



Status of MACRO PMT pressure tests at SAB

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overview

- ▶ 150 waterproof MACRO EMI PMT assemblies need to be pressure tested at the SAB. They have already passed performance tests at DGUT.
- ▶ We test about 10 PMTs per week (mid-August to December).
- ▶ For more information, see [doc 5373](#).

As of November 18, we have passed 97 of 108 tested MACRO PMTs



pressure test results

11 PMTs were tested during the past week (Nov 11 - November 17).

SN	mass(g)	pressure (psig)	test time (h:m)	result
8927	3046.5 [†]	13.0	16:42	PASS ²
7113	3042.5 [†]	11.9	7:49	PASS ¹
6908	589.0	12.0	15:00	PASS ¹
7727	583.5	12.0	8:13	PASS ¹
7224	614.0	12.0	16:18	PASS ²
6300	608.0	12.0	46:47	PASS ²
7660	593.5	12.0	8:18	PASS ¹
6587	570.5	12.0	15:00	PASS ¹
6455	558.5	12.2	<8:21	FAIL ³
7739	594.0	12.1	15:20	PASS ¹
7037	576.5	12.1	7:10	PASS ¹

[†] This PMT doesn't have unpotted weight. 12.0 psig of pressure was applied according to unpotted-potted mass correlation.

¹ Cable dry. No leaks or cracks.

² 1+Some water penetrated the mastic tape seal of the cable strain relief plug, but did not penetrate the UW cable plug.

³ PMT was broken. (see photos in the next page)

photos: PMT 6455



signal test results

The operational capability of a PMT is verified after pressure testing:

The PMT is placed in a dark box, connected to a single channel decoupler box, and set to its 2E7 gain voltage, as recorded in the DGUT data. After tens of minutes, the count rate, rise time, and pulse height are recorded. We use a threshold of 3.00 mV, which is roughly 1/4 pe.

SN	Rate (kHz)	DGUT (kHz)	rate	Rise time (ns)	DGUT rise time (ns)
7961	3.8	0.47		4.8	4.9
7804	5.2	0.44		4.9	3.2
6514	5.3	0.6		4.9	8.2
6477	12.5 [†]	1.72		5.4	5.1
7415	7.5	5.29		4.7	6.8
6619	2.3	0.56		4.7	4.8
7087	9.5	0.44		5.2	4.3
7199	7.0	0.4		5.5	4.7
8927	3.0	0.59		5.5	5.8
7113	3.0	0.63		5.6	6.6
6908	1.5	0.36		5.3	5.7
7727	3.4	0.35		4.2	6.6
7224	2.0	0.32		5.6	7.8
6300	1.8	0.5		5.1	6.2
7660	4.5	0.51		5.5	2.8

[†] The rate could be below 10 kHz if it was given enough time.

PMTs not passed so far

SN	reason of failure
8430	crack and hole on photocathode
7046	imploded
6545	imploded
6455	broken

Table 1: PMTs failed

SN	reason of not pass
8727	hole in cable jacket
7368	water leaks into acrylic shell cap
7934	water leaks into acrylic shell cap
8870	hole in cable jacket
7343	water leaks into acrylic shell cap
8377	hole in cable jacket
7130	hole in cable jacket

Table 2: PMTs not passed