

# PETROSAINS RBTX CHALLENGE 2023



## RULES AND REGULATIONS



## ROBO SUMO 3 kg 10 years old & above

It is recommended that you review the general terms and conditions prior to reading the rules for a specific category, as the general terms and conditions apply to all categories throughout the entire competition.

Version: 15 April 2023

# **TABLE OF CONTENT**

1.0 INTRODUCTION

2.0 GENERAL RULES

3.0 RING INTERIOR

4.0 RING EXTERIOR

5.0 SPECIFICATIONS OF THE ROBOT

6.0 RESTRICTIONS ON ROBOT DESIGN

7.0 GAME PRINCIPLES

8.0 BEGINNING OF A MATCH

9.0 END OF A MATCH

10.0 MATCH CANCELLATION AND REMATCH

11.0 WINNING A MATCH

12.0 VIOLATIONS

13.0 DISQUALIFICATION

14.0 OBJECTIONS

15.0 SPECIFICATIONS OF ROBOT TAGGING

16.0 INJURIES AND ACCIDENTS DURING THE MATCH

17.0 MISCELLANEOUS

APPENDIX

## 1.0 INTRODUCTION

**Robo Sumo** is a sport that involves designing and programming a robot equipped with sustainable features to push its opponent out of a circular ring. The robots are equipped with sensors, motors, and other mechanical components that allow them to navigate the arena and react to their opponents. The aim is to create a resilient autonomous robot that can outmaneuver and outsmart its opponents, pushing them out of the ring while remaining inside itself

**Robo Sumo 3kg category challenged young innovators aged 10 years old and above to build and program a resilient autonomous robot integrated with sustainable features which capable of propelling its opponent out of the ring. The robot that remains inside the ring will be declared the Robo Sumo champion.**

## 2.0 GENERAL RULES

- 2.1 A match involves two contestants (one operator per robot can be registered but may be assisted by their mechanic/team) who start the robot that they have made themselves in the Ring according to the Game Rules.
- 2.2 Participants must be **10 years old and above**. Those aged below 18 years old must be accompanied by a parent/guardian/teacher.
- 2.3 The contest continues until a robot falls out of the Ring or the match time limit is reached. Any decision to end the match will be made by the referee.
- 2.4 **Competition Phases:**
  - I. **Registration:** Each team is required to register through the RBTX website. Each participant can register for one team **ONLY**.
  - II. **Online Learning:** Participants are required to complete the learning modules and passed the assessment in the RBTX Portal to proceed for the next level. Passing marks is 80%.
  - III. **Grand Finals:** All finalists will be informed of the competition schedule right during technical briefing.

### 3.0 RING INTERIOR

- 3.1 The Ring interior is a **circular metal plate** with a height of 5 cm and a diameter of 154 cm including the borderline (refer to Appendix A). It has a black matte surface.
- 3.2 The border line is indicated as a white circle with a width of 5 cm. "On the border" is defined as being within the interior of the Ring.
- 3.3 Shikiri lines (starting lines) consist of two painted parallel brown (or equivalent for absorption of IR light) lines centred in the ring with appropriate width and spacing. The distance between the lines is measured to their outside edges.
- 3.4 During the game, it is up to the referee to decide whether the Ring can continue to be used or whether it should be changed when a scratch or tear appears on the Ring surface.

### 4.0 RING EXTERIOR

There will be a space appropriate outside the outer edge of the ring for the referee and contestants. This space will be of different colours, and any material or shape as long as the basic concept of these rules is not violated.

### 5.0 SPECIFICATIONS OF THE ROBOT

- 5.1 The robot size (when all parts are not extended) must be less than 20cm x 20cm (W x L) at the beginning of the match.
- 5.2 During the match, after the game starts signal, **the robot is allowed to expand to a maximum of 25cm x 25cm (W x L) in size**. However, every time before a match starts, the robot must retract to its original size.
- 5.3 Weight (including accessories) must be more than 2000g and not exceed 3000g.
- 5.4 The robot must be self-operated (autonomous) with a remote start/stop button.
- 5.5 There are no restrictions on the microprocessor, type, or brand of robot to be used. The robot can be built from scratch, custom made or bought off the shelves and all shall compete within the same category as long as it complies with the rules and regulations as stated within. All costs or expenses for the robot build-up shall be borne by each participating team, and not the organizer.

