Specifications for Advanced LIGO COC

Major assumptions:

- 3rd IFO will differ from 1st two in one optic: ITM all other optics are the same (perhaps different coating on SRM) 3rd IFO, formerly known as 2K, may be converted to 4K
- FM does not need a unique diameter
- TMs are 40 Kg

Major Schedule Milestones:

- Sapphire decision Q1 2002
- Install 1st IFO Q1 2005

LIGO-T000140-00-D
last modified 11-15-00

	PRM	**SRM**	**BS**	**FM**	**1st 2 ifo ITM**	**3rd ifo ITM**	**ETM**
Baseline Optic size (mm)	254 x 100	254 x 100	350 x 60	350 x 118	320 x 130	320 x 130	320 x 130
Fall back optic size (mm)	254 x 100	254 x 100	350 x 60	350 x 140	380 x 160 SWAG at 40 KG size	380 x 160 SWAG at 40 KG size	380 x 160 SWAG at 40 KG size
No. Required 1st 2 IFOs	2	2	2	0	4	0	4
Spares 1st 2 IFOs	3	3	2	0	4	0	4
No. Required 3rd IFO	1	1	1	2	0	2	2
Spares 3rd IFO	1	1	0	1	0	2	0
Total Number 44	7	7	5	3	8	4	10
Baseline Material (fall back material is all FS)	Low inclusion FS	Low inclusion FS	Low absorption FS	FS	Sapphire	Sapphire	Sapphire
SUS coating	Yes	Yes	No	No	Yes	Yes	Yes
	PRM	**SRM**	**BS**	**FM**	**1st 2 ifo ITM**	**3rd ifo ITM**	**ETM**
Clear Aperture (Dia - 2 cm)	224	224	330	330	300	300	300
Sagitta (nm) over central 215 mm dia (2*w_0 dia)	240 ± **TBD**	240 ± **TBD**	Flat ± **TBD**	Flat ± **TBD**	165 ± 10	165 ± 10	165 ± 10
Surface error -TPA (nm rms) over central 215 mm diamter	< 1.6	< 1.6	< 1.6	< 1.6	< 0.8	< 0.8	< 0.8
Microroughness spec over central 215 mm dia (rms)	< 0.4 nm	< 0.4 nm	< 0.4 nm	< 0.4 nm	< 0.2 nm	< 0.2 nm	< 0.2 nm
Microroughness goal over central 215 mm dia (rms)					< 0.1 nm	< 0.1 nm	< 0.1 nm
Absorption (ppm/cm)	< 20	< 20	< 1	< 20	< 40 - 80	< 40 - 80	
Homogeneity (nm) Peak to Valley	< 500	< 500	< 500		< 40	< 40	
Coating (ppm) Absorption	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Coating (ppm) Absorption goal					<0.05	<0.05	<0.05

Thickness Uniformity (%)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Transmission	~6±0.6%	5.0 to 12 %	50±1 %	< 20 ppm	0.5 ±0.05 %	0.5 ±0.05 %	1ppm<T< 20 ppm
AR Coating (ppm)	~1000	<100	<100	<300	600 ± 100	600 ± 100	<300
Scatter (ppm)	<15	<15	<15	<15	<15	<15	<15