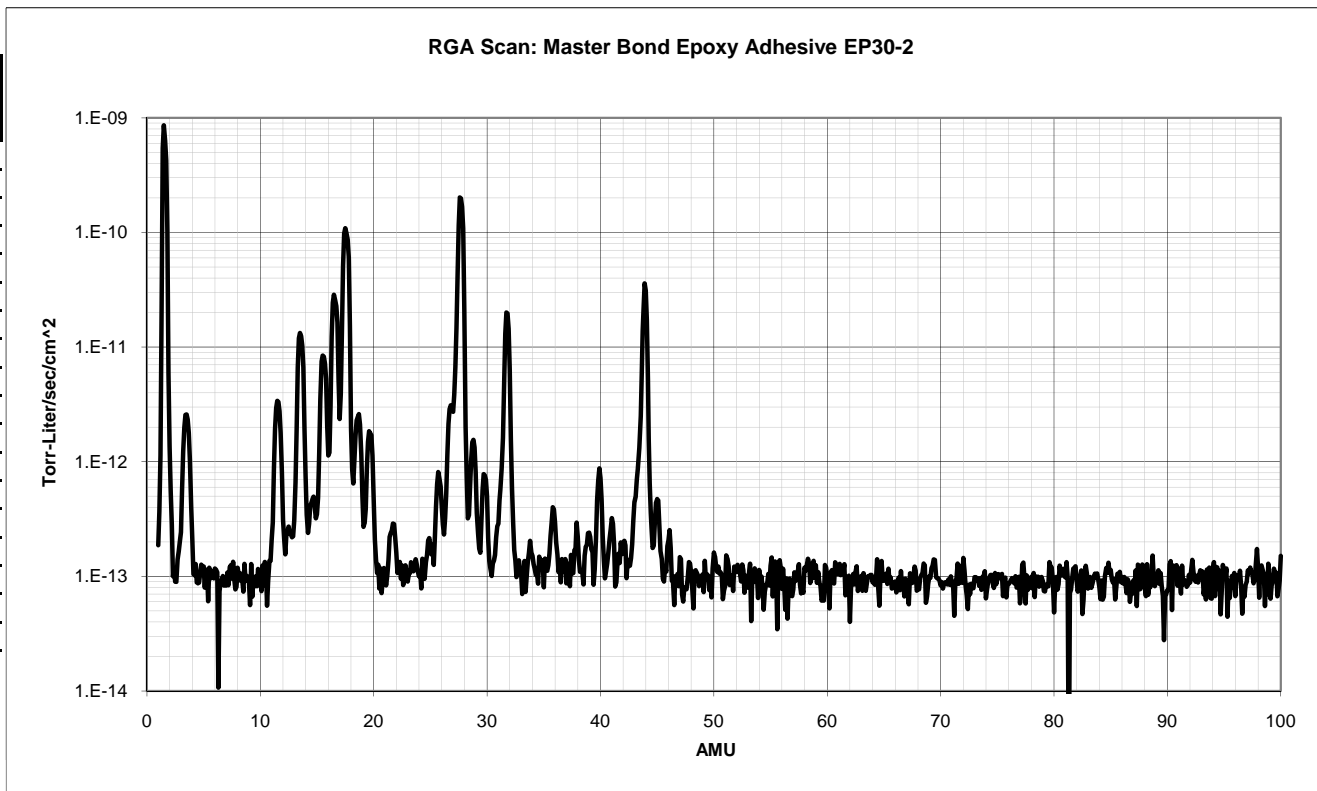


Master Bond Epoxy Adhesive EP30-2

Species	AMU	Outgassing Rate (Torr-L/s/cm ²)
H	2	1.2E-12
He	4	7.8E-14
C+	12	1.8E-13
N+, N2+	14	6.1E-13
water (O+)	16	1.0E-12
water (HO+)	17	2.2E-12
water (H2O+)	18	1.8E-12
CO2++	22	2.9E-14
N2	28	2.1E-11
O2	32	6.2E-12
Ar	40	5.9E-13
hydrocarbon	41	1.9E-13
hydrocarbon	43	3.1E-13
CO2	44	3.1E-11
hydrocarbon	53	1.4E-17
hydrocarbon	55	1.4E-17
hydrocarbon	57	1.4E-17
Sum HC		5.0E-13

*caveat: a peak detection algorithm is not used. The values above assume that there isn't a significant shift in the peak from the nominal AMU value.



outgassing rates for the residual gas estimate (E0900398)

	AMU	Outgassing Rate (Torr-L/s/cm ²)
hydrogen (H2)	2	1.2E-12
water (H2O) at 1000 hr	max of 16, 17, 18	2.2E-12
air (N2)	28	2.1E-11
CO2	44	3.1E-11
hydrocarbons	sum of 41, 43, 53, 55, 57	5.0E-13

Note that this approximation is not based on a least squares fit to the cracked patterns of multiple gases. It is simply an approximate assignment of the largest peak in a cracking pattern to the most likely gas source.

