



Eurobot<sup>open</sup> 2007

## Robot Recycling Rally



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Official Rules 2007

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## FAQ 1

### Introduction

This FAQ is divided into two sections: "Corrections", containing information which replace or add precisions to the official rules for 2007, and "Answers to common questions", which contains official answers to some of the most common questions posted on the forum or asked by email.

### Corrections

#### 3.6.1 Aluminium Cans

The cans are 115mm high and have a **66mm diameter** around most of the can's length. For the Eurobot final, the cans are silk-screen printed entirely in yellow and have a vertical line of 5mm from top to bottom without colour (metallic).

#### 3.6.2 Plastic bottles

The bottles are 230mm high and have a **65mm diameter** at height of the label

#### 3.7.1 Bins

The bottoms of the bins (the part below the table) are made of hard plexiglass and include a door so that the content can be removed. The other parts are made of netting (like the nets to protect fruit trees from birds). The netting is tight.

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#### 3.7.2 Basket

The basket is a hollow cylinder, 200mm in diameter (external diameter) and 30mm tall, with 10mm walls.

#### 4.2.1 Fair-play

This sentence is missing: No system is allowed which attach the robot to the playing-field (eg: suction cups). At any time during the match, the force required to lift the robot must not exceed its own weight.

### 5.1 General Comments

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The masts of the beacon supports are not covered by reflective tape. The cylinders about 22mm in diameter and 280mm high are located in front of the two masts, on the corners where the bins are located. They are covered by reflective tape (see paragraph 3.5)

## Answers to common questions

Q1) Is the number of waste transported in the robot limited?

A1) No, there is no limitation on the amount of waste transported by the robot.

Q2) Is it allowed to put waste in the opponent's bins? Or to help the opponent to put objects in her bins?

A2) Yes, it is allowed for well sorted waste. The points are for the other robot and are counted at the end of the match. But be careful, don't obstruct the way of the robot to its bins and don't put cans in the bottles' bin and bottles in the cans' bins. In this case, you can be disqualified.

We encourage the fair-play but try to solve the problem posed (to sort the waste in your bins), not a different problem!

Q3) Can we intentionally put incorrect waste into opponent bins?

A3) No it is forbidden, and you can be disqualified if you do that.

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Q4) Is it allowed to throw waste?

A4) Yes of course, but only in the bins.

Q5) Is it authorized to withdraw the opponent's batteries from the basket?

A5) No, it is forbidden.

Q6) a. Can we touch/move the batteries of the other team?

b. It is possible to catch and keep the batteries of the other team?

c. Can we remove the cans/bottles out of the bins of the other team?

A6) a) yes, but they have to be accessible for the other robot.

b) Yes but only during a short time. The robot cannot keep the opponent's batteries for a long time. It will be penalised if it seems to be a strategy.

c) No it is forbidden.

Q7) What happens if we put batteries in the bin for cans or bottles? Is that "incorrectly sorted waste" or does it mean nothing?

A7) It is 'incorrectly sorted waste". If the batteries are to the opponent team, you will get penalties or even disqualification.

Q8) Is it allowed to push waste towards the baskets? They will be considered in the perimeter of the robot?

A8) Yes it is allowed; They are not considered in the perimeter of the robot.

Q9) What happens if a battery is on the edge of the basket? Is it counted in the basket?

A9) No, it doesn't count.

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Q10) Can one store the bottles in a plastic bag and deposit the bottles and plastic bag in the bin or only the bottles necessarily should be put, without the plastic bag? How about cans?

A10) No, the robot has to stay in one part, so no detaching bags from the robot.

Q11) Waste will not be counted as being in the perimeter of the robot: can one store waste above the top of the robot?

A11) Yes it is allowed to store waste between 35cm and 43cm above the ground, provided it does not interfere with beacon systems. In particular, there must be clear line of sight between a beacon on the robot beacon platform and the beacons on the side of the playing field.

Q12) The bottles will be very fragile because open. Would it be possible to fill them with polyurethane foam in order to make them a little more solid?

A12) No, the bottle will not be filled with foam, and will not have their caps attached. They are solid enough.

Q13) Which type of battery will be used?

A13) Alkaline batteries will be used. They are magnetic.

Q14) What is the reference of the green adhesive band?

A14) It is available in every DIY shop. It is an extra-adhesive tape, watertight (or waterproof), resisting to high traction, UV and bad weather. It is a tape for reparation, protection, water tightness, reinforcement, packaging... It is possible to cut by hand. The colour is bright green.

Q15) For the localization system we are developing this year, we will use a dedicated electronic board. Is it possible to place this board on the mast (right under the support, and without exceeding 80x80 mm)?

A15) It is allowed if it is a part of the localisation system. Any sensor or similar systems are allowed there, including associated electronics, but not actuation systems.





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Q16) The borders are 7cm tall, and the diameter of the bottles and cans is 66mm. That leaves only one small centimetre of margin to the robots to make the distinction between a wall to be avoided and some waste.) Can you make the border taller?

A16) No.

Q17) How will our obstacle avoidance system be tested?

A17) The obstacle avoidance system will be examined during approvals, and may be tested in a trial on the game table. In the trial, the system should be able to successfully avoid a static dummy obstacle (30cm high cylinder, 20cm diameter, between 2kg and 3kg weight) placed at a random distance in front of the robot on the table. If desired, you will be able to place a beacon on the dummy obstacle, which has a beacon platform.

Q18) If the other robot is 7cm tall and our infra-red based detection systems (for example) are located 20 cm above the ground, how could it be detected? What if my bumpers don't touch the opponent robot? If the opponent robot has a very particular shape, it might not be reliably detected!

A18) You must try to make your obstacle avoidance system as robust as possible. Obviously, a very small opponent robot (e.g.: smaller than a bottle!) needs not be avoided. Your system will be examined, and might be tested as described above. Make sure your system works with a simple obstacle like that. For robots with a hollow structure, if you want to be safe, we suggest you to add bodywork, made of cardboard for instance. This will increase the visibility of your robot to IR and sonar based systems. In the same idea, you should avoid painting your robot in black since it could confuse IR based detection systems.

Q19) What happen if a bottle or a can rolls out of place when the referees remove the triangle?

A19) We put it back in the triangle.

Q20) The borders are painted in red/blue; is it only the interior side or the tops of the borders too?

A20) Only the interior border is painted in blue/red.

Q21) Can the robot ram the piles of waste at the start?

A21) Yes, but if there is damage to the waste, you might be penalized.

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Q22) a) Does my beacon mast have to be rigid?

b) Does that mean the mast may turn/swivel, if it stays in place?

c) May my mast include moving sensors (like a swivelling laser or mirror)?

A22) a) Yes, totally.

b) No, the mast may not turn or swivel either, it must be completely rigid.

c) Yes, you may, but these may not move the mast, or occlude the area on top of the mast. Mirror systems may not be designed to deliberately confuse the opponents.

