



An initiative by SPAARK

ISO 9001:2015 Certified Motorsport Company

## INDIA'S BIGGEST KARTING CHALLENGE



## Indian Karting Championship

### SEASON 6

## Rulebook –Electric Category

(Version 1 released on 01/07/2023)

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## SECTION A

### ADMINISTRATIVE REGULATION

**1.1** At Spaark Motorsport, we intend to provide our young emerging undergraduates with the best learning experience, where student after graduation will be a technically developed, dedicated towards own dreams and concepts, innovative and skilled Engineer. We aim to build an Engineer who will spend each second of his life in developing himself. We strive hard to ensure that each student in our family evolves to their best potential.

#### **1.2 Organizer's objective**

The Indian Karting Championship is an intercollegiate Engineering design competition for undergraduate and graduate Engineering students. The objective of the competition is to implement good Engineering practices, design projects and their related research work. Each participating student will learn, innovate and gain the experience of team work, leadership and the technical skill. The students must function as a team to design, Engineer, build, test, promote and compete with a vehicle considering the few sets of rules applied by organizing committee. The organization also aims to provide an opportunity for students to be recognized at a national level for Research and Development careers in automotive Engineering.

**1.3 The Indian Karting Championship®** is a GO KART design, manufacturing and racing competition initiated by the Spaark Motorsport, Pune. The teams from various Engineering college will have to design, fabricate and race the vehicles by their own without any assistance of faculty adviser or professional Engineers.

#### **1.4 Official announcement**

All official announcements, results and every other details regarding IKC will be published on the website [www.indkc.com](http://www.indkc.com) and Instagram page @indiankarting\_ikc

## SECTION B

### Organizer authority

#### **2.1 Rules authority**

Organizing Committee is having right to impound each and every rule associated with the event. Violation by anyone of the participating member may be liable to be penalized severely or may lead to disqualification from the event at any time of event calendar.

#### **2.2 Rules validity**

The rules specified in the rulebook will be valid throughout the event calendar and will be limited for specific edition of **Indian Karting Championship**. If organizing committee announces any changes in the rules, all the participants will be informed before amendments.

#### **2.3 Rules compliance**

By participating in **Indian Karting Championship**, the team members, faculty advisors and respective college agree to comply with, and be bound by all rules interpretations or procedures issued or announced by **Spaark Motorsport**. All team members, faculty advisors and other university representatives are required to cooperate with, and follow all instructions, penalties and results from competition organizers and officials.

## SECTION C

### Participation Requirements

#### 3.1 Student Requirements

Team members must be enrolled as degree seeking undergraduate or graduate student in a college or university. Team members who have graduated before the year 2022 or in 2022 are not eligible to participate.

#### 3.2 Team Requirement

The team registering for **Indian Karting Championship** must have a Team Name, Team Logo, Team Captain and the Faculty Facilitator. Maximum three teams can register from one College and in case of multiple registrations from a single College, the Team Name, Team Logo and Team Captain must be different but the Faculty Advisor can be same.

#### 3.3 Registration Agreement

By registering in IKC, The Team Captain/Team Member/Faculty Advisor/College Management must agree with the rules and regulations of **Spaark Motorsport**. They understand that all the information provided in the registration documents and online registration forms are correct to the best of their knowledge. They accept that team would undertake all the activities without the help of a professional directly or indirectly. The amount deposited by teams is non-refundable.

#### 3.4 Registration Fee

The registration fee is distributed in two phases and total fee is **INR 35,000** including taxes.

Phase 1 – Static Round – INR 20,000 (must be paid within 12 Days of online Registration)

Phase 2 – Dynamic Round – INR 15,000 (submission date will be announced after virtual Round)

The above registration fee is for a team of 20 Members only. For every extra member above 20, INR.1200 (Inclusive of Tax) per member must be paid. Minimum 5 and Maximum 30 Members are allowed in a Team. This fee does not include additional charges like driver training program, workshops, transponders, etc.

#### 3.5 Mode of payment

The Bank account details will be mailed to registered email address after successful online registration.

The scanned copy of payment slip should be submitted on team portal account on [www.indkc.com](http://www.indkc.com)

## SECTION D

### 4.0 Judging criteria

The participating team will be judged in following tests-

#### 4.1 Virtual Round-

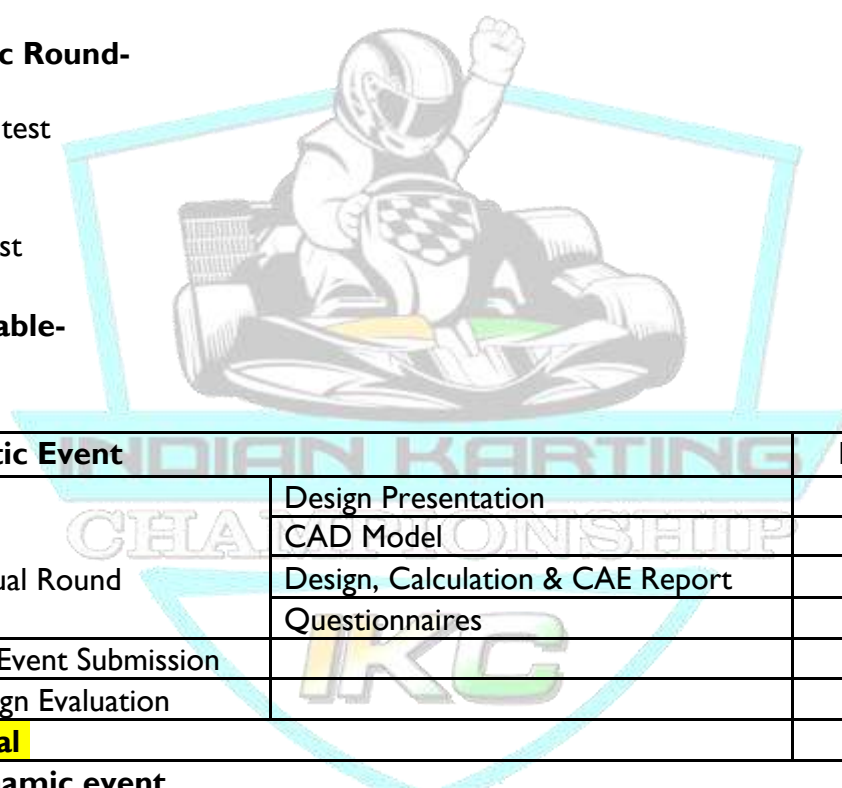
Design Presentation  
Design, Calculation & CAE Report  
Questionary Round

