



Project Number: SAFN10149 Customer: Cross Technology/Nu-Tech
Product Description: Cable Entry Seal Model/Type: NUS-4X, NUS-5
Document: SFE.10-001 Rev. 0
Date: 10/5/17

ENVIRONMENTAL TEST REPORT

Equipment or Devices for use in
Specific Application Environment

Test Report Number: R171005
Certificate Number: C171005

Customer

Manufacturer: Nu-Tech
Address: 305 Junia Ave.
Winston Salem, NC 27127


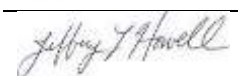
Testing Information:

Test Requested: Outdoor Use
Product Category: Enclosures, Electrical Equipment
Testing Standard: NEMA250 Edition: N/A Dated: 2008
Date of Testing: 10/5/17

Equipment Under Test (EUT) Details:

Product Description: Cable Entry Seal
Model/Type: NUS-4X, NUS-5
Quantity: 1

Evaluation Information:

Testing Engineer: Josh Hunt Signature:  Date: 10/5/17
Reviewing Engineer: Jeff Howell Signature:  Date: 10/5/17

Test Procedure Reference: (All testing has been done in accordance with the following work instructions.)

Test Procedure Number: SW5.4.1-31

Test Results: Please see the following 14 pages

CERTIFIGROUP

Regulatory Compliance Specialists



Project Number:	<u>SAFN10149</u>	Customer:	<u>Cross Technology/Nu-Tech</u>
Product Description:	<u>Cable Entry Seal</u>	Model/Type:	<u>NUS-4X, NUS-5</u>
Document:	<u>SFE.10-001</u> Rev.		<u>0</u>
Date:	<u>10/5/17</u>		

Test Report Contents

Contents

Test Condition for protection against water (Hosedown): NEMA 250..... 3
 Test Results: 3
 Test Condition for protection against water (Hosedown): NEMA 250..... 4
 Test Results: 4
 Test Condition for protection against solid foreign objects 5
 Test Results: 5
 Test Condition for protection against solid foreign objects 6
 Test Results: 6
 Test Condition for protection against water: IEC 60529 7
 Test Results:..... 7
 Test Condition for protection against water: IEC 60529 8
 Test Results:..... 8
 Test Photos: 9
 Atmospheric Conditions for water or dust tests (IEC 60529) 13
 Environmental Testing Lab Conditions 13
 Calibrated Test Equipment 13
 End of Report 13
 INGRESS PROTECTION TESTING AND EXAMINATION CERTIFICATE 14
 Customer Satisfaction Survey 15

CERTIFIGROUP

Regulatory Compliance Specialists

901 Sheldon Drive, Cary, NC 27513 Ph: 800-422-1651 Fax: (919) 228-4065



Project Number: SAFN10149 Customer: Cross Technology/Nu-Tech
 Product Description: Cable Entry Seal Model/Type: NUS-4X, NUS-5
 Document: SFE.10-001 Rev. 0
 Date: 10/5/17

Test Condition for protection against water (Hosedown): NEMA 250

Test Rating: Type 4, 4X, 6P (Protected against hose directed water)
 Test Standard Reference: Sec. 5.7 (Test for protection against ingress of water (Hosedown))
 Description of Test: EUT is subjected to jet of water from a hose with a 25mm (1in.) ID nozzle
 Water Flow Rate: 240 L/min
 Distance from Nozzle to EUT: 3-3.5 m
 Test Duration: Depends on size of sample and location of test points.
 Nozzle movement speed: 6 mm/sec (¼ "/sec)
 Sample Orientation: Vertical

Test Results:

Model: NUS-5
 Test Standard Reference: Sec. 5.7.2 (Evaluation)
 Acceptance Criteria: The enclosure shall be considered to have met the requirements if at the conclusion of the test no water has entered the enclosure.

Were water deposits found inside the EUT? YES NO N/A

Compliance:

YES / NO

Inspection Notes/Comments: No trace of water was found inside the enclosure or seal.