## **6.0 RESTRICTIONS ON ROBOT DESIGN**

- 6.1 The robot must not be equipped with any parts **that might damage or deface the Ring**.
- 6.2 The robot must not be equipped with any parts that might damage the opponent robot.
- 6.3 The robot must not be equipped with a device that obstructs the opponent's operation, such as a jammer or strobe light.
- 6.4 The robot must not be equipped with a device that can release liquid, powder or gas.
- 6.5 The robot must not be equipped with detachable parts or a firing or throwing device.
- 6.6 The robot must not cause danger to the referee, operators and audience.

## **7.0 GAME PRINCIPLES**

- 7.1 A game consists of three one-minute matches. There will be no breaks in between the matches.
- 7.2 The first contestant to win two matches is the winner of the game.
- 7.3 The contestant with the most wins out of the three matches will be the winner of the game.
- 7.4 In the event of a tie after the third match, the lighter robot will be declared the winner.

## **8.0 BEGINNING OF A MATCH**

- 8.1 Following the referee's instructions, the contestants will enter the Ring area and place their robots (facing any direction) centred behind their starting point.
- 8.2 At the referee's start signal, the operator must press the start button/flick from a remote (due to safety reasons, no START/STOP switch button on the robot is allowed). The robot should be designed to begin action about 5 seconds after it is turned on. During these 5 seconds, contestants must clear out of the ring area.
- 8.3 No changes in robot components and batteries are allowed during the match.

## **9.0 END OF A MATCH**

The match ends when the referee calls the winner, or the match time limit is reached.

## 10.0 MATCH CANCELLATION AND REMATCH

A match will be cancelled for a rematch under the following conditions:

- 10.1 Both robots touch the exterior of the Ring at the same time.
- 10.2 Any occurrence of violations.
- 10.3 Any other conditions under which the referee decides that there are no winners.
- 10.4 In the case of a rematch, maintenance of competing robots is prohibited, and the robots must immediately be placed back at the starting point. The one-minute timer will not be reset.

## 11.0 WINNING A MATCH

- 11.1 The robot which manages to push its opponent out of the Ring with a fair action will be declared the match winner.
- 11.2 A robot will be declared a match winner if the opponent's robot steps out of the Ring on its own (due to any reason).
- 11.3 A robot will be declared a match winner if the opponent is disqualified or has more than one violation.
- 11.4 The match will be considered a tie if both robots manage to stay in the Ring until the match timer ends.

## 12.0 VIOLATIONS

- 12.1 The operator enters the Ring before the referee's call to end the match.
- 12.2 The robot begins action before the referee's start signal or before the '5 seconds' mark.
- 12.3 The robot does not move at all or is not powered on during the match.
- 12.4 Any other actions that may be deemed unfair by the referee.
- 12.5 A warning will be given for the first violation. A second violation will result in disqualification.

## 13.0 DISQUALIFICATION

- 13.1 A contestant is not present for robot inspection five minutes before the beginning of the game.
- 13.2 A contestant's robot does not meet the "**Specifications of the robot**" and "**Restrictions on robot design**". For example, the robot size is bigger than 20cm x 20cm or the robot is equipped with parts that will damage the Ring.
- 13.3 A contestant ruins the game. For example, by intentionally breaking, damaging or defacing the Ring.
- 13.4 A contestant displays unsportsmanlike behaviour. For example, using rude and offensive language or injuring an opponent or a referee.

## 14.0 OBJECTIONS

- 14.1 Contestants with any objection must express the disagreement to the secretariat before the end of the game.
- 14.2 Objections to the judgment of the referee will not be entertained.

## 15.0 SPECIFICATIONS OF ROBOT TAGGING

Contestants must **clearly display** the registered robot numbering code during the competition.

## 16.0 INJURIES AND ACCIDENTS DURING THE MATCH

- 16.1 A contestant can request to stop the game when he/she is injured or his/her robot has an accident which can prevent the game to continue.
- 16.2 In the event that the game cannot continue due to a contestant's injury or robot's accident, the contestant who is the cause of such injury or accident will be forfeited. When it is not clear which team is the cause of such incident, the contestant who is unable to continue the game, or who requests to stop the game, shall be declared as the loser.
- 16.3 The game can continue in the event of any injury or accident if decided by the referee and the Committee members. The decision process shall take no longer than five minutes.

## 17.0 MISCELLANEOUS

As long as the concept and fundamentals of the rules are observed, these rules shall be flexible enough to encompass the changes in the number of players and the contents of the matches.

**APPENDIX**  
Appendix A



Sumo Robot (3kg Category): Game Field Setup

- **5cm** white border
- Separation of Shikiri lines **20 cm**
- Length of Shikiri lines **20 cm**
- Width of Shikiri lines **2 cm**
- The diameter of the Ring (including the white border) is **154cm**