



# TEST REPORT

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Project No. G101297091

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REPORT NO. 101297091CHI-001

INGRESS PROTECTION (IP66) AND  
HOSEDOWN TESTING  
ON A EXPLOSION PROOF DIGITAL  
INTERCOM STATION, MODEL E1-SM  
RENDERED TO

FEDERAL SIGNAL CORPORATION  
2645 FEDERAL SIGNAL DRIVE  
UNIVERSITY PARK, IL. USA

## INTRODUCTION

This report gives the results of the tests for protection against solid foreign objects and protection against water on an Explosion Proof Digital Intercom Station, Model E1-SM. A prototype sample in good condition was provided by the client on August 6, 2013 and tested at Intertek's Arlington Heights, IL facility.

## AUTHORIZATION

This investigation was authorized by Signed Quotes 500472406 and 500473608, dated 08/05/13 and 08/08/13.

## TEST METHOD

A sample of the Explosion Proof Digital Intercom Station, Model E1-SM was evaluated for conformance to the tests for protection against dust & water and also was subjected to the Hosedown test to the Standards noted below.

***Degrees of Protection Provided by Enclosures (IP Code)  
IEC 60529: Second Edition***

***UL Standard for Safety Enclosures for Electrical Equipment, Environmental Considerations  
UL 50E: First Edition***

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## **GENERAL**

These test methods describe the degree of protection indicated by:

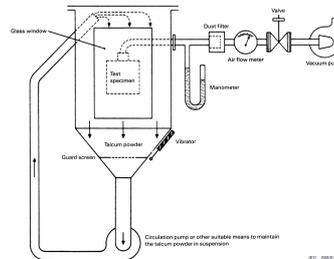
The first character numeral	Protection of the equipment against the ingress of dust
The second character numeral	Protection of the equipment inside the enclosure against harmful ingress of water

These test methods also describe NEMA Type 4 Hosedown

## **TEST – FIRST CHARACTER NUMERAL 6**

### **METHOD**

The sample was tested in a dust chamber similar to figure 2 of the standard. Talcum powder was maintained in suspension by an air current. The chamber contained 2 kg of powder for every cubic meter of its volume. The talcum powder used was able to pass through a square meshed sieve whose nominal wire diameter is 50  $\mu\text{m}$  and whose nominal free distance between wires was 75 $\mu\text{m}$ . The powder was not used for more than 20 tests.



NOTE: See IEC 60529-2-68, Figure 2, table for test only.  
Figure 2 – Test device to verify protection against dust (dust chamber)

The sample under test was supported inside the test chamber and the pressure inside the enclosure was maintained below the surrounding atmospheric pressure by a vacuum pump. The suction connection was made to the cable inlet hole. The other holes were treated as intended for normal use on site.

The object of the test was to draw into the enclosure, by means of depression, a volume of air 80 times the volume of the sample enclosure tested without exceeding the extraction rate of 60 volumes per hour. The depression is not to exceed 2 kPa (20 mbar) on the manometer shown in figure 2.

If an extraction rate of 40 to 60 volumes per hour is obtained the duration of the test is 2 h.

If, with a maximum depression of 2 kPa (20 mbar), the extraction rate is less than 40 volumes per hour, the test is continued until 80 volumes have been drawn through, or a period of 8 h has elapsed.

## **RESULTS OF TEST – PASS**

The results comply with the requirements since there wasn't accumulation of talcum powder in a quantity or location such that it could interfere with the correct operation of the equipment or impair safety.

## **TEST – SECOND CHARACTER NUMERAL 6**

### **METHOD**

During the test, the water temperature was not to differ by more than 5 K from the temperature of the sample under test. If the water temperature is more than 5 K below the temperature of the specimen, a pressure balance was to be provided for the enclosure.

During the test, the moisture contained inside the enclosure may partly condense. The dew which may thus deposit is not to be mistaken for ingress of water.

The surface area of the enclosure is calculated with a tolerance of 10 %.

The test is made by spraying the enclosure from all practicable directions with a stream of water from a standard test nozzle as shown in figure 6.

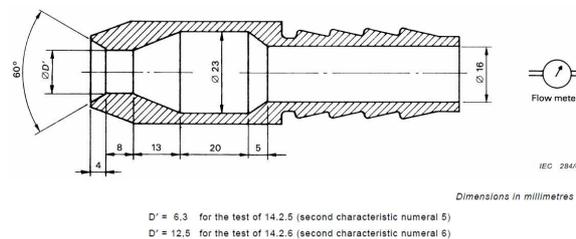


Figure 6 – Test device to verify protection against water jets (hose nozzle)

The conditions to be observed are as follows:

- internal diameter of the nozzle: 12.5mm;
- delivery rate: 100 l/min  $\pm$  5 %;
- water pressure: to be adjusted to achieve the specified delivery rate;
- core of the substantial stream: circle of approximately 120 mm diameter at 2.5 m distance from nozzle;
- test duration per square meter of enclosure surface area likely to be sprayed: 1 min;
- minimum test duration: 3 min;
- distance from nozzle to enclosure surface: between 2.5 m and 3 m.

### **RESULTS OF TEST - PASS**

The results comply with the requirements since there wasn't any water that entered the enclosure.