Project Number: SAFN10149 Customer: Cross Technology/Nu-Tech
 Product Description: Cable Entry Seal Model/Type: NUS-4X, NUS-5
 Document: SFE.10-001 Rev. 0
 Date: 10/5/17

Test Condition for protection against water (Hosedown): NEMA 250

Test Rating: Type 4, 4X, 6P (Protected against hose directed water)
 Test Standard Reference: Sec. 5.7 (Test for protection against ingress of water (Hosedown))
 Description of Test: EUT is subjected to jet of water from a hose with a 25mm (1in.) ID nozzle
 Water Flow Rate: 240 L/min
 Distance from Nozzle to EUT: 3-3.5 m
 Test Duration: Depends on size of sample and location of test points.
 Nozzle movement speed: 6 mm/sec (¼ "/sec)
 Sample Orientation: Vertical

Test Results:

Model: NUS-4X
 Test Standard Reference: Sec. 5.7.2 (Evaluation)
 Acceptance Criteria: The enclosure shall be considered to have met the requirements if at the conclusion of the test no water has entered the enclosure.

Were water deposits found inside the EUT? YES NO N/A

Compliance:

YES / NO

Inspection Notes/Comments: No trace of water was found inside the enclosure or seal.



Project Number: SAFN10149 Customer: Cross Technology/Nu-Tech
 Product Description: Cable Entry Seal Model/Type: NUS-4X, NUS-5
 Document: SFE.10-001 Rev. 0
 Date: 10/5/17

Test Condition for protection against solid foreign objects

Test Rating: IP6X (Dust Tight)
 Test Standard Reference: Sec. 13.4 (Dust test for first characteristic numerals 5 and 6)
 Sec. 13.6.1 (Test conditions for first characteristic numeral 6)
 Description of Test: EUT is subjected to a depression vacuum while dust is maintained in suspension within the chamber.
 Dust Medium: Talcum Powder
 Amount of Dust: 5 kg
 Chamber Size: 2.5 m³
 Maximum Depression Pressure: 2 kPA
 Maximum Depression Flow Rate: 60 volumes/hr
 Test Duration: 2 hours (flow rate was between 40-60 volumes/hr)
 Sample Orientation: Intended Mounting Position
 Enclosure Type: Category 1

Test Results:

Model: NUS-5
 Test Standard Reference: 13.6.2 (Acceptance conditions for first characteristic numeral 6)
 Acceptance Criteria: The protection is satisfactory if no deposit of dust is observable inside the enclosure at the end of the test.

Were dust deposits found inside the EUT?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
Is dust entry sufficient to interfere with correct operation or impair safety?	YES <input type="checkbox"/>	NO <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
Has dust deposited on insulation parts which could reduce creepage distances?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
Has dust accumulated on a live part?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
Has dust accumulated near a cable end or entered the cable if any?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>

Compliance:

YES / NO

Inspection Notes/Comments: No evidence of dust ingress into the enclosure through the cable entry seal.



Project Number: SAFN10149 Customer: Cross Technology/Nu-Tech
 Product Description: Cable Entry Seal Model/Type: NUS-4X, NUS-5
 Document: SFE.10-001 Rev. 0
 Date: 10/5/17

Test Condition for protection against solid foreign objects

Test Rating: IP6X (Dust Tight)
 Test Standard Reference: Sec. 13.4 (Dust test for first characteristic numerals 5 and 6)
 Sec. 13.6.1 (Test conditions for first characteristic numeral 6)
 Description of Test: EUT is subjected to a depression vacuum while dust is maintained in suspension within the chamber.
 Dust Medium: Talcum Powder
 Amount of Dust: 5 kg
 Chamber Size: 2.5 m³
 Maximum Depression Pressure: 2 kPA
 Maximum Depression Flow Rate: 60 volumes/hr
 Test Duration: 2 hours (flow rate was between 40-60 volumes/hr)
 Sample Orientation: Intended Mounting Position
 Enclosure Type: Category 1

Test Results:

Model: NUS-4X
 Test Standard Reference: 13.6.2 (Acceptance conditions for first characteristic numeral 6)
 Acceptance Criteria: The protection is satisfactory if no deposit of dust is observable inside the enclosure at the end of the test.

Were dust deposits found inside the EUT?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
Is dust entry sufficient to interfere with correct operation or impair safety?	YES <input type="checkbox"/>	NO <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
Has dust deposited on insulation parts which could reduce creepage distances?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
Has dust accumulated on a live part?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
Has dust accumulated near a cable end or entered the cable if any?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>

Compliance:

YES / NO

Inspection Notes/Comments: No evidence of dust ingress into the enclosure through the cable entry seal.



