
5.7	Ergonomics hazards			
5.7.1	Pedals means of adjustment Pedals Pedal Brake Pedal Throttle	Loss of control due to bad ergonomics leading to crash situations		6.9 <i>Protection against incorrect action on control systems</i>
		Crash situation resulting from incorrect action on pedal / failure of brake pedal		6.9 <i>Protection against incorrect action on control systems</i>
5.7.2	Steering system	Crash situation resulting from a failure of steering system		6.4.2 <i>Steering wheel</i>
5.7.3	Steering wheel	Injury due to steering wheel bad design NOTE In case 3, the bad design of the steering wheel is an aggravating factor of a risk that has an other cause such as high speed crash.		6.4.2 <i>Steering wheel</i>

6 Safety requirements and/or protective measures

6.1 Description dimensions

The dimensions of the kart shall meet the requirements of Table 4.

Table 4 — Dimensions of the kart

Dimensions in mm

	Maximum Total length L/ mm/ max	Maximum Total width B/mm/max	Minimum Wheel base A/mm	Minimum Rear wheel track^a ratio ^b	Minimum Front wheel track^a ratio ^c
Kart Type A1	1700	1300	700	1	0,8
Kart Type A2	2000	1400	800	1	0,8
Others (B, C1, C2)	2200	1500	900	1	0,8
^a The measurement of the track is taken from centre of the wheel to centre of the wheel. ^b The minimum rear wheel track dimension is the actual q. ^c The minimum front wheel track dimension is the actual wheel base multiplied by the minimum front wheel track ratio.					

6.2 Materials and products

The kart shall be designed in such a way the risks related to the presence of fuel including LPG is kept to a minimum.

No part or system shall contain asbestos or other materials endangering persons' safety or health.

6.3 Protection against mechanical hazards

6.3.1 Kart protection

All around protection shall be provided that:

- prevents wheel to kart contact and, therefore, the launching effect,
- ensures impact stability, e.g. reduce the risk of karts climbing one on the other, of karts rolling over, of karts going under track protection,
- reduces the effect of impact loads on the driver,
- reduces the effects of the impact loads on the frame and components.