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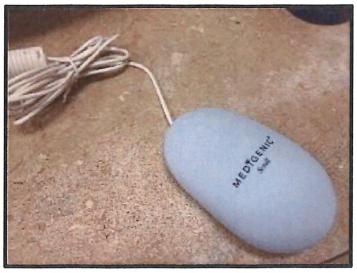
Test Report
Medigenic Keyboard & Mouse Water Ingress

Test Report Number:	9700-02201-00x	Rev: A
Keyboard Part #s:	K104E01-XX, K104C02-XX, K105E01-XXX, K105C02-XXX, K108E01-XX, K108C02-XX	
Scroll Mouse Part #s:	9200 Mouse, M03 Mouse	
Product Manager:	Harley McAllister	
Reliability Engineer:	Wayne Hash	
Test Conducted by:	Wayne Hash	
Date of Test:	September 23, 2020	
Location of Test:	Advanced Input Systems; Coeur d'Alene, ID	

Program/Account Management **Harley McAllister**	Signature Harley McAllister	Date 9/29/20
Reliability/Compliance **Wayne Hash**	Signature Wayne Hash	Date 9/26/2020

Information in this document is classified as EAR99.

Revision History

Rev	Dash	Description	Date	By
A	001	Initial Release	9/23/2020	W Hash

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1. Purpose

This report presents the results of an IPX7 water ingress test performed on the Medigenic "compliance" keyboard and Medigenic scroll mouse. In addition to demonstrating IPX7 compliance, the test is being used as a surrogate test for dust/object testing. Water under pressure is a more stringent requirement than 75µm dust particles under no pressure.

The intent is to demonstrate both products are compliant to a more stringent level of IP67 (temporary immersion) and therefore, also immune to dust ingress.

2. Referenced Documents

Ref #	Number	Title
1	Medigenic scroll Mouse data sheet	Medigenic Scroll Mouse Datasheet link
2	Medigenic keyboard data sheet	Medigenic Compliance Keyboard Datasheet link

3. Ingress Test Description

Per IEC 60529, the IPX7 ingress test (protection against temporary immersion) is performed as follows:

- Water depth = 1 meter
- Test Duration = 30 minutes

4. Test Unit (EUT) Description

A production test sample of both products were provided. Label information is listed in the table below.

AIS P/N	Model	Serial #	Date Code
9375-00505-003	Medigenic Keyboard	C00081	06012
9200	Medigenic Mouse	none	none

5. Summary

Both samples passed the IPX7 test regimen which is withstanding water submersion to 1.41psi or 9.72kPa for 30 minutes. At this pressure, no water entered the samples. Dust ingress at 0.0psi would not be possible if water (at pressure) was stopped. Consequently, there no possibility for dust ingress and the product is determined to be compliant to IP67. See section 8 for details and photographs.

6. Tests conducted

To demonstrate compliance to IPX7, the only testing required was to submerge each EUT for 30 minutes to a depth of 1 meter. See Figure 1 and Figure 2.

Figure 1: 1-meter deep dunk tank used for IPX7 testing.

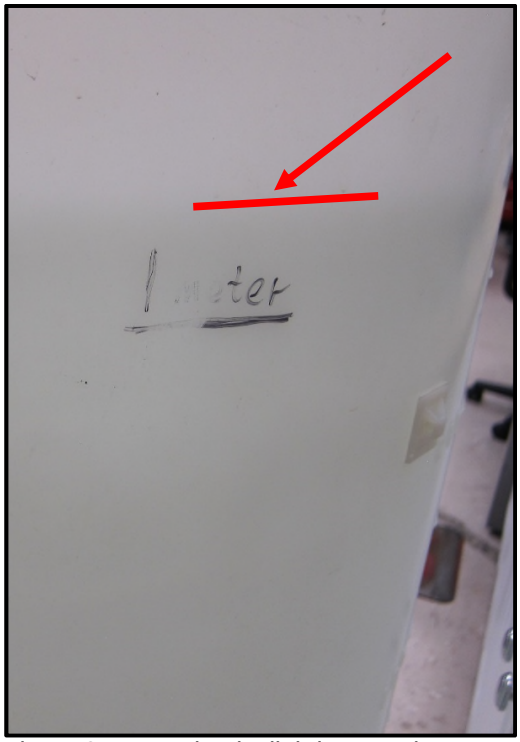

Figure 2: Water depth slightly more than 1 meter

7. Test procedure

Because the EUTs are buoyant, a metal sinker was taped to the mouse and a PVC rod was used to keep the EUTs at the bottom of the tank. No other prep was done. The water temperature was approximately 68F (20C).

Both EUTs were put in the tank such that the highest portion was more than 1 meter below the surface of the water. After 30 minutes, both were removed, towel-dried thoroughly then disassembled to look for water that may have entered. See section 8 for photos.