#### 4.2 Static Round-

Pre-Event Submission  
Design evaluation  
Technical Inspection

#### 4.3 Dynamic Round-

Brake test  
Acceleration test  
Skid pad  
Autocross  
Endurance test



#### 4.4 Point Table-

Static Event		Points
Virtual Round	Design Presentation	25
	CAD Model	10
	Design, Calculation & CAE Report	90
	Questionnaires	100
Pre-Event Submission		50
Design Evaluation		25
<b>Total</b>		<b>300</b>
<b>Dynamic event</b>		
Acceleration test		50
Skid pad test		50
Autocross test		50
Endurance test		450
<b>Total</b>		<b>900</b>



## SECTION E

### **Driver Requirement-**

Each team must have two drivers. If any team have single driver, they will have only one attempt of the entire dynamic event except endurance. The single driver can complete entire endurance test. It is mandatory to attend the paid driver training program by each team.

**5.1 Driver's Age-** Every driver must be 18 years or above on 1<sup>st</sup> April, 2023. Driver can be of Maximum 24 Years.

**5.2 Driver's License-** Every driver must have four wheeler driving license and must present it at registration desk.

**5.5 Driver's Suit-** A fire resistant one piece suit, made from a minimum of 1 layer that covers the body from the neck down to the ankles and the wrists. The suit must be certified to either one of the following standards and be labelled as such: SFI 3.2 or 3.3 (or higher) FIA Standard 1986

**5.6 Underclothing-** Every driver must wear underclothing of fire resistant material like cotton. The shirt must be full sleeve and should cover maximum body part. The drivers can wear denim material clothing inside the fire suit.

**5.7 Helmet-** A well-fitting closed face helmet that meets one of the following certifications and is labelled as such Snell K2000, K2005, K2010, M2000, M2005, M2010, SA2000, SA2005, SA2010 - SFI 31.2A, SFI 31.1/2005 - FIA 8860-2004, FIA 8860-2010 Open faced helmets are not allowed. All helmets to be used in the competition must be presented during Technical Inspection where approved helmets will be stickered. DOT rated helmets with closed face are also accepted. **ISI rated helmets are not allowed.**

**5.8 Balaclava-** A balaclava which covers the driver's head, hair and neck, made from an acceptable fire resistant material as or a full helmet skirt of acceptable fire resistant material. The balaclava requirement applies to drivers of either gender, with any hair length.

**5.9 Gloves-** Leather gloves with extra foam are acceptable.

**5.10 Shoes-** Fire resistant shoes made from acceptable fire resistant material shoes must be certified to the standard and labelled as such: SFI 3.3 FIA 8856-2000. The sport shoes/Canvas shoes/Leather shoes/Industrial safety shoes are not allowed at any point of the event.

**5.11 Neck Support-** SFI 3.2/3.3A rated is must.

The failure to fulfil any above requirement by any team will be disqualified immediately from the dynamic events.

## SECTION F

### Vehicle Requirements

#### 6.1 Chassis or frame design-

The vehicle must have four wheels that cannot be in a straight line in longitudinal direction. The vehicle must have a wheelbase of at least 1016 mm (40 inches) and the smaller track width must be no less than 80% of the wheelbase of the vehicle.

While designing the chassis, driver ergonomics should be considered in such way that body parts of driver should not touch any component except seat and steering wheel when seated in his driving posture.

The overall length must be less than 200 cm and width must be less than 150 cm including bodyworks and bumpers. The maximum height should be less than 95 cm from the ground. No part may project beyond the quadrilateral formed by the front, side and rear fairings.

The violation of above any rule will assign penalty of 50 points.

#### 6.2 Chassis Material-

The tube/rectangular pipe used in the fabrication of the chassis or the other frames/supports must be seamless. Minimum cross section must be 1 inch (25.4mm) and minimum wall thickness 1.65mm, for pipe it will be OD and for rectangular section or square section it will be its minimum height.

Material certification mentioning mechanical and chemical properties must be presented during the technical inspection at the event. The recommended materials are AISI 1018, AISI 1020 etc.

#### 6.3 Ground Clearance-

With the driver aboard there must be a minimum of 25.4 mm and maximum 50.8 mm ground clearance measured from the lowest point (except tyres) of the vehicle, under the complete vehicle. No compensation (like chain sprocket, brake disc) in ground clearance would be entertained.