## **TEST – HOSEDOWN**

### **METHOD**

The enclosure and its external mechanisms were subjected to a stream of water from a hose that has a 25 mm inside diameter (1 inch inside diameter) nozzle that delivers at least 240 L per minute (65 gallons per minute). The water was directed at all joints from a distance of 3.0 – 3.5 m (10 – 12 feet). The nozzle was moved along each joint one time at a uniform nominal rate of 6 mm/s (1/4 inch per second). A conduit may be installed to equalize internal and external pressures, but didn't serve as a drain.

### **RESULTS OF TEST –**

The results comply with the requirements since there wasn't any water that entered the enclosure.

**DESCRIPTION**

The sample provided is an Explosion Proof Digital Intercom Station, Model E1-SM

**PHOTOS**

Photo 1 – Model E1-SM following IP6X test.



Photo 2 – No sign of talc entry at microphone



Photo 3 – Front Subassembly free of talc.



Photo 4 – Main Enclosure free of talc.

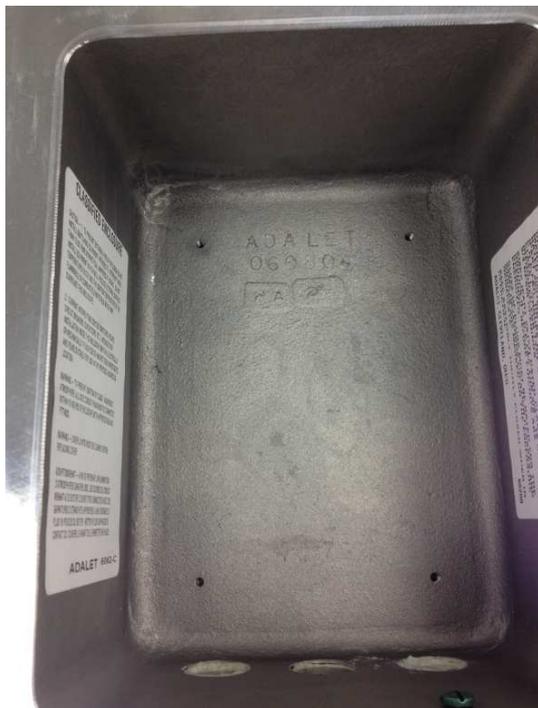


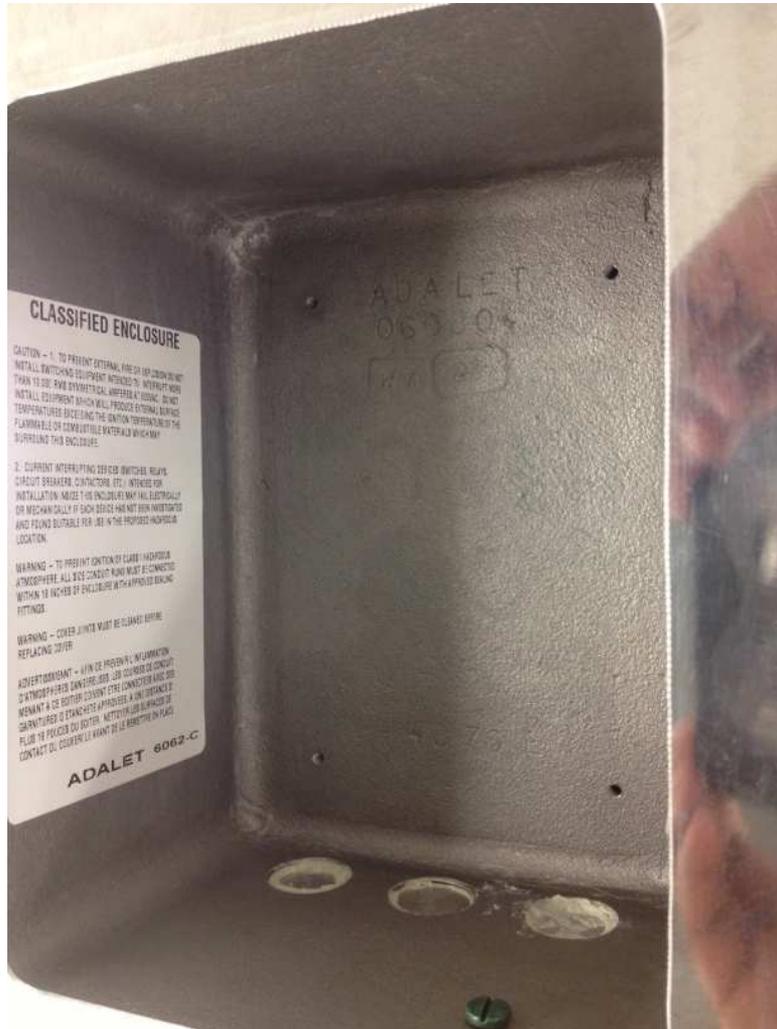
Photo 5 – No water detected in Microphone.



Photo 6 – No water detected in Front Assembly



Photo 7 – No water detected in Main Enclosure



**CONCLUSION**

The results of the tests indicate that the Explosion Proof Digital Intercom Station, Model E1-SM, met the requirements of the degree of ingress protection rating of IP66 and also the requirements of the Type 4 Hosedown test.

This Test Report completes our evaluation of this model, covered by Intertek Project No. G101297091. If there are any questions regarding the results contained in this report, or any of the other services offered by Intertek, please do not hesitate to contact the undersigned.

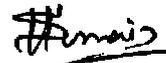
Please note; this Test Report does not represent authorization for the use of any Intertek certification marks.

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