APPROVED APPLICATIONS FOR MASTER BOND EP30-2 ADHESIVE IN ALIGO

dwg	Title	Notes on bond	Suspension	Qty per Susp	area each (mm^2)	thickness (mm)	mm^3 per sus	mm^2 per sus	#suspensions per Vacuum Volume			Adhesive Volume (mm^3)			Adhesive Surface (mm^2)					
									Vertex	Diagonal	End	Vertex	Diagonal	End	Vertex	Diagonal	End			
D080479-v3	ETM/ITM PM Break-Off Prism attachment	0.5 mm wide by 5 mm long at 4 corners of each prism	ITM, ETM	2	10.0	0.05	0.5	10.0	2.0	2.0	1.0	1.0	1.0	0.5	20.0	20.0	10.0			
D080750-v1	ERM/CP prism attachment	0.5 mm wide by 5 mm long at 4 corners of each prism	ITM, ETM	2	10.0	0.05	0.5	10.0	2.0	2.0	1.0	1.0	1.0	0.5	20.0	20.0	10.0			
D080765-v2	FM/BS 1st prism attachment	0.5 mm wide by 5 mm long at 4 corners of each prism	BS, FM	2	10.0	0.05	20.0	40.0	1.0	3.0	0.0	20.0	60.0	0.0	40.0	120.0	0.0			
D0902368-v2	FM/BS 2nd prism attachment	0.5 mm wide by 5 mm long at 4 corners of each prism	BS, FM	2	10.0	0.05	20.0	40.0	1.0	3.0	0.0	20.0	60.0	0.0	40.0	120.0	0.0			
D070234-v2	OSEM Magnet Assy, Penultimate Reaction Mass		ITM, ETM, BS, FM	4		--	12.2	243.4	3.0	5.0	1.0	36.5	60.8	12.2	730.1	1216.9	243.4			
	D070237-v2, magnet base	.05 mm thick over entire base area		4	52.8	0.05														
	D070238-v2, steel disk	.05 mm thick over one end of the cylinder		12	2.7	0.05														
D070441-v4	HLTS prism attachment	0.5 mm wide by 5 mm long at 4 corners of each prism	HLTS	2	10.0	0.05	0.5	10.0	1.0	1.0	0.0	0.5	0.5	0.0	10.0	10.0	0.0			
D0901286	HLTS secondary metal prism	0.5 mm wide by 5 mm long at 4 corners of each prism	HLTS	2	10.0	0.05	0.5	10.0	1.0	1.0	0.0	0.5	0.5	0.0	10.0	10.0	0.0			
D0810033-v4	HSTS prism attachment	0.5 mm wide by 5 mm long at 4 corners of each prism	HSTS	2	10.0	0.05	0.5	10.0	7.0	7.0	0.0	3.5	3.5	0.0	70.0	70.0	0.0			
D0901278	HSTS secondary metal prism	0.5 mm wide by 5 mm long at 4 corners of each prism	HSTS	2	10.0	0.05	0.5	10.0	7.0	7.0	0.0	3.5	3.5	0.0	70.0	70.0	0.0			
D0902432	Magnet Standoff Assy	.05 mm thick over entire circular area	HLTS, HSTS	4	6.3	0.05	0.3	6.3	8.0	8.0	0.0	2.5	2.5	0.0	50.6	50.6	0.0			
D0901066	AOSEM optical filters	~1.4 mm dia. x .05 thick at 1 spot	ITM, ETM	4	1.5	0.05	0.1	1.5	2.0	2.0	1.0	0.2	0.2	0.1	3.1	3.1	1.5			
			HLTS	8	1.5	0.05	0.07697	1.53938	1.0	1.0	0.0	0.1	0.1	0.0	1.5	1.5	0.0			
			HSTS	8	1.5	0.05	0.07697	1.53938	7.0	7.0	0.0	0.5	0.5	0.0	10.8	10.8	0.0			
TBD	Acoustic Mode Damper (AMD) attachment	10 x 10 x .05	ITM, ETM	4	100.0	0.05	5.0	100.0	2.0	2.0	1.0	10.0	10.0	5.0	200.0	200.0	100.0			
TOTALS (cm^3 or cm^2):												0.0998	0.204144	0.0182	12.7613	19.22888	3.64919			

Note that these adhesive surface area amounts in each of the LIGO vacuum volumes contributes approximately the following partial pressures which are all acceptable:

	Vertex	End	Diagonal
Hydrogen	9.E-16	1.E-15	1.E-15
Water (1000h)	1.E-16	6.E-17	2.E-16
Air	3.E-14	4.E-14	5.E-14
CO2	5.E-14	6.E-14	7.E-14
hydrocarbons	9.E-16	1.E-15	1.E-15

N.B.: projection from a background limited RGA measurement