



LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

RECORD OF DECISION/AGREEMENT (RODA)

Document	LIGO-M <u>050397-02</u> _Y <u>-03</u>	
Date:	8-23-2005 <u>4 April 2008</u>	
Title:	Core Optic sizes, including TMs, BS, FM and RM	
RODA:		
To the Attention of:	COC: GariLynn Billingsley, Helena Armandula, Bill Kells, Gregg Harry SUS: Norna Robertson, Ken Strain, Justin Greenhalgh, Caroline Cantley, Calum Torrie, Jim Hough, Mark Barton SYS: Peter Fritschel, Dennis Coyne, David Shoemaker, Carol Wilkinson AOS: Phil Willems, David Ottaway, Mike Smith	
cc:	Aligo_systems, Aligo_sus, Aligo_coc	
From/signatories:	Name/Title:	G. Billingsley/ COC Leader Signature: _____
	Name/Title:	J. Romie/ SUS Leader US Signature: _____
	Name/Title:	D. Coyne/SUS Lead.&SYS Lead. Signature: _____
	Name/Title:	P. Fritschel/SYS Cog. Scientist Signature: _____
	Name/Title:	C. Cantley/SUS/UK/UG/PrjMgr Signature: _____
	Name/Title:	J. Greenhalgh/SUS/UK/RAL/PrjM Signature: _____
System(s) affected:	<input type="checkbox"/> Initial LIGO <input checked="" type="checkbox"/> Advanced LIGO <input type="checkbox"/> Other: _____	
Nature/Scope:	<input checked="" type="checkbox"/> Design Decision <input type="checkbox"/> Requirements Decision <input type="checkbox"/> Work Scope Decision <input type="checkbox"/> Working Agreement between Groups <input type="checkbox"/> Other _____	
Subsystem(s) affected	<input checked="" type="checkbox"/> Relevant Subsystem(s)/Component(s): SUS, COC, AOS, SYS	
REVISION -03: Record change only. RODA M070120-02 (16 Nov 2007) set the BS thickness (at its thickest point) to 60 mm and called for this RODA to be revised accordingly.		
Primary Contacts	G. Billingsley, J. Romie	
	Group or Affiliation and Contact	
Reference Documents:	RODA M040283-01 for ITM and ETM size (replaced by this document) RODA M040387-00 for Recycling mirror size (replaced by this document)	

DECISION/AGREEMENT STATEMENT:

Baseline design dimensions for COC are in the Conceptual Design Document, [T000098-02](#) which will be updated before the next review.

TEST MASSES: [M040283-01](#) (for ITM and ETM) are now fused silica, 340mm x 200mm. M040283-01 is now superseded by this document.

BEAMSPLITTER 370 mm diameter by 60 mm thick with 95 mm long flats. The flat length of 95 mm is supported by a study on diffraction for the BS in [T050066-03](#). The figure of merit for this analysis is that the BS loss should not exceed 0.1%. The analysis was performed for a 60 mm thick optic. ~~In order to keep the 60 mm at the critical central location we are splitting the difference on the baseline wedge defined in [T010076-01](#), which is 1.3 degrees or 8.1 mm difference across the part. Therefore,~~ the nominal thickness is 64 mm, measured at the thickest point. This keeps the definition of thickness constant across all the type of optics.

FOLDING MIRROR is stipulated to be the same size as the BS in RODA [M040006-00](#).

RECYCLING MIRRORS are stipulated to be 265mm diameter by 100mm thick as described in [M040387-00](#), that RODA is superseded by this document.

WEDGES: The wedge angles are given in Table 3 of the optical layout [T010076-01](#). However, Mike Smith has noted that the separation distance assumed in the analysis for pick-off beams was inadequate. The result is a larger wedge angle for the ITMs. **Wedges are therefore not yet finally defined in this document.**

MOUNTING FLATS: Mounting flats are 95 mm long on all fiber or ribbon suspended COC. The flat length of 95 mm is supported by an analysis in [T040008-00](#) for test masses and [T050066-03](#) for beamsplitters.



OPTIC	DIAMETER (mm) Measured from thickest to thinnest part of the optic. Not to be measured flat to flat.	THICKNESS (mm) Measured at the thickest point of the optic. The wedges will remove material from the optic.	MOUNTING FLAT LENGTH (mm)
TEST MASSES	340	200	95
BEAMSPLITTER AND FOLD MIRROR	370	64 60	95
RECYCLING MIRRORS	265	100	No mounting flats