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Moment of inertia is basically the rotational equivalent of mass. Newton's Second Law says that an applied force is equal to the mass of an object multiplied by its resulting acceleration. The rotational equivalent is that an applied torque is equal to an object's moment of inertial multiplied by its resulting angular acceleration. The terms of the equation may be rearranged to show that the moment of inertial is equal to the ratio between the torque applied to an object and the rate at which it begins to rotate.

An electric drill is an excellent demonstration of the moment of inertia. If a drill bit is inserted into the chuck, the drill spins up to speed almost immediately when the trigger is pulled; however, if a wire wheel or similar object is inserted into the chuck, it will take a few seconds for the drill to get up to speed. The wire wheel has a high moment of inertia than the drill bit.

Moment of inertia is related to both the mass of the object and the distribution of its mass. For object of roughly the sme geometry, heavier ones have higher moments of inertia. The further from the axis of rotation that the mass is distributed, the higher the moment of inertia. As examples, the shafts for the small clutches have lower moments of inertia than the ones for the larger clutches. Also, the CO1-11 clutch pack weighs about the same as the shaft for the CO3-11 clutch but has a much higher moment of inertia. This is because the weight of the clutch pack is distributed much further from the axis of rotation than the weight of the shaft.

Moment of inertia as it is defined is a property of an object related to its mass. However, it is often more convenient to express moment of inertia in terms of weight, a quantity that is easier to relate to. WR^2, is moment of inertia expressed on a weight basis. The units of WR^2 are lb/inch^2. The following is a table of WR^2 data for PEC Manufacturing's clutches. We believe that these values are accurate to within 5% of the actual value.

WR^2 Data for PEC Manufacturing's Mechanical Clutches (lb-in^2)

	CO1-11	CO2-11	CO1-14	CO2-14	CO3-14
Shaft	11.1	17.7	37.5	100.6	98.6
Shaft & Hub	189.9	199.9	572.2	651	574.7
Clutch Pack	516.2	813.7	1998.4	2239.8	2956.6
Clutch Pack w/ Drive Ring	856.9	1537.3	2609.4	3842.5	4974.1