

# RoboWar PS - Finale Round

## Overview

Enter the battlefield where metal meets mayhem, and only the strongest bots survive! Sparks will fly, gears will grind, and destruction will reign as fearless warriors of steel clash for glory. This is not just a fight—it's a war of innovation, strategy, and pure engineering dominance. In the electrifying finale, unleash your most devastating designs with flames, spinning blades, and razor-sharp edges to claim ultimate victory! "Welcome to Robowar—where legends are built and machines rise to victory!"

## Problem Statement

Design and construct a remote-controlled (wirelessly) robot capable of fighting a tournament against another robot.

**Objective:** Design, build, and battle a combat robot that outperforms rivals through strategy, innovation, and engineering excellence. In the finale, dominate the arena with unrestricted destructive potential—harness flames, spinning blades, and sharp edges for maximum impact—while ensuring safety, fair play, and an electrifying competition. The sole limitation is the prohibition of any liquid-based elements.

## General Rules

The competition will be played on a knockout basis, consisting of 2 teams at a time.

The maximum duration of each round will be 5 minutes. Any team that is not ready at the time specified will be disqualified from the competition automatically.

The machine would be checked for its safety before the competition and would be discarded if found unsafe for other participants and spectators.

The organizers reserve the right to change any or all of the above rules as they deem fit.

Violation of any of the above rules will lead to disqualification.

Judges' decisions shall be treated as final and binding on all.

## Design Specifications

## Basic Specifications

- **Weight Limit:** The robot must not exceed 9 Kg, including all components. The remote controller's weight is excluded.
- **Dimensions:** Participants are free to design the robot in any size. However, the total weight of the robot, including all components, must not exceed the given range (9 kg).
- **Cluster Bots:** If using a cluster bot formation, each bot must meet the weight and dimension requirements, and the total weight of all bots combined must not exceed 9 kg.
- **No Liquids:** The robot must not use any liquid-based weapons, projectiles, or mechanisms (e.g., water, glue, or other fluids) as part of its system. Flames, spinning blades, and sharp edges are permitted in the finale.

## Mobility

### Allowed Mobility Methods:

- Rolling: Wheels, tracks, or the entire robot can roll.
- Walking: Linear-actuated legs with no rolling or cam-operated motion.
- Shuffling: Rotational cam-operated legs.

### Not Allowed:

- Jumping/Hopping: Any form of jumping or hopping is prohibited.
- Flying: Use of airfoils, helium balloons, ornithopters, or hovercrafts is not allowed.
- Sticky Surfaces: Robots cannot use suction cups, sticky treads, or glue to secure themselves to the arena.

## Robot Control Requirements

- **Control Type:** The robot must be controlled wirelessly. Wired control is not allowed.
- **Frequency:** The robot must have at least a four-frequency remote control circuit or two dual-control circuits to avoid frequency interference with other teams.
- **Autonomous Functions:** Autonomous functions are allowed, but the controller must be able to override or disable them at any time.
- **Emergency Stop:** A manual emergency stop (E-stop) function must be available on the remote control to override autonomous functions in case of emergencies.
- **Binding Capability:** The remote must bind with the robot and function through barriers like polycarbonate or metal.
- The DC motor used for the robot's movement should not exceed 300-500 RPM.
- If any tools, such as a hammer or lifting endpoints, are used, their motor speed must not exceed 100-300 RPM.

## Battery and Power

- **Power Source:** The robot must be powered electrically. Internal combustion engines (IC engines) are not allowed.
- **Battery Type:** Only sealed, immobilized-electrolyte batteries (e.g., Li-ion, NiMH, NiCd, or dry cells) are allowed.
- **Voltage Limit:** The voltage between any two points on the robot must not exceed 24V DC.
- **Battery Protection:** Battery terminals must be protected from short circuits. Damaged or non-leak-proof batteries will lead to disqualification.
- **Battery Change:** Battery changes are not allowed during the match. Teams must ensure their batteries can last the entire match duration.

## Weapon Systems

### Allowed Weapons:

- **Mechanical Weapons:** Lifters, claspers, rammers, wedges, spinning blades, sharp edges, and other mechanical weapons are allowed.
- **Flame-Based Weapons:** Controlled flames or fire-based systems are permitted, provided they pose no risk to spectators or the arena beyond the robot's design.
- **Magnetic Weapons:** Magnetic weapons are allowed, but high-power magnets or electromagnets are prohibited.