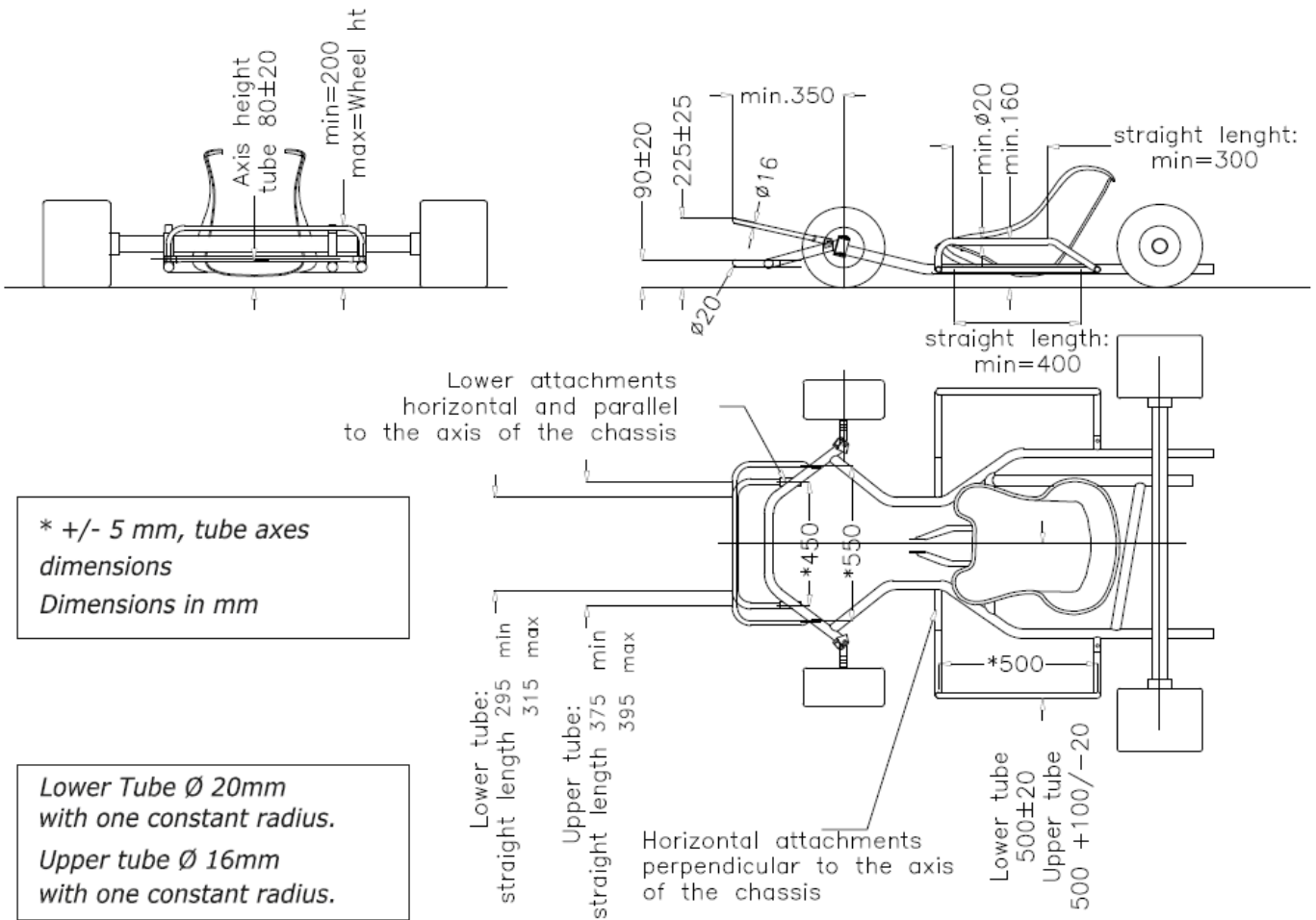
The violation of above any rule will assign penalty of 50 points.

#### 6.4. 1/2 Front Bumper / Side Bumpers

If bumpers are not made as per specified dimensions, the technical inspection will not be given OK.







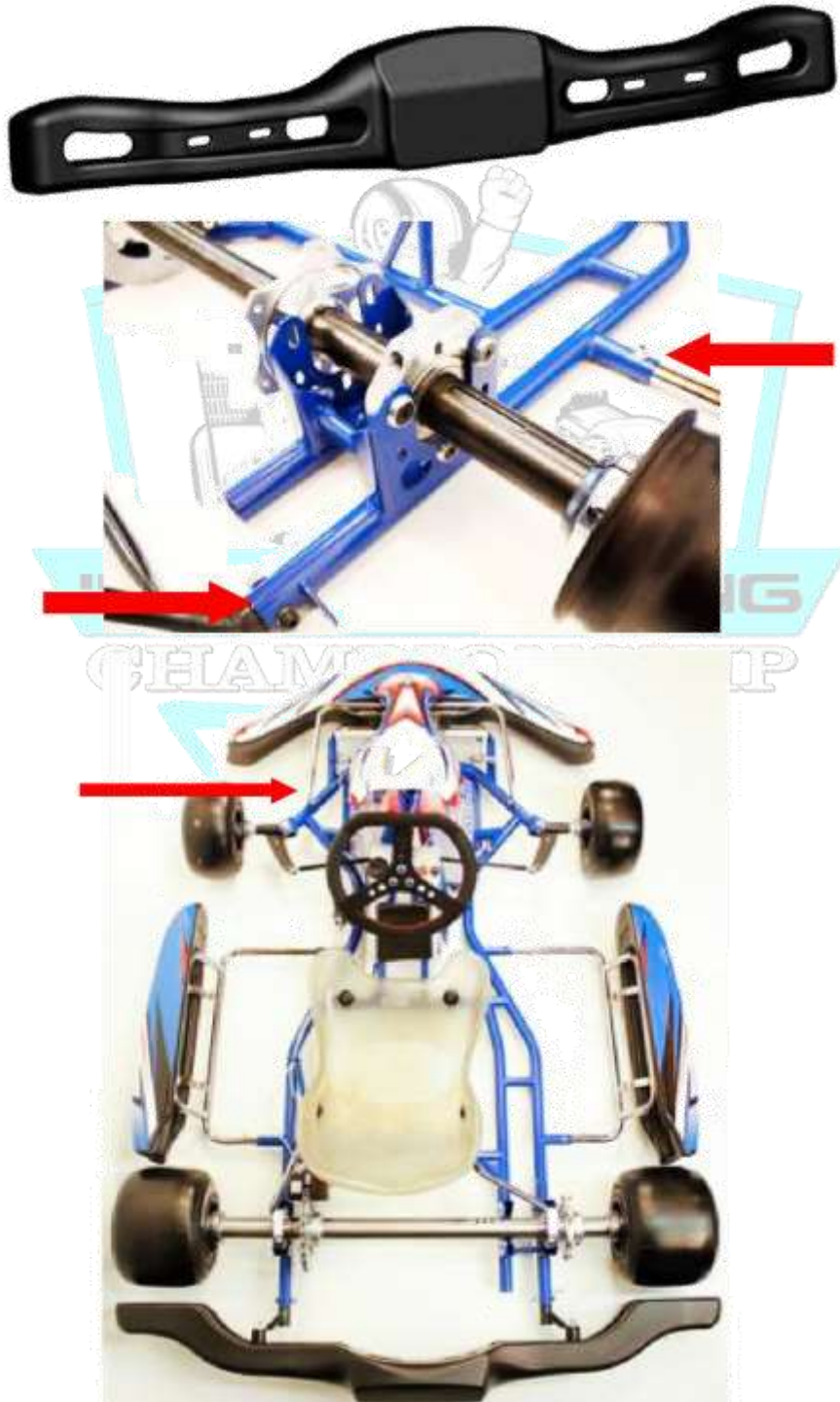
**(Refer above pictures for front and side bumper mountings)**

### 6.4.3 Rear Wheel Protection –

There is no requirement of using metallic pipe or bar as bumper but, it is mandatory to use rear wheel protection.