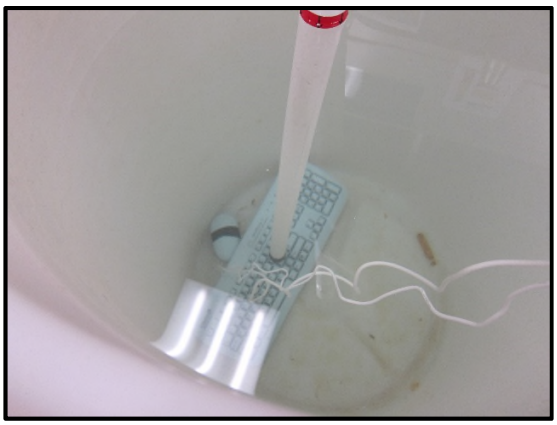

Figure 3: Keyboard pressed to the bottom of the tank. Mouse is weighted.

Figure 4: Metal sinker taped to mouse.

8. Ingress Results

Once removed from the water, the keyboard needed time to acclimate. The air volume inside had cooled which put the elastomer in compression pressing all the keys. Once it had warmed, both samples were plugged into a PC and verified to operate properly. Each was disassembled to look for evidence of water. Photos of the results are in section 8.1 and section 8.2 below.

8.1. Keyboard Results

The keyboard was disassembled by peeling away the elastomer then removing ten screws that hold the two housings together.

Figure 5: Keyboard sample prior to test.

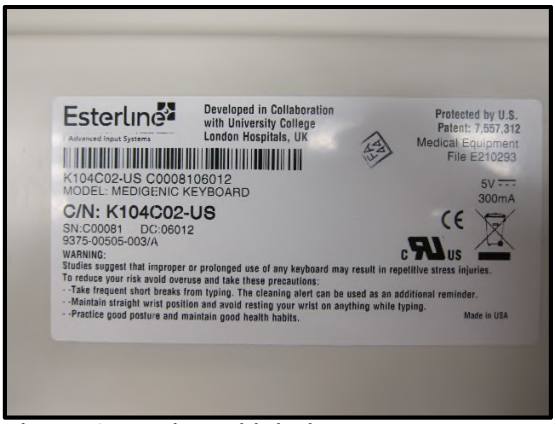

Figure 6: Keyboard label.

Figure 7: The underside of the elastomer overlay is dry.

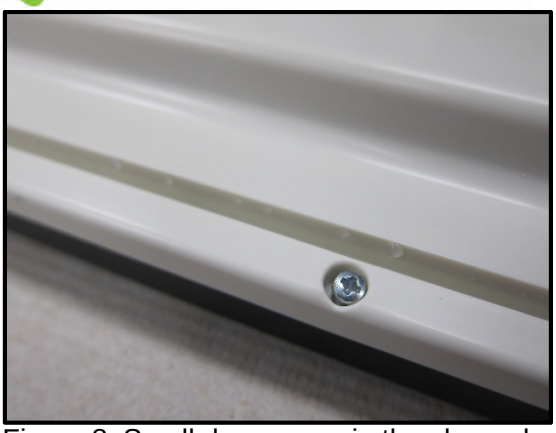

Figure 8: Small drops were in the channel where the elastomer seals to the housing.

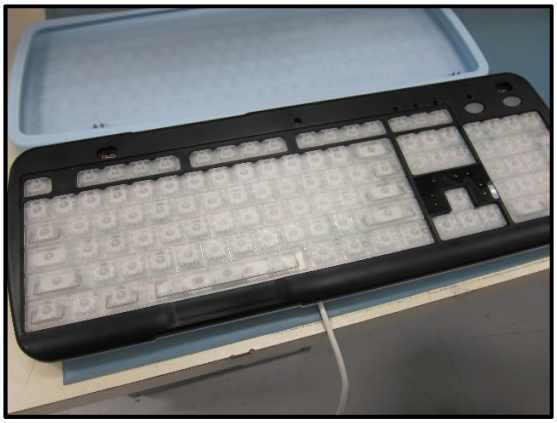

Figure 9: The top side of the keyboard was dry.

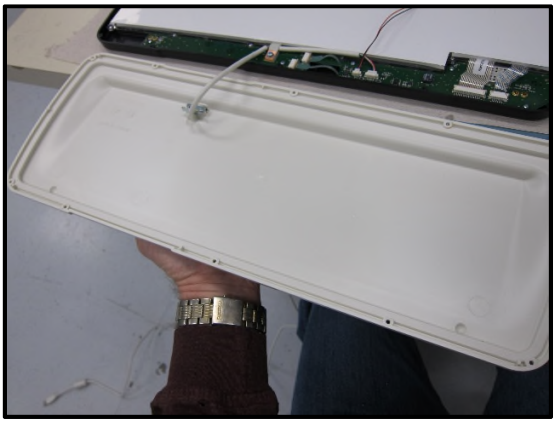

Figure 10: No evidence of ingress on the bottom housing

Figure 11: Cable exit was dry.