Project Number: SAFN10149 Customer: Cross Technology/Nu-Tech
 Product Description: Cable Entry Seal Model/Type: NUS-4X, NUS-5
 Document: SFE.10-001 Rev. 0
 Date: 10/5/17

Test Condition for protection against water: IEC 60529

Test Rating: IPX8 (Protected against effects of continuous immersion in water)
 Test Standard Reference: Sec. 14.2.7 (Test for second characteristic numeral 8: continuous immersion subject to agreement)
 Description of Test: EUT is continuously immersed in water in conditions which are set by manufacturer and are more severe than IPX7.
 Test Duration: 60 minutes
 Distance under water: 1 meter
 Sample Orientation: Horizontal

Test Results:

Model: NUS-5
 Test Standard Reference: Sec. 14.3 (Acceptance conditions)
 Acceptance Criteria: It is the responsibility of the relevant technical committee to specify the amount of water which may be allowed to enter the enclosure and the details of a dielectric strength test, if any.
 In general, if any water has entered, it shall not:

- be sufficient to interfere with the correct operation of the equipment or impair safety;
- deposit on insulation parts where it could lead to tracking along the creepage distances;
- reach live parts or windings not designed to operate when wet;
- accumulate near the cable end or enter the cable if any.

If the enclosure is provided with drain-holes, it should be proved by inspection that any water which enters does not accumulate and that it drains away without doing any harm to the equipment.
 For enclosures without drain-holes, the relevant product standard shall specify the acceptance conditions if water can accumulate to reach live parts.

Were water deposits found inside the EUT?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
Is water entry sufficient to interfere with correct operation or impair safety?	YES <input type="checkbox"/>	NO <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
Has water deposited on insulation parts which could reduce creep age distances?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
Has water accumulated on a live part?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
Has water accumulated near a cable end or entered the cable if any?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>

Compliance:
 YES / NO

Inspection Notes/Comments: No trace of water deposits within



Project Number: SAFN10149 Customer: Cross Technology/Nu-Tech
 Product Description: Cable Entry Seal Model/Type: NUS-4X, NUS-5
 Document: SFE.10-001 Rev. 0
 Date: 10/5/17

Test Condition for protection against water: IEC 60529

Test Rating: IPX8 (Protected against effects of continuous immersion in water)
 Test Standard Reference: Sec. 14.2.7 (Test for second characteristic numeral 8: continuous immersion subject to agreement)
 Description of Test: EUT is continuously immersed in water in conditions which are set by manufacturer and are more severe than IPX7.
 Test Duration: 60 minutes
 Distance under water: 1 meter
 Sample Orientation: Horizontal

Test Results:

Model: NUS-4X
 Test Standard Reference: Sec. 14.3 (Acceptance conditions)
 Acceptance Criteria: It is the responsibility of the relevant technical committee to specify the amount of water which may be allowed to enter the enclosure and the details of a dielectric strength test, if any.
 In general, if any water has entered, it shall not:

- be sufficient to interfere with the correct operation of the equipment or impair safety;
- deposit on insulation parts where it could lead to tracking along the creepage distances;
- reach live parts or windings not designed to operate when wet;
- accumulate near the cable end or enter the cable if any.

If the enclosure is provided with drain-holes, it should be proved by inspection that any water which enters does not accumulate and that it drains away without doing any harm to the equipment.
 For enclosures without drain-holes, the relevant product standard shall specify the acceptance conditions if water can accumulate to reach live parts.

Were water deposits found inside the EUT?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
Is water entry sufficient to interfere with correct operation or impair safety?	YES <input type="checkbox"/>	NO <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
Has water deposited on insulation parts which could reduce creep age distances?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
Has water accumulated on a live part?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
Has water accumulated near a cable end or entered the cable if any?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>

Compliance:
 YES / NO

Inspection Notes/Comments: No trace of water deposits within

Test Photos:



Figure 1: EUT View

Figure 2: EUT View



Figure 3: EUT Dust Test

Figure 4: EUT Dust Test



Figure 5: EUT Inspection



Figure 6: EUT Inspection



Figure 7: EUT Hosedown



Figure 8: EUT Hosedown



Figure 9: EUT Hosedown



Figure 10: EUT Immersion



Figure 11: EUT Inspection



Figure 12: EUT Inspection



Figure 13: EUT Inspection



Figure 14: EUT Inspection



Figure 15: EUT Inspection



Figure 16: EUT Inspection



Project Number:	SAFN10149	Customer:	Cross Technology/Nu-Tech
Product Description:	Cable Entry Seal	Model/Type:	NUS-4X, NUS-5
Document:	SFE.10-001 Rev.		0
Date:	10/5/17		