The rear protection must be made of hollow plastic moulded and must not present any danger as regards safety. Use of metallic sheets is prohibited as rear wheel protection. It should not be situated above the plane through the top of the rear tyres. The surface of the rear protection must be uniform and smooth; the rear protection must not comprise holes or cuttings other than those necessary for its attachment.

The unit must be attached to the frame in at least 2 points by supports made up of steel or aluminium. The acceptable/recommended rear wheel protection is given in below picture.



Refer above images for bumper mounting to frame.

## **7.0 Steering System-**

The steering system must have positive steering stops that prevent the steering linkages from locking up either in RH or LH turning (the inversion of a four-bar linkage at one of the pivots). Allowable total steering system free play (inclusive of play in all the steering linkages) is limited to 7 degrees, measured at the steering wheel.

Any device mounted on the steering wheel must not protrude by more than 20 mm from the plane forward of the steering wheel and must not have sharp edges.

The steering wheel must be of continuous type and must be connected to steering rod by fasteners only.

The welding of steering wheel or Steering Wheel Hub to steering rod is strictly prohibited. The vertical or 90 degree inclination of steering rod with respect to horizontal axis of vehicle will not be allowed.

If in case steering rod is welded, it must be in double shear.

The steering column must have a minimum diameter of 18 mm and a minimum wall thickness of 1.8 mm. It must be mounted with a safety clip system for the lower bearing restraint nut

## **8.0 Braking System-**

The brake system installed must be capable of stopping the vehicle in a straight line without losing control during the brake test.

Electronic braking or wire operated braking systems are strictly prohibited. There should be no leakage from the master cylinder or reservoir.

The bleeding point should be at upper most side of calliper.

The teams are recommended to have marginal brake pedal working travel to reduce skidding away of vehicle after heavy braking.

The master cylinder must be inside the pedal box means it must be behind pedal box when viewing from front side of kart.

Calliper pads must be completely covered by brake disc. Use of SAE Rated Fluid Line is must.

## **9.0 Brake Light-**

The vehicle must be installed with a brake light red in colour which is clearly visible from the rear.

If an LED brake light is used, it must be clearly visible in very bright sunlight. This light must be mounted between the wheel centreline above rear fairing only.

All the electrical connections done must be well insulated.

## **10.0 Brake Over travel Switch-**

All the vehicles must have a properly mounted brake over travel switch. This switch should not be operable in normal braking conditions, it must act in case of brake failure or the over travel of the brake pedal in case of brake failure.

This switch must kill the Motor but not the brake light connection when pressed. Push to off kill switch must be used.

## **11.0 Visibility Requirements-**

The Motor compartment must be completely visible to the examiners. There should be no hindrance to air flow over the Motor so that Motor will not get overheat. All items on the Inspection Form must be clearly visible to the technical inspectors without using instruments.

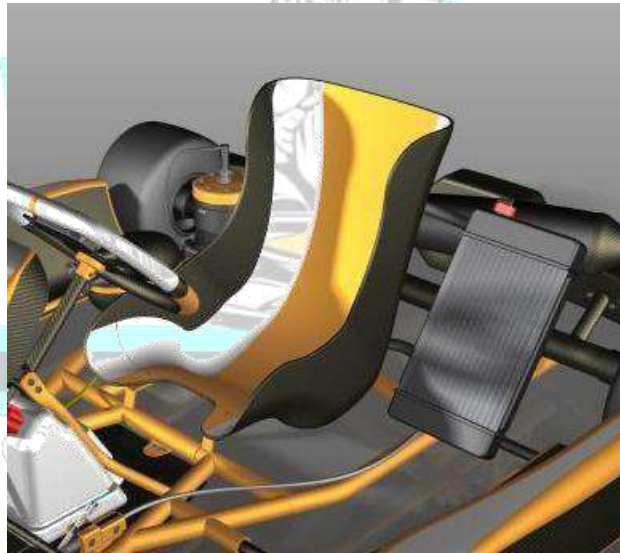
### **12.0 Driver Seat-**

The seat mounting must be rigid enough to withstand the dynamic conditions while the driver is driving the vehicle on the track. The driver seat should be at least 2 inches away from the firewall.

Seat must be mounted at four points to frame by fasteners only and dampers must be used between seat and frame for vibration isolation.

Circular Pipes must be used as seat mounting Member. Square pipe or L angles will not be allowed. It is strongly recommended to use bucket seat of reinforced material. Seats used from chairs or stools or seats having height from floor pan are strictly prohibited.

When seated in the normal driving posture, the driver seat will not contact any metal or other materials which may become heated to a surface temperature above sixty degrees C (60°C). If such condition arises, there should be insulation provided to avoid heat.



(Bucket type driver seat)

### **13.0 Floor pan-**

The teams must use floor pan of metals only which should prevent dirt or debris to enter in driver cockpit. There must not be hole greater than 6 mm in any area of floor pan. They must be bolted to frame by using rubber washers in order to reduce vibrations and noise.

### **14.0 Bodywork-**

The teams must use bodyworks provided by SPAARK Motorsport / NGIL Solutions Pvt Ltd only. Use of metallic sheet is strictly prohibited. Any other type of bodyworks is strictly prohibited.

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### **15.0 Kill Switch-**

The vehicle must be equipped with at least two kill switches. These kill switches must be able to cut off all the electrical connections including motor and must be rigidly mounted near the steering handle where the driver can easily control it.

Second kill switch should be placed in left side of the vehicle such that in emergency the external person can operate it easily.



### **16.0 Wheels and Tyres-**

Teams must use standard go-kart wheels only. The rear wheels must be locked by using castle nut and cotter pin. The teams which don't have this locking system will lead to disqualification. Any modifications on the wheels after the manufacturer are strictly prohibited.

### **17.0 Fasteners-**

All bolts used in the system must meet metric grade M8.8. No fasteners used should be less than 8.8 hardness.

Thread lockers spring washers are prohibited. All fasteners used should have min 2 threads showing past the nut.

Locking nuts are mandatory to be used everywhere in the vehicle. Failure to fulfil this, no team will get "T.I. OK" for the vehicle.

