

**58687-1 Environmental Tests (230)**

<b>Certification prepared for</b>	<b>Seahorse Protective Equipment Cases</b>		
<b>Attention</b>	Flavio Valencia		
<b>Test start</b>	2/6/2019	<b>Test completion</b>	6/7/2019
<b>Purchase order number</b>	<b>22660</b>	<b>Purchase date</b>	2/12/2019
<b>As received</b>	This document describes procedures and results of testing performed to the specification(s) and/or requirement(s) detailed herein. The results described in this report relate only to the specific items as received and tested.		
<b>Decision rule</b>	Based upon the type of testing being categorized as CAT I (Quantitative or Semi-Quantitative) as defined in A2LA's P103 Policy on Estimating Measurement Uncertainty for Testing Laboratories, decision rules are not required.		

<b>Manufacturer</b>	Seahorse Protective Equipment Cases
<b>Device</b>	One (1) Seahorse Case
<b>Model/part number</b>	230
<b>Serial number</b>	N/A
<b>Sample identifier</b>	UUT-58687-2

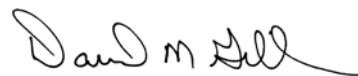
*The results of this test apply only to the units identified in this Engineering Report by device identifier and model / part number, or serial number.*

Element Minneapolis certifies that one Seahorse Case was subjected to Immersion Tests as specified in *MIL-STD-810F*, dated May 5, 2003, Method 512.4, Procedure I—Immersion and *IEC 60529*, Edition 2.2, dated August 2013, Paragraph 14.2.7, IPX7, a Dust Test as specified in *IEC 60529*, Edition 2.2, dated August 2013, Section 13.4, Category 1, IP6X, and a Drop Test as specified in *MIL-STD-3010C*, dated August 1, 2013, Method 5007, Level Apurchase order 22660, dated February 12, 2019.

No water or dust ingress was observed upon completion of the immersion or dust tests. No significant damage to the test unit was observed after the drop test, only minor scuffing and scratching was noted.



Nicole T. Duff, Technical Writer



David M. Gillen, Senior Program Manager

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## **Procedure**

### **Immersion Test**

The test unit was rapidly submerged in water to a depth of 1 meter. The water temperature and test unit temperature were within 5K of each other. The test unit was immersed for 30 minutes.

The test unit was removed from the water and examined for evidence of leakage.

### **Dust Test**

The test unit was placed on the mounting rack inside the dust chamber. A line to the vacuum pump was connected to the unit. The internal unit pressure was reduced by 2 kPa (8 in-H<sub>2</sub>O), and the leak rate was measured. No measurable flow was detected.

Talcum powder that meets the requirements of *IEC 60529* was used for the test. The amount of talcum powder used was 2 kg per cubic meter of test chamber volume. The chamber was sealed. The vacuum was adjusted for a 2 kPa depression within the test unit. The dust activation system was started. The test was conducted for 8 hours.

At the completion of the exposure, the test unit was removed from the chamber and inspected for dust penetration.

### **Drop Test**

The test unit was subjected to twenty-six drops from a height of 36 inches, drops on each flat face, edge, and corner. After each drop, the test unit was visually examined for damage and the test unit functionality was checked.

## Instrumentation

All instrumentation is calibrated regularly by instruments directly traceable to the National Institute of Standards and Technology, and in accordance with *ANSI/NCSL Z540.1*, *ANSI/NCSL Z540.3-2006*, and *ISO/IEC 17025: 2017*.

Equipment Number	Description	Manufacturer	Model Number	Last Calibration	Due Calibration	Range
<b>Immersion Test (MIL-STD-810F)</b>						
200-322	Digital Thermometer	Fluke	52 II	1/14/2019	1/14/2020	-200°C to 1372°C Type K; -250°C to +400°C Type T
400-062	Stopwatch	Extech	365510	1/11/2019	1/11/2021	0 to 23 hrs, 59 mins, 59 sec
770-068	Measuring Tape	Starrett	530-100	5/22/2018	5/22/2019	0 to 100 feet
<b>Dust Test (IEC 60529)</b>						
186-004CL	Talc Powder	Powder Technology Inc	#399 Talc	N/A	N/A	See Certificate of Conformance
380-559	DC Power Supply	Hewlett Packard	6234A	N/A	N/A	0 to 30 Vdc; 0 to 0.25 A
400-060	Stopwatch	Extech Instruments	365510	10/16/2018	10/16/2020	0 to 23 hrs, 59 mins, 59 sec
504-019	Dust Chamber	Environ	D-4	N/A	N/A	N/A
710-337	Differential Pressure Gage	Dwyer Instruments	2015	1/24/2018	1/24/2020	0 to 15 in. H <sub>2</sub> O
717-140	Flowmeter	Dwyer Instruments	RMA-22-APF-TMV	1/24/2018	1/24/2020	2 to 25 L/min air
717-141	Flowmeter	Dwyer Instruments	RMA-26-APF-TMV	1/24/2018	1/24/2020	0.5 to 5.0 L/min air
717-142	Flowmeter	Dwyer Instruments	RMA-12-APF-TMV	1/24/2018	1/24/2020	50 to 500 cc/min air
730-017	Digital Weight Indicator / Bench Scale	Rice Lake Weighing Systems	BM1212SB-100/IQ355	7/16/2018	7/16/2019	0 to 100 lbs; 0 to 50 Kg
<b>Immersion Test</b>						
200-322	Digital Thermometer	Fluke	52 II	1/14/2019	1/14/2020	-200°C to 1372°C Type K; -250°C to 400°C Type T
400-062	Stopwatch	Extech	365510	1/11/2019	1/11/2021	0 to 23 hrs, 59 mins, 59 sec
770-068	Measuring Tape	Starrett	530-100	5/22/2018	5/22/2019	0 to 100 feet
<b>Drop Test</b>						
503-213	Precision Drop Tester	Lansmont	PDT-56ED	N/A	N/A	0 to 48 inches
770-068	Measuring Tape	Starrett	530-100	5/22/2018	5/22/2019	0 to 100 feet