### Prohibited Weapons:

- **Liquid-Based Weapons:** No liquids, water, glue, or other fluid projectiles or mechanisms.
- **Entanglement Devices:** Nets, tape, or similar devices are not allowed.
- **High-Voltage Devices:** No tasers, Tesla coils, or radio jamming devices.
- **Arena Safety:** The robot must not damage the arena under any circumstances. All flame and spinning systems must include fail-safes to prevent uncontrolled spread.

## Competition Rules and Specifications

### Match Duration and Type

- **Match Duration:** Each match will last 5 minutes of active fight time, excluding any timeouts.
- **Match Types:**
  - 1-on-1 Match: A standard match between two robots.

### Match Frequency

- **Preparation Time:** Teams will have 20 minutes to prepare for the next match after the previous one ends.

- **Disqualification:** Teams that fail to return with their robot ready within the allotted time may be disqualified.

## Criteria for Victory

- **Immobilization:** A robot is declared victorious if its opponent is immobilized.
- **Immobility Definition:** A robot is considered immobile if it cannot display linear motion of at least one inch within 15 seconds.
- **Arena Exit:** If a robot is thrown out of the arena, the match stops immediately, and the robot inside the arena is declared the winner.
- **Judging Criteria:** Points are awarded based on aggression, control, and damage.
  - **Aggression:** Aggression is judged by the frequency, severity, boldness, and effectiveness of attacks deliberately initiated by the robot against its opponent.
  - **Control:** Control is judged in terms of the ability to attack an opponent at its weakest point, using weapons most effectively, and minimizing the damage caused by the opponent.
  - **Damage:** Through deliberate action, a robot either directly or indirectly reduces the functionality, effectiveness, or defensibility of an opponent. Damage is not considered relevant if a robot inadvertently harms itself. Also, if a pressure vessel or a rapidly spinning device on a robot fragments, any damage to the opponent will not be considered "deliberate."

## Event-Specific Terminology

- **Disabled:** A robot is not functioning correctly due to either an internal malfunction or contact with the opposing robot or Arena Hazard.
- **Disqualification:** A robot is no longer permitted to compete in the current Robowars tournament.
- **Immobilized:** A robot is not responsive for a specified period of time.
- **Knockout:** This occurs when the attack or deliberate actions of one robot cause its opponent to become immobilized.
- **Lifting:** This occurs when one robot controls an opponent's translational motion by lifting the drive mechanism of the opponent off of the arena floor.
- **No Contact:** Neither robot makes contact with the other for a specified period of time.
- **Pinning:** Occurs when one robot, through sheer force, holds an opponent stationary in order to immobilize it.
- **Radio Interference:** Refers to a situation where at least one robot becomes unresponsive or non-controllable due to the effect of the other robot's remote-control signal.
- **Non-Responsive:** In the judge's opinion, the robot cannot display some kind of controlled translational movement along the arena floor.
- **Restart:** This occurs after a fault or a timeout has been declared and the competing robots are ready to continue.

- **Stuck:** A robot is hung-up in a part of the arena, an arena hazard, or an opponent, such that it is effectively non-responsive.
- **Tap-Out:** This occurs when a robot's operators decide that they no longer want to continue the match and concede the win to the opposing team.
- **Technical Knockout:** This occurs when a robot wins due to the immobilization of its opponent even though, in the judges' opinion, no action of the winning robot caused the opponent's immobilization.
- **Timeout:** A temporary halting of a match. Timeouts are usually called to separate robots but can be called for other reasons as well.

## Safety Rules

- **Compliance:** All event rules must be followed. Violations may lead to disqualification.
- **Safety Inspections:** Robots must pass safety inspections before competing. Enhanced checks for flames, spinning blades, and sharp edges will be conducted in the finale.
- **Weapon Safety:** All weapons must have safety covers on sharp edges when not in use. Flame systems require ignition fail-safes and must be demonstrably controllable.
- **Arena Safety:** No team members can enter the arena once the robots are inside. Any changes must be made by the organizers.

## An Important Note

- **Rule Changes:** The organizers reserve the right to change the rules at any time. Participants are responsible for staying updated with the latest rules.
- **Disqualification:** Teams found violating the rules or engaging in unethical behaviour will be disqualified and may forfeit any prize money.

## Arena Layout

The game will take place in a 360 cm × 400 cm Robo-War arena.