### **18.0 Fire Extinguisher-**

Each team must have at least two (2) no's of 01 kg ABC type fire extinguishers.

One to be rigidly mounted with vehicle and should be easily accessible to the driver in case of emergency and another with crew member at all dynamic events.

Fire extinguisher should be working in condition. It should bear a sticker or a bill clearly mentioning its expiry.

### **19.0 Path for Wires and Pipes-**

No pipelines/wire connections must go under the chassis. It is strictly prohibited. Doing so may lead to disqualification of the team.

Teams are recommended to join the wires by lugs to avoid poor earthing and loose connections due to vibration.

### **20.0 Shaft-**

Any type of welding on or to shaft, sprocket, disc and hubs is strictly prohibited. The locking of hubs should not be achieved by throughout holes. Use of Key, circlip or spline is recommended.

### **21.0 Firewall-**

It is not necessary to use firewall or electric vehicle.

### **22.0 Push rod-**

The teams must have any detachable system to push or pull the kart in the run off area throughout entire event. It is recommended to have mounting of rod exactly at the centre axis of kart. **It is mandatory to use Kart Stand.**

### **23.0 Unstable Vehicle-**

Any vehicle exhibiting handling or other vehicle dynamics (such as wobbling front wheels) that are deemed unstable by the technical inspectors will not be permitted to participate in the dynamic event. The decision of the Head of the Technical Committee of IKC in this regard will be final and binding to all. This is in the interest of safety of all teams.



## 24.0 Power Unit-

### Motor

Teams are free to select any motor meeting following requirements. The System Peak Power should not exceed 6000 W.

The acceptable specification of the power train is mentioned below.

- Motor type: BLDC/PMDC/hub motor wheel.
- Peak System Wattage: Peak Wattage of system is limited to 6000 W in all.
- Number of motors: 01
- Motor wattage (Total): up to 6000 W rated.
- Maximum System (Battery, Motor) Voltage: 72V
- Transmission type: Geared/Non-geared/chain-sprocket etc.
- Power Source : Battery only
- Maximum rated current : 84A
- Maximum peak current: 168A
- Charger voltage : 220V 50Hz
- Controller Voltage: Maximum 72V
- Controller current capacity: As per motor, battery specifications.

Teams can design their vehicle at any maximum safe speed. This can be done by selecting an appropriate final drive reduction.

Teams must provide the powertrain specification sheet with compulsory parameters as mentioned below in design report and present hard copies while technical inspection –

1. Motor Manufacturer Name
2. Model No / Identification No
3. Motor Type
4. Rated Power (Kw)
5. Peak Power (Kw @ xxxx RPM) / (Kw @ xxx kmph)
6. Rated Torque (Nm)
7. Max Torque (Nm @ xxxx RPM)
8. Max 30 Minutes Power (Kw)
9. Max 30 Minutes Speed (Kmph)
10. Cooling System (Liquid / Air / Natural Air)
11. International Protection ((IP) code
12. Motor Weight (kg)

It is mandatory to present data sheet of motor and produce Torque vs RPM & Power vs RPM graph of the selected motor in design report.

**Failing to mention all above points in design report will result in 50 points penalty.**

### Motor Controller

The speed controller for the motor should be in accordance with the motor specification. A higher grade controller is always beneficial to avoid cut offs. For a motor connected at 48V the controller will be rated higher than 48V to avoid controller damage but the controller used should not be more than 72V.

It is mandatory to produce data sheet of controller in design report as well as during TI.

Teams must provide the controller specification sheet with compulsory parameters as mentioned below in design report and present hard copies while technical inspection –

1. Manufacturer Name
2. Model No / Identification No
3. Control Principle (Vectorial / Open Loop / Closed Loop / Other)
4. Cooling System
5. International Protection (IP) Code
6. Rated Current (A)
7. Peak Current (A)
8. Affiliated Feature
9. Circuit / Connection Diagram
10. Controller Weight (Kg)

All electric connections must be secured with water and dust proofing. No wire should be hanging on any component of the vehicle.

Teams are allowed to attach external gearbox

### **Battery Pack – Rechargeable Energy Storage System (RESS)**

Allowed Battery Type – Any Chemistry of Lithium – Ion

Allowed Charger – 0.2C to 0.5C Rated

It is mandatory to provide data sheet of Li-ion cells that will be used in the RESS. The battery Pack should be IP67 Rated and team must present certificate of it. Teams must use EV Grade cells for battery ie. 3C Rated cells. Continuous current should not exceed 63A and peak current should not exceed 190A. If a team is using old battery pack, they must submit its health certificate.

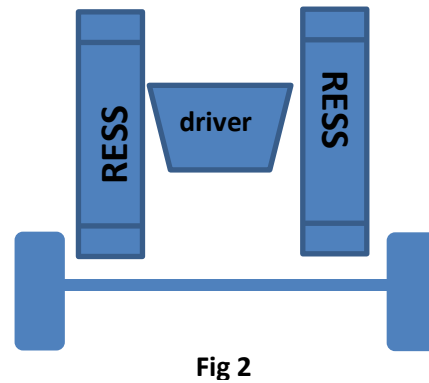
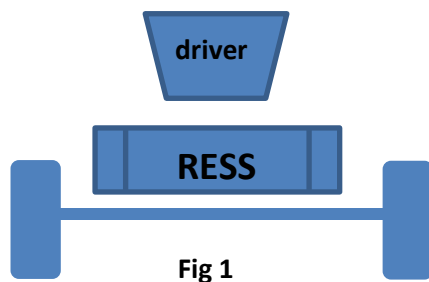
It is mandatory to have metal casing for the battery pack. Inside metal casing, RESS must be insulated with epoxy sheets & Heat Sink. Teams must have digital SoC meter installed on the RESS. Use of CAN Communicated BMS is must. The BMS must have protection from

1. Over Voltage
2. Under Voltage
3. Over Charging
4. Over Temperature
5. Short Circuit
6. Under Temperature
7. Over Discharging

Max Allowable DoD – 95%

Teams are allowed to use 1 single RESS or two RESS connected together. Use of additional power source for other vehicle accessories is strictly prohibited.

## Battery Pack Mounting



If team is using single battery pack, it must be mounted at the rear in centre as shown in fig 1. If team is using 2 battery packs connected together in parallel, it must be mounted sideways as shown in fig 2.

