

# Sumo Rules

## (Mini-, Full-Size, and LEGO)

### Goal

The goal is for your robot to push the other robot out of the sumo ring.

### Robot Specifications

Robots must not intentionally harm other robots!

Robots must be safe, and must comply with the "General Rules for All Robots."

#### Mini-Sumo

- Maximum size: 10 cm x 10 cm square x any height, at the start of the match
- Maximum weight: 500 grams
- Must be autonomous
- Three levels of competitors

#### Full-Size Sumo

- Maximum size: 20 cm x 20 cm square by any height, at the start of the match
- Maximum weight: 3 kilograms
- Can be autonomous or remote controlled

#### LEGO Sumo

- Maximum size: 15.2 cm x 15.2 cm square x any height, at the start of the match
- Maximum weight: 1 kilogram
- Must be autonomous
- Compete on the mini sumo ring

### Classes

#### Mini-Sumo (Beginner and Master)

There are 2 classes for Mini-Sumo: Beginner and Master. The classes are based on the robot builder. A builder cannot enter both mini-sumo classes (if you have two robots, you must place them both in the same class). For more details see "Which Mini-Sumo Class to Enter."

#### Full-Size Sumo (Open)

For bigger, more powerful robots, come and play with the big boys...if you think you can handle it!

#### LEGO Sumo (Beginner)

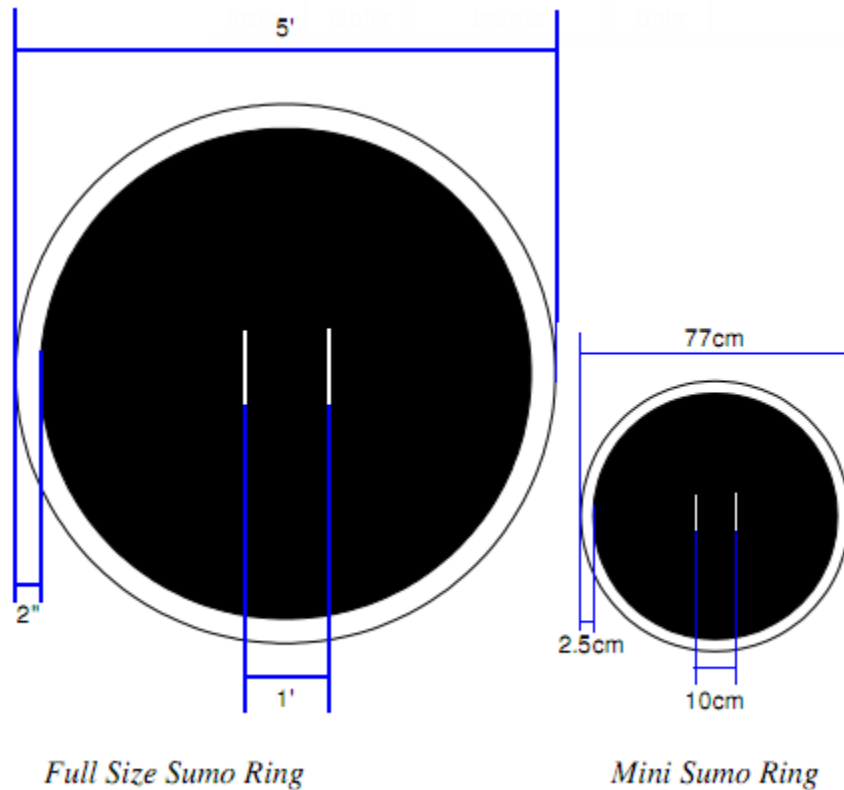
This class has been added to give beginners an opportunity to get into the sumo competition.

## The Sumo Ring

The ring is a circle, made of particle board with a black melamine surface. It has a painted white line around the edge, and the top surface of the ring is raised approximately 2.5 cm above the surrounding surface.

The starting lines are in the center of the ring and are made with black marker.

When the robots are competing, the area outside the ring shall remain clear of all spectators, competitors, and objects for a distance of 1 ring diameter beyond the edge of the ring. This is to maintain consistent conditions for sighted robots.



## The Sumo Match

Each "match" consists of 3 "rounds", with each match a maximum of 3 minutes, unless extended by the judges. The winner of each round is awarded 1 point. In the event of a tie for the round, no points are awarded for that round.

