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## ANDYMARK MECANUM WHEELS

### Special Instructions:

Wheels will be sold as kits, unassembled.

### Description



BBengt Ilon invented this type of wheel while working for the Swedish company Mecanum AB. The Mecanum-style drive base uses 4 wheels, including 2 right wheels and 2 left wheels. One right and left is on each side of the robot. Each wheel is driven independently. More info on Mecanum drive methods can be found on [Wikipedia](http://Wikipedia).

### Weight

2.5 lbs. each wheel

### Structure

Our version of the Mecanum wheel utilizes 2 bent sheet metal plates and 12 rubber rollers. The sheet plates are 1/8" thick 6061 aluminum. 12 bent tabs are on each side plate, containing the 12 rollers. Each roller has a 3 inch long #10 screw holding it in place and a 2 inch long brass tube as a bearing. On either side of the roller, there are 2 washers, enabling the roller to move consistently. A Nylock nut captures the roller in between the side plates. Near the center bore of the wheel, 6 aluminum spacers and screws are tightly holding the 2 side plates together.

### Roller Tension

Tension on the roller can be adjusted by loosening or tightening the 12 Nylock rollers on the perimeter screws. Tighten the nylock nut for a more restricted roll. Loosen the nut for a more freely spinning roller.

### Propulsion

Providing power to the Mecanum wheel: Each wheel must be driven independently. They can be driven by a hub (by means of a shaft) or a sprocket. AndyMark Universal Hubs can be added and fit into the center of this wheel. Alternatively, a sprocket can be fastened to the 6 screws near the center bore (on a 1.875" bolt circle), and 2 bearings can be pressed into the side plate bores (1.1245" diameter holes, for FR8ZZ flange bearings, 1/2" id, 1+1/8" od).

### Rollers

Each of the 12 rollers are made up of three segmented rollers, made from black non-marking 70a durometer SBR rubber. Two 1 inch diameter rollers are located outside a center roller of 1.25 inches in diameter. These three rollers are pressed onto a 1/4 inch diameter brass tube.

## Friction Information

8" Mecanum Wheel friction coefficients: Radial Static: 0.7 Radial Dynamic: 0.6 Transverse Static: 0.7  
Transverse Dynamic: 0.6

More information about friction coefficients:

Radial friction could also be considered driving friction, as it is the friction involved when the wheel is being driven forward and reverse. Or, it can be applied when the wheel is stationary and it is resisting a force from the front or back.

Transverse Friction is the ability of the wheel to move sideways, or scrub. This is also the friction involved when the wheel is stationary and a force from the side is applied to it.

Static friction is involved when the wheel just begins to move from a stationary position. Dynamic friction is involved when the wheel is already moving.

These tests were made on FRC (FIRST Robotics Competition) -type carpet, with 30 lbs. of downforce on each wheel. The Mecanums were tested in a right and left pair, with 60 lbs. of total downforce.