There should be a minimum of 3" distance between battery pack and driver.

Battery pack casing should be rigidly mounted to the chassis with top cover. The battery pack should be tightly packed inside the casing. Teams must place foam below and sideways of battery pack for tight fitting and reduced vibrations. **Use of smart BMS is must (CAN/Bluetooth communicated)**

Teams must provide the controller specification sheet with compulsory parameters as mentioned below in design report and present hard copies while technical inspection –

1. Battery Type
2. Battery Manufacturing Date
3. Battery Assembly Vendor
4. Battery Chemistry
5. Nominal Voltage
6. Maximum Voltage
7. Minimum Voltage
8. Continuous Charge C-Rate
9. Peak Charge C-Rate
10. Continuous Discharge C-Rate
11. Peak Discharge C-Rate
12. Charger Manufacturer
13. Charger Rating
14. Battery Life Cycle
15. BMS Manufacturer
16. BMS Protection

Teams failing to justify the above given battery pack specifications will lead to disqualification.

## 25.0 Fuse or Circuit Breaker

One or more Fuses or circuit breaker should be installed in the power line i.e. from batteries to controller, to shut down the vehicle in the event of a fault in traction circuit. Minimum of 1 fuse (of rating  $\leq$  max System Current) is mandatory at primary output of battery; If vehicle electronics (e.g. horns) operates at separate voltage, 1 Fuse or circuit breaker is mandatory in that circuit.

Under no circumstances teams will be allowed on track without specified fuses installed. All fuse locations must be chosen such that they are easily accessible for verification/replacement. Fuse specification should be clearly readable. Cartridge fuses are recommended

## 26.0 Chain guard-

There must be protection of chain and sprocket by using metal sheet or plastic mould to ensure safety of power train.

## 27.0 Kart Number

There are chances of getting low lights during the race, so for better visibility, it is mandatory to stick kart number in black front colour having height exactly 5 inch at front nose and either side fairings and rear fairing of kart in yellow background only.



(Refer above images for kart number position.)

## 28.0 Power Unit Registration-

For Power Unit registration, teams will need to present bill and papers of the Motor on which the model and Specs of Motor and Battery is clearly mentioned. Teams are advised to purchase the motor from a trusted dealer; no motor should be engaged in illegal issues, it may result into disqualification from the event.

## 29.0 Pre-Event Submission (50 Points)

In Pre-Event Submission, teams should submit-

1. Production Video- 2 to 3 minutes - Max Size 100 Mb
2. Brake Test- Max Size 100 Mb
3. TI Sheet- Max Size 2Mb
4. TI Photos- Zipped Folder-Max Size- 100 Mb
5. Material Testing Certificate- Max Size 2 Mb
6. Power Unit Registration- Max Size 2 Mb
7. Indemnity Bond- Max Size 2Mb

Again, we would like to remind you that above submissions are made compulsory to make teams present their kart in event in RACE READY CONDITION and to avoid last minute rush during event.

Teams will have to email above mentioned data in given size through Google Drive to [info@indkc.com](mailto:info@indkc.com). Team should share Google Drive Links of above different videos and zipped folder in single email only from their registered team email-id. The subject should include Team Name. The access of Google Drive Link must be open. If any team by mistake share links without permission, such team will be directly dis-qualified without any prior notice.

Teams failing to submit Google Drive Link before mentioned deadline will be DISQUALIFIED from INDIAN KARTING CHAMPIONSHIP and will not be allowed to enter at event venue.

### **1. Production Video**

2 to 3 Minute Video covering spot welding and seam welding on frame, bending and cutting of pipes, mountings such as Motor, seat and other sub-systems. This video should also include 1st trial run of vehicle.

### **2. Brake test video submission-**

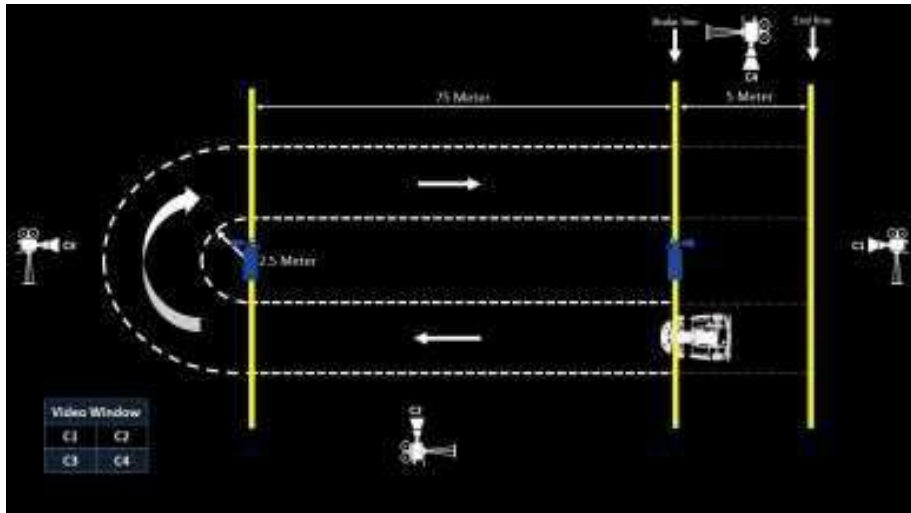
The goal of the brake test video submission is to ensure that all teams present a car to Technical Inspection and brake test in race ready condition which is capable of passing because there will be no time given to teams to work on kart after technical inspection.

Teams are required to have properly working brake system before coming to event in such manner that all wheels should be locked after applying brake and kart must stop in straight line.

The maximum allowed angle of skidding after application of brake is limited to 25<sup>0</sup> approximately. This is to keep vehicles in the control of driver in endurance test.

- i. Driver must wear full safety gear as mentioned in above rules
- ii. Marking must be done on tires for clear visibility of locking.
- iii. One team member must keep fire extinguisher in hand and should remain close with kart. This student must be seen on the video during the Motor start and when the car first moves.
- iv. Motor must be started by the driver with no external help. After starting Motor, kart will travel minimum 30 meters and must achieve speed of approximately 45kmph then kart will make u turn may be left handed or right handed with any radius of arc, again kart will travel for 30 meters in straight line. Driver will have to apply brakes and is recommended not to lift up brake pedal until all wheels get locked. The Motor should not turn off after application of brakes. Once vehicle stops in straight line, driver will turn off the Motor with kill switch must egress out of the kart within 5 seconds. The disconnection of Motor and egress should be clearly visible in video.
- v. The entire video needs to be shot in HD (720 p) format and it must be continuously shot from the driver getting in the car, starting the Motor, running the kart, performing the manoeuvres as described above, coming to a standstill with all four wheels locked under braking, killing the Motor and driver egress.
- vi. If any team submit video which is shot in dimmed light or do not include shot of rear wheel locking, such team will be dis-qualified without prior notice.