Atmospheric Conditions for water or dust tests (IEC 60529)

Standard Reference	Sec. 11.1 (Atmospheric conditions for water or dust tests)
Recommended Temperature	15° C to 35° C
Relative Humidity	25% to 75%

Environmental Testing Lab Conditions

Air Temperature	27.2° C
Relative Humidity	53.5%

Calibrated Test Equipment

Asset #	Test Equipment	Manufacturer	Model#	Serial #	Calibration Due Date
1976	Dust Chamber	ED&D	DTC-4000	W12050135	3/8/2018
2816	Tape Measure	Stanley	30-824	2816	NO CAL
4128	Stop Watch - Wet lab	Control Company	1030	S10470408	10/6/2018
2820	Jet Nozzle	ED&D	JET-50	W11420616	5/4/2018

End of Report



AT-1545

INGRESS PROTECTION TESTING AND EXAMINATION CERTIFICATE

Equipment or Devices for use in Specific Application Environment

Ingress Protection Examination Certificate: C171005
Test Report: R171005
Applicant/Manufacturer: Nu-Tech
Address: 305 Junia Ave.
Winston Salem, NC 27127
Equipment or Device Category: Enclosures, Electrical Equipment
Equipment or Device Model/Type: NUS-4X, NUS-5

This Equipment or device and any acceptable variation thereto are specified in the report to this certificate on the preceding 5 pages.

The Certification Services Certified that this equipment or device has been found to comply by "Type-Tests" for the Ingress Protection (IP) Requirements relating to the design and construction of the equipment submitted by Applicant to CertifiGroup.

Compliance has been established by testing under the requested Standard:

Testing Standard: NEMA 250, IEC 60529

Ingress Protection Code (IP Code) achieved by testing under the above Standard(s) for this Equipment or Device of the same design and construction shall be eligible to include the following marking:

"Type 4X – Hosedown Only", "IP6X", "IPX8", "IP68"

This Certification Certificate may only be reproduced in its entirety and without any change.

CertifiGroup Environmental Certification Services
901 Sheldon Dr. Cary, NC 27513
Ph: 800-422-1651 Fax: (919) 228-4065



Customer Satisfaction Survey

We appreciate your business and value your opinion. In an effort to serve you better, we ask that you please take a few minutes to let us know how we are doing and note any area that you feel could use some improvement.

Which one of our services did you use? (check all that apply)

IP Testing
 NEMA
 Consulting
 Other _____

Please Rate the following:	Very Dissatisfied ← — — — — → Very Satisfied				
Professionalism of the Receptionist	1	2	3	4	5
Phone System – Ease of Use	1	2	3	4	5
Helpfulness of Office Staff	1	2	3	4	5
Marketing/Sales					
Fulfillment of Information Requested	1	2	3	4	5
Clarity of Information Received	1	2	3	4	5
Timeliness & Clarity of Quote	1	2	3	4	5
Technical/Auditing Services					
Professionalism of Engineering Staff	1	2	3	4	5
Ease of Reaching Engineering Staff Via Telephone	1	2	3	4	5
Project Turnaround Time	1	2	3	4	5
Communications were clear, timely and effective	1	2	3	4	5
Documentation					
Quality of Documentation (test reports, certificate, etc.)	1	2	3	4	5
Timeliness of Report Issuance	1	2	3	4	5
Invoices					
Accuracy	1	2	3	4	5
Clarity	1	2	3	4	5
Timeliness of Projects Being Invoiced Upon Their Completion	1	2	3	4	5
Compared to other agencies, how would you rate the amount of paperwork that we require for a project?	More		Same	Less	
	1	2	3	4	5
OVERALL SATISFACTION WITH CERTIFIGROUP	1	2	3	4	5

Do you have a specific suggestion on how we can serve you better?

If there is a particular issue that you would like to discuss personally, please write your name, title, and phone number and we will contact you.

Company: _____ Project # SAFN10149

Thank you for your time and help. Please fax survey to (919) 228-4065

CertifiGroup. 901 Sheldon Drive, Cary, NC 27513 Ph: 800-422-1651 Fax: (919) 228-4065