The first robot to get 2 points is the winner of the match. If after three rounds, the score is 1 to 0, the robot with 1 point is declared the winner. In the event of a tie for the match, the judges decide which robot is superior, and declare it the winner.

Each robot is initially placed by its operator at any point behind the starting line and at any angle. For the first round, one robot operator is chosen at random to place their robot first. For the second and third rounds, the loser of the previous round places their robot last.

# WCRG 2012 SUMO ROBOTS REV0

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**Note:** If a competitor takes more than 60 seconds to prepare their robot for a round, the other robot is declared the winner of that round.

Once the robots are positioned, the judge announces the start of the round. The contestants immediately activate their robots, and do not do anything more to control their robots until the round is over. **The robots must not move for at least the first 5 seconds of the round.**

A robot is declared the winner of a round and awarded 1 point when:

- The other robot starts to move before 5 seconds.
- The other robot touches the space outside the ring, which includes the vertical side of the ring (not the white line).
- The other robot stops moving for 10 seconds (it shall be considered not having the will to fight), or if it falls over "on the ring" and becomes immobilized in any way for 10 seconds. This is the case even if the first robot also stops moving or becomes immobilized during that 10 seconds.
- A Judge considers the other robot to be unsafe.

The round shall be stopped and re-started when:

- Both robots are in a clinch and stop movement for 10 seconds\*, or move in the same orbit for 10 seconds, with no progress being made.
- Both robots stop (at the same time) and stay stopped for 10 seconds\* without touching each other.
- Both robots touch the outside of the ring at about the same time, and it cannot be determined which touched first.

\* If it is not clear if progress is being made or not, the Judge can extend any of the 10 second time limits for up to 30 seconds.

If there is no winner within 3 minutes, the match is declared a draw.

If the match is tied, the judges will decide which robot is the winner of the match. The judges will take the following merits into consideration:

- Technical merits in movement and operation of each robot.
- Attitude of the players during the match.

## Not-So-Fine Print

1. If a robot damages another robot, a ring, the facility, or a person, that robot will be immediately disqualified from competing for the rest of the Games.
2. A robot must not leave any residue on the ring.
3. Tires and other components of the robot in contact with the ring must not be able to pick up and hold a standard 3"x5" index card for more than two seconds.
4. A robot must not fix itself to the ring (for example, glue, etc.).
5. Devices to increase down force, such as a vacuum pump or magnets, are **only** allowed in the 3 kg class.
6. All edges, including but not limited to the front scoop, must not be sharp enough to scratch or damage the ring, other robots, or players. In general, edges with a radius of greater than .005", as would be obtained with an unsharpened .010" thick metal strip, should be ok. Judges or competition officials may require edges that they deem too sharp to be covered with a piece of tape.
7. A robot must move (i.e. blocks of wood, etc. trying to impersonate a robot, will not be allowed).

## Which Mini-Sumo Class to Enter

The Beginner level is for novices (i.e. junior robot builders), so competitors must be under 18 on the day of competition. If you have won or placed in a major robotic Sumo or Mini-Sumo contest previously, then you cannot enter the Beginner class.

If you are over 18 years old, even if this is your first robot, and/or if you have attended a workshop and/or built a simple kit then the Beginner class is for you, even if your dad helped you out a bit.

If you are an electronics engineer and have designed and built a robot with a micro controller, optical range-finders and high-powered gear motors, then even though it may be your first robot, you should be in the Advanced class.

If you machined a custom chassis, or fabricated your own printed circuit board, Master class is for you.

The following components on your robot will automatically class you in the Master level: Rechargeable Lithium battery pack, custom-made wheels or hubs, custom-made micro controller, custom-made printed circuit board, Titanium motor mounts.

If your uncle (who just happens to be an engineer with NASA) built and programmed an advanced robot for you, then you should be in the Master class even if you're only six years old.

If in doubt you should enter the Advanced or Master class: that's where the bigger prizes, bragging rights, and maximum respect will be earned anyways! Keep in mind, Judges reserve the right to class you in a higher class after looking at the level of technology and complexity of your robot.

## Other Sumo Competitions

If you are planning on attending other robotic competitions, make sure you check each competition's rules for any variations. For example, some competitions use steel rings.