#### 4. Online Technical Inspection submissions-

In mentioned deadlines, teams should send their photos and videos of kart along with TI sheet. Then the kart will be inspected by checking photos and videos & accordingly, changes will be assigned if any. When team come for TI during the final event, they will have only 1(one) attempt in which changes will be verified however if team still wouldn't have made the assigned changes will be disqualified.

However, if committee finds that there are very small changes that teams need to do to clear Technical Inspection at the event site; such teams will have 1 more chance to clear it. The teams can work in their paddocks after their 1st attempt. At the end of 1st day, the committee will visit paddocks of such teams who failed to clear TI and after reviving the seriousness of issues, the committee will either clear TI or disqualify team from the event. It is recommended that teams must not depend on this attempt of TI since it is totally depending upon technical committee decision and conditions during the event.

There should not be violation in the submitted sheet and at event sites inspection time.

#### 5. TI Photos

1. Front View of Complete Assembled Kart
2. Side View of Complete Assembled Kart
3. Top View Complete Assembled Kart
4. Under body View
5. Front bumper (mounting to chassis)
6. Rear bumper (mounting to chassis)
7. Side bumper (mounting to chassis)
8. Driver Kit Photos- In each photo, SFI sticker should be visible.
9. Seat and Mounting member
10. Floor Pan and Mounting
11. Steering stoppers
12. Tie-rods
13. Knuckle
14. Front wheel Lock nut.
15. Tripod or Rack and its mounting
16. Steering column and its mounting members
17. Steering wheel hub and its attachment to column

18. Top view of steering wheel
19. Master cylinder mounting
20. Brake pedal attachment to master cylinder
21. Brake over travel switch
22. Controller
23. Positive Controller stopper
24. Brake fluid line
25. Brake disc mount
26. Calliper mount- Bleeding point should be upward
27. Brake light
28. Motor Mounting
29. Fire wall
30. Wiring box
32. Chain sprocket assembly
33. Chain guard
34. Ground Clearance (lowest point of vehicle) measurement by tape.
35. Rear wheel locking to shafts (may include castle nut and cotter pin)
36. Kill Switches
37. Electric Wires routing
38. Battery mounting
39. Kart number on body fairing
40. Push Rod and its pivot mounting
41. Fire extinguisher mounting

### 29.1 Pre-Event Submission Scoring Format-

Rating	Points	Parameters
A	50	Followed maximum guidelines for each submission. Brake Test is OK! Technical Inspection criteria cleared– more than 90%
B	30	Maximum guidelines maintained for each submission. Brake Test is OK! Presented maximum photos of TI. Technical Inspection criteria cleared– more than 60%
C	10	Just completed all submissions maintaining few guidelines. Incomplete production Video. Brake Test Is not OK! Technical Inspection criteria cleared– more than 50%
D	Dis-Qualify	No DVD Submission or No complete assembled kart or Not following any guidelines for submission. Technical Inspection criteria cleared– less than 50%

### 30.0 Innovation-

It does not contain any points and is not mandatory to have innovation. The innovation will be verified during the technical inspection of the kart. The teams must submit innovation report along with design report submission.

## SECTION G

### 31.0 Virtual round-

This round will be held to judge best design and to evaluate design. There will be no elimination of teams.

Teams will have to present their design report, analysis, innovation (if applicable) calculations and presentation in this round. The design evaluation will be conducted during technical inspection.

Teams are requested to bring hard copies of each report during the presentation.

The maximum number of team members for presentation round is limited to 5 people.

The format for each document will be mailed or announced on website.

### 32.0 Technical inspection –

Before the dynamic event there will be TI (technical inspection) which does not carry any points but is necessary for participating in dynamic event. TI will be based on rulebook parameter and safety checks of the vehicle.

The team will be allowed only 2 chances for the TI test failing which the team will be considered disqualified for the dynamic events.

The maximum number of team members for TI is limited to 4 people including drivers.

**Inspection sticker-** The teams who have cleared technical inspection will get sticker on kart which will also be used in further dynamic events for noting down timing of each event on it.

Technical Inspection OK Signature _____	Brake Test OK Signature _____	Acceleration Time _____ Signature _____	SKIDPAD Time _____ Signature _____
AUTCROSS Time _____ Signature _____	INDIAN KARTING CHAMPIONSHIP TIME TRIAL Time _____ Signature _____	QUALIFYING Time _____ Signature _____	FINAL Time _____ Signature _____

(All the Test Timing & Design Evaluation Rating will be put on this sticker just after clearing a test)

### 33.0 Brake Test-

As soon as team clears technical inspection, it will line up for brake test. Thus, teams are requested to bring kart for TI in race ready condition.

It's mandatory for a vehicle to pass the brake test to participate in any of the dynamic events. The vehicle must stop in a straight line after the brake is applied on the vehicle. It is mandatory that all wheels must be locked to clear brake test.

Each vehicle will be given 2 attempts to pass the brake test. But in case if the vehicle passes the test in first attempt it will not be given any other trials.

There will be 25 meters distance between starting and finishing line. In case, if team is having gearless Motor, driver should throttle up the Motor upto 75%. As soon as front wheel approaches to finishing line, driver should press the brake pedal and immediately wheel should get locked and should be in continuously locked till the vehicle stops. When the vehicle stops, the Motor should not get killed, however, it should in ON condition.

## SECTION H

### 34.0 Acceleration Test-

Acceleration determines the time it takes the vehicle to accelerate along 50 meters flat course.

Each team may take two attempts but with different drivers.

Scoring will be based on better of two attempts. The starting and stopping moment of vehicle will be judged by positional sensor devices.

