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 IGR, GLASGOW UNIVERSITY, GEO 600 GROUP

T030147 - 01

DRWG NO. REV GID

SHEET SEE BOTTOM LEFT

ASSEMBLY NO.

EXCEL CALCULATION, MAINTAINING THE CENTRE OF MASS OF D020534

D020534

TITLE: **SPACERS AND STANDOFFS FOR THE MODE CLEANER C.P. UPPER MASS, D020534**

DATE: **Sept-24-2003**

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DRAFT: **00** Equations checked and verified
Draft Original

SUMMARY: If once a triple pendulum has been suspended the centre of the final optic is too high with respect the position of the laser beam, due to the dynamic nature fo the cantilever blades it is possible to add mass to the upper mass to adjust the height in situa It is important that when adding the mass that the position of the centre of mass of the upper mass is not affected.

MATLAB PARAMETERS: The following calcuation was carried out in order to select "sets of masses" that can be added without affecting the Centre of Mass. NAR, has checked that +200 g to the upper mass made little or no difference to the performance of the MC suspension

NOTES: * HAVE EXISTING SET ALTHOUGH VERY SIMILAR TO CALCULATED FINAL SET
 ** originally 12.7mm thick! CAN MODIFY SET OF MASSES THAT CAN BE USED FOR ~ 40g of ADDED WEIGHT
 *** originally 25.4 thick CAN MODILFY AN EXISTING SET IN ORDER TO ADD ~ 140 g CORRECTLY!

DCC #	SET #	density (kg/m^3)	length (mm)	length (inch)	diameter (mm)	ratio of masses :	mass, m (g)	total mass (g)	ESTIMATED DEFLECTION	h1 + d1/2 (mm)	h2 + d2/2 (mm)	ratio of lengths :
-	NOT IN	7800	16	0.63	25.4	2.03	63.24	94.36		30.93	57.7	1.87
-	USE	7800	14	0.55	19.05		31.12					
-	IN	7800	30	1.18	25.4	1.58	118.57	193.66		37.93	60.2	1.59
-	RESERVE	7800	19	0.75	25.4		75.09					
D020350	CHOSEN	7800	21.5	0.85	25.4	1.69	84.97	135.13	2.0	33.68	57.045	1.69
D020351	SET 1	7800	12.69	0.50	25.4		50.15		mm			
-	NOT IN	7800	27	1.06	25.4	2.00	106.71	160.07		36.43	62.7	1.72
-	USE	7800	24	0.94	19.05		53.36					
D030468	CHOSEN	7800	11.1	0.44	25.4	1.88	43.87	67.19	1.00	28.48	53.65	1.88
D030078	SET 4	7800	5.9	0.23	25.4		23.32		mm			
D030454	CHOSEN	7800	26	1.02	19.05	1.63	57.80	93.37	1.50	35.93	58.7	1.63
D030455	SET 3	7800	16	0.63	19.05		35.57		mm			
D030078	CHOSEN	7800	5.9	0.23	25.4	1.99	23.32	35.06	0.50	25.88	52.185	2.02
D030079	SET 2	7800	2.97	0.12	25.4		11.74		mm			
-	NOT IN	7800	12	0.47	19.05	1.88	26.68	40.88		28.93	53.895	1.86
-	USE	7800	6.39	0.25	19.05		14.21					



TITLE:

SPACERS AND STANDOFFS FOR THE MODE CLEANER C.P. UPPER MASS, D020534

CALCULATIONS:

- 1) AVAILABLE DIAMETERS OF SPACERS, THAT INTERFACE WITH TABLE CLOTH AND INTERMEDIATE MASS
 REF: - Seastrom, 1 800 634 2356

DIMAETER	INCH (")	METRIC (MM)
"	1	25.4
"	0.75	19.05
"	0.5	12.7
"	0.38	9.53
"	0.31	7.94



- 2) MAINTAINING THE CENTRE OF MASS POSITION FOR THE MODE CLEANER UPPER MASS

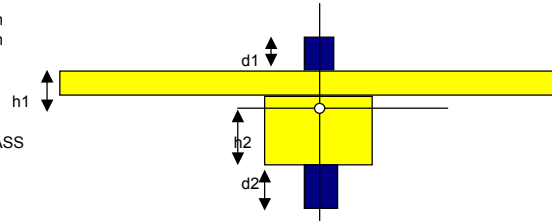
The centre of mass is positioned 20mm from the top of the main section and 50mm from the bottom of the T section.

From D020535, configuration CofM

From the top, h1 = 22.93 mm

From the bottom, h2 = 50.7 mm

KEY: -
 ADDED MASS
 MAIN 'T' SECTION TOP MASS



mass, m1
 mass, m2
 distance, h1
 distance, h2

$$(m1) * (h1) = (m2) * (h2)$$