

RECYCLING MIRROR PARAMETERS

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1.1 Introduction

The following sets of numbers are taken from Solid Works, using the assumption that the density of stainless Steel and Aluminium are 7800 and 2700 g/mm³ respectively. The purpose in creating a summary of the numbers is to allow for an updated set of more realistic numbers to be entered into the MATLAB model and to facilitate the design of the cantilever blades. Centre of mass calculations wrt to the “d’s” in the MATLAB model are also included. The axis are: - **X** parallel to the beam, **Y** perpendicular to the beam and **Z** vertical.

1.2 Mass properties of D020671 Assembly Uppermass

Mass = **12.065 kg**

Moments of inertia: (kg.m²) **I_{xx} = 0.1255 I_{yy} = 0.0186 I_{zz} = 0.1267**

Centre of mass: **Z = -9.7 mm** (from the bottom of the main T section)

This implies that, in the Solid Works model, $d0 = 1.0$ mm and $d1 = 1.1$ mm.

1.3 Mass properties of D030157 Assembly IntermediateMass

Mass = **12.211 kg**

Moments of inertia: (kg.m²) **I_{xx} = 0.0818 I_{yy} = 0.0205 I_{zz} = 0.0815**

Centre of mass: **Z = - 0.09 mm** (from the centre of the assembly)

This implies that, in the Solid Works model, $d2 \sim 1.0$ mm and $d3 \sim 1.0$ mm.

1.4 Mass properties of D030160 Assembly TestMass (includes hole through centre, counter boar for small optic, small optic and alignment holes top and bottom)

Mass = **12.181 kg**

Moments of inertia: (kg.m²) **I_{xx} = 0.1058 I_{yy} = 0.0631 I_{zz} = 0.0630**

Centre of mass: **Z = 0.0 mm** (from the centre of the assembly)

This implies that, in the Solid Works model, $d4 = 1.0$ mm

1.5 Upper Blades

Length = 250 mm

Width (clamped end) = 65 mm

Thickness = 2.3 mm

Max Deflection = 103.3 mm

1.6 Lower Blades

Length = 120 mm

Width (clamped end) = 32 mm

Thickness = 1.3 mm

Max Deflection = 49 mm