Scoring Formula- Acceleration score =  $50 \times [(T_{\text{longest}} - T_{\text{yours}}) / (T_{\text{longest}} - T_{\text{shortest}})]$

### 35.0 Skid Pad –

The skid pad layout may be a figure of 8 or S depending on the track condition but minimum track width will be 2.5m and shortest turning radius 2.0m.

Each team may make two attempts but with different drivers. Scoring will be based on the better of the two attempts. Timing will be measured by using either electronic system.

Scoring Formula- Skid Pad score =  $50 \times [(T_{\text{longest}} - T_{\text{yours}}) / (T_{\text{longest}} - T_{\text{shortest}})]$

### 36.0 Autocross-

The autocross course will consist of zig-zag path and having cones at continuously decreasing distances. The detailed path will be announced on prior to dynamic events.

The vehicle will be staged such that the front wheels are 6 m behind the starting line. Each team may make two attempts but with different drivers. Scoring will be based on the better of the two attempts. Timing may be done using either electronic systems or stop watches.

Scoring Formula- Autocross score =  $50 \times [(T_{\text{longest}} - T_{\text{yours}}) / (T_{\text{longest}} - T_{\text{shortest}})]$

### Penalties of skid pad and autocross -

Cones down or out- A penalty of 2 seconds will be added to the time for every cone that is knocked.

DNF- The vehicle which go out of course or follow incorrect path will be given Does Not Finish penalty. If vehicle stalls or breaks down, it will be given as DNF.



### **37.0 Endurance test-**

The Endurance Event is designed to evaluate the overall performance of the vehicle and to test the vehicle's reliability. There will be track walk for drivers and no trial run will be provided. It will consist of 15 laps wheel to wheel racing of Maximum 12 Karts. The pole position for final race will be assigned on the basis of fastest lap in qualifying race. No driver change is allowed during race.

Final race score=  $500 \times [(T_{\text{longest}} - T_{\text{yours}}) / (T_{\text{longest}} - T_{\text{shortest}})]$

T longest value will be assigned between 2 to 3 times of T shortest based on track pace.

Endurance Charging- No Charging of Battery is permitted during the race.

Vehicle Breakdown and Stalls- If a vehicle stalls, or ingests a cone, etc., it will be allowed to restart and re-enter the course where it went off, but no work may be performed on the vehicle. If a car stalls and cannot be restarted without external assistance, the track workers will push the car clear of the track.

Endurance Minimum Speed Requirement- If a car is unable to maintain lap times within 105% of the fastest lap time for the course, and then it must exit immediately. Disqualification for failure to maintain the minimum speed will be made at the discretion of the Director of Operations.

Rash Driving- Any reckless or aggressive driving behaviour (such as forcing another car off the track, refusal to allow passing, or close driving that would cause the likelihood of car contact) will result in a black flag for that driver. When a driver receives a black flag signal, he must proceed to the penalty box to listen to a reprimand for his driving behaviour. The amount of time spent in the penalty box will be the time penalty for the vehicle.

Last Lap Board- Suppose, kart number 50 completes the second last lap, he will be shown Last lap board mentioning "Last Lap 50" in black font on yellow background.

In this manner, each kart in slot will be reminded by volunteer assigned to particular team. If any team overlap or underlaps, it will be assigned with 0 points.

External Assistance- If vehicle stalls during race, no external assistance is allowed. Working on kart will be allowed only in safe region. Driver should move kart from track area to safe region.

Wet weather condition- If by chance, there comes rain prior to race, teams are advised to fit wet tires since race schedule will not be changed and teams must race on wet track. Teams who will not have wet tires will not be allowed to enter in race.

If there comes rain during the race (after starting of race in dry condition), the race will be restarted in wet condition. However, time for changing tire will be provided.

Teams can use wet tires on dry condition but are restricted to use dry tires on wet condition.

#### **10 Second Penalty-**

1. Disobeying Flags
2. Intentionally pushing other vehicles outside the track
3. Blocking faster vehicles from overtaking



## Flags

The flags are the instructions expelled by organizer during the dynamic event and each driver must obey flags.

Black/Red flag- Pull into the penalty box for discussion with the race controller or other official concerning an incident. A time penalty may be assessed for such incident.

Checker flag - Your session has been completed. Exit the course at the first opportunity.

Green flag - Your session has started, enter the course under direction of the starter. (NOTE: If you stall the vehicle, please restart and await another green flag as the opening in traffic may have closed.)

Yellow flag - Danger, SLOW DOWN, be prepared to take evasive action, something has happened beyond the flag station. NO PASSING unless directed by the corner workers.

## SECTION I

### 38.0 Queries

For registrations and technical issue, schedule and other questions- [info@indkc.com](mailto:info@indkc.com)

If team want to clear query immediately, they can contact on following numbers.

Contact no for registrations and technical questions: +91-8308073141 & +91-7798406779

## SECTION J

### 39.0 Results

The results of each dynamic and static event will be written on TI Sticker at event site in a moment after clearing test.

The decisions by organizers regarding the result will be final and teams must comply with it. No any team possess any right to object on the decisions of organizer regarding result. We appreciate and respect each participant's hard work and effort to enter the event. Teams are requested to settle down any disputes in professional manner in a meeting room.

## SECTION K

### 40.0 Penalties

#### 40.1 Document submission-

The late submission or failure to submission of design report, CAE report, Technical Inspection Sheet, calculation report, design presentation and indemnity bond will lead to 50 points standard penalty. If you submit design report 1 hour late or 1 week late, you will be applied with 50 points penalty.

**40.2 Violations to flags-** if any driver does not obey flags, the team will be penalized for 50 points.

**40.3 Vehicle movement-** Teams are restricted to use the power of Motor other than dynamic events. If any team uses power of Motor for movement, they will get penalty of 100 points without any prior warning.

**40.4 Misbehaviour or arguments with officials or volunteers -** 100 points penalty or disqualification or ban for 3 years.

#### 40.5 Changes in vehicle after TI –

Team can change their sprocket ratio and tires after technical inspection without disturbing parameters such as ground clearance mentioned in TI sheet.

Teams are not allowed to eliminate any component in vehicle after technical inspection. If any team found while eliminating or disturbing safety parameters mentioned in TI sheet, such team will be penalised for 50 points.

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Or call us on +91-8788746228 / 8788746228



Kind Regards

A handwritten signature in black ink, appearing to be "S. S. S." or similar.

Convenor, IKC