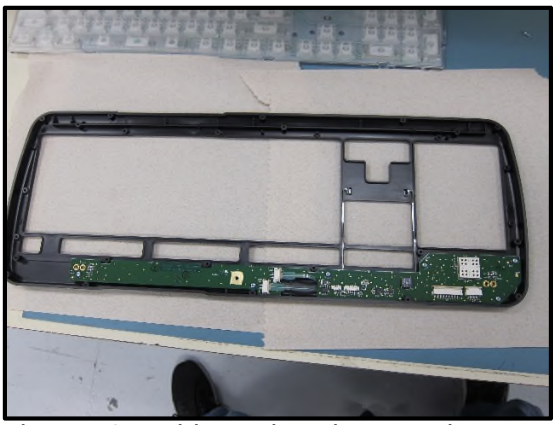

Figure 12: Inside top housing was dry.

8.2. Scroll Mouse Results

The mouse disassembly was destructive. The elastomer was cut off by scribing a line around the label adhered to the bottom. No water was found under the elastomer. An adhesive-backed label on the bottom surface was removed to expose screws to disassemble the rest of the unit.

Figure 13: Mouse sample prior to test.

Figure 14: Mouse label.


Figure 15: No water under elastomer

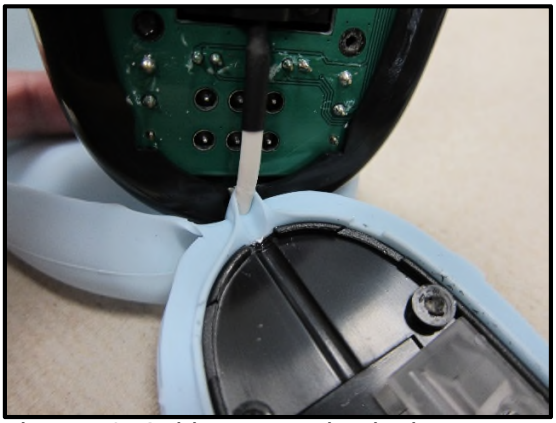
Figure 16: Cable penetration is dry

Figure 17: Water under adhesive label overlay

Figure 18: Interior of mouse dry

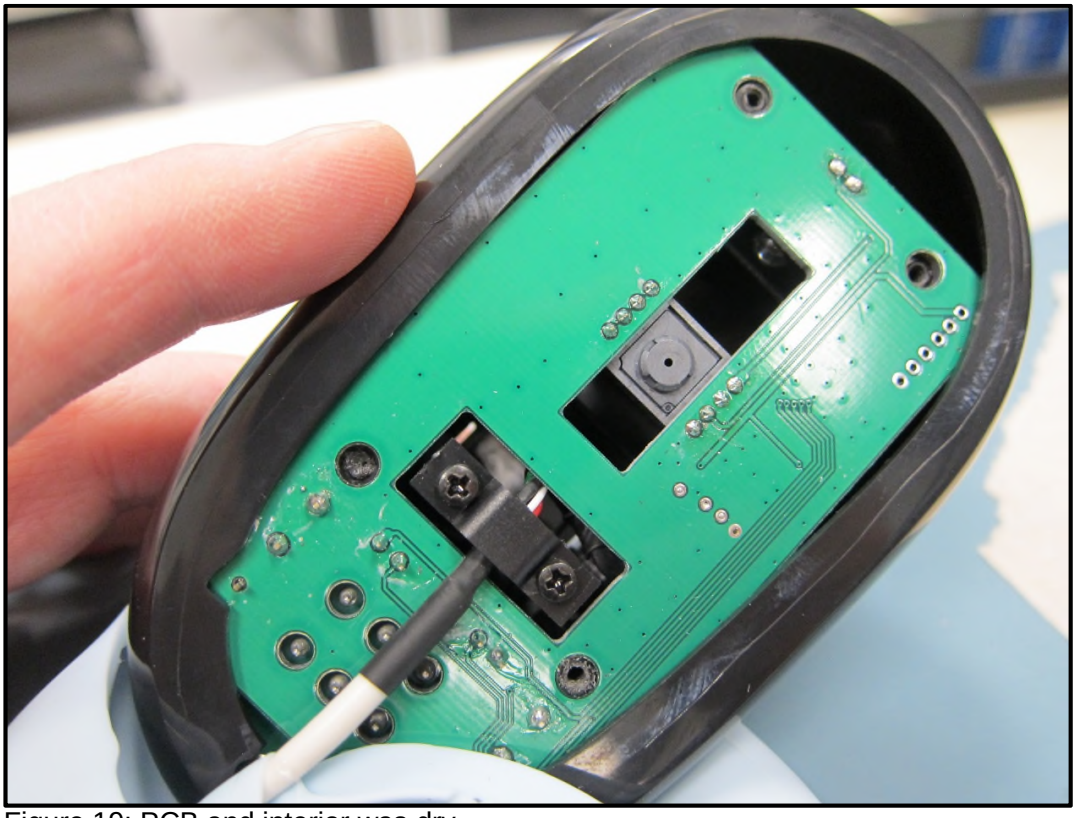

Figure 19: PCB and interior was dry

9. Test Support Equipment

Item	Manufacturer	Model	ID	Cal Due
IPX7 Ingress Test Dunk tank	AIS	n/a	n/a	n/a
Laptop PC	Dell	Inspiron	N/A	N/A