

## Electric Skateboard – Wheels

### Areas of Consideration

- Grip
- Dimensions and Mass
- Bearings
- Attachment to axle

#### -Grip

Wheels must achieve sufficient traction with road surface to provide efficient power transfer, whilst also keeping rolling resistance to a minimum. The former is particularly important for the wheels on the driven axle, with those on the non-driven axle being more concerned with reducing any resistance to the motion of the skateboard, though they must still have sufficient grip to provide directional control.

#### -Dimensions and Mass

Optimally, the wheels should have as little mass as possible whilst still retaining the structural strength to sustain the loads placed upon them. The dimensions of the wheels, particularly the diameter, will be determined by the capabilities of the motor and the demands of the load: velocity ratio increases with diameter, thus achieving a high top speed under low loads or with a powerful motor – however torque developed at the road surface decreases with increased wheel diameter, limiting acceleration and operating capability in cases of high load or a low powered motor.

#### -Bearings

Bearings enable wheels to rotate about the axles with greatly reduced frictional resistance, and the choice of bearing significantly affects the performance and durability of the skateboard.

- Steel – Industry standard, cheap, mechanically durable, susceptible to rust, require regular lubrication
- Ceramic – Harder than steel thus deform less, also more heat resistant, both allowing for reduced friction particularly at high speeds, more brittle than steel so not suitable for high impact manoeuvres, considerably more expensive than steel
- Titanium – Similar performance to steel however more durable and rust resistant, slightly more expensive than steel (much less than ceramic), require regular lubrication