

Date:

SAFN10149 Cable Entry Seal SFE.10-001 10/5/17

Customer: Model/Type: Cross Technology/Nu-Tech NUS-4X, NUS-5

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ENVIRONMENTAL TEST REPORT

Rev.

Equipment or Devices for use in $\stackrel{\cdot}{\text{Specific Application Environment}}$

Test Report Number:	R171005				
Certificate Number:	C171005	C171005			
Customer					
Manufacturer:	Nu-Tech				
Address:	305 Junia Ave.				
Addiess.	Winston Salem, N	NC 27127			
Testing Information:					
Test Requested:	Outdoor Use				
Product Category:	Enclosures, Electi	rical Fouinment			
Testing Standard:	NEMA250	Edition: N/A	Dated:	2008	
Date of Testing:	10/5/17	Lattion: 14/70	Datea.	2000	
,					
Equipment Under Test (EUT) D	etails:				
Product Description:	Cable Entry Seal				
Model/Type:	NUS-4X, NUS-5				
Quantity:	1				
Evaluation Information:					
Testing Engineer:	Josh Hunt	Signature:	OL Abot	Date:	10/5/17
			June 18		
Reviewing Engineer:	Jeff Howell	Signature:	John That- Jeffry I Howell	Date:	10/5/17
Took Dungandung Defenence (All	++: b b d	:	م المسام المسام المسام المسام		- \
Test Procedure Reference: (All testing has been done in accordance with the following work instructions				5.)	
Test Procedure Number:	SW5.4.1-31				
Test Results:	Please see the f	ollowing 14 pages			



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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		
Гest 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	e the EUT? YES NO N/A		
	Compliance:		
	YES 🔀 / NO 🗌		
Inspection Notes/Comments:	No trace of water was found inside the enclosure or seal.		

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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		
Γest 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 N/A		
Inspection Notes/Comments:	Compliance: YES / NO No trace of water was found inside the enclosure or seal.		

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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) EUT is subjected to a depression vacuum while dust is maintained in Description of Test: suspension within the chamber. **Dust Medium:** Talcum Powder Amount of Dust: 5 kg 2.5 m³ Chamber Size: 2 kPA Maximum Depression Pressure: Maximum Depression Flow Rate: 60 volumes/hr 2 hours (flow rate was between 40-60 volumes/hr) **Test Duration:** 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) The protection is satisfactory if no deposit of dust is observable inside the Acceptance Criteria: enclosure at the end of the test. Were dust deposits found inside the EUT? YES NO 🖂 N/A NO 🗆 N/A 🔀 Is dust entry sufficient to interfere with correct operation or impair safety? YES YES NO 🖂 N/A [Has dust deposited on insulation parts which could reduce creepage distances? YES NO \boxtimes N/A Has dust accumulated on a live part? Has dust accumulated near a cable end or entered the cable if any? YES \square NO \boxtimes N/A **Compliance:** YES X / NO Inspection Notes/Comments: No evidence of dust ingress into the enclosure through the cable entry seal.



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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) EUT is continuously immersed in water in conditions which are set by Description of Test: manufacturer and are more severe than IPX7. **Test Duration** 60 minutes 1 meter Distance under water 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. NO \boxtimes Were water deposits found inside the EUT? YES N/A N/A 🖂 Is water entry sufficient to interfere with correct operation or impair safety? YES NO YES \bowtie N/A Has water deposited on insulation parts which could reduce creep age distances? YES \square NO \boxtimes N/A Has water accumulated on a live part? YES NO \bowtie N/A Has water accumulated near a cable end or entered the cable if any? Compliance: YES X / NO Inspection Notes/Comments: No trace of water deposits within



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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. 60 minutes 1 meter Horizontal Test Results: Model: NUS-4X Sec. 14.3 (Acceptance conditions) 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 det 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 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 inspect 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 spetha acceptance conditions if water can accumulate to reach live parts. Were water deposits found inside the EUT? YES NO N// N// Has water deposited on insulation parts which could reduce creep age distances? YES NO N// N// N// Has water accumulated on a live part?	IPX8 (Protected against effects of continuous in		water	
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Has water accumulated near a cable end or entered the cable if any? YES \square NO \boxtimes N/ \not Compliance:			=	N/A 📙
Compliance:	•			N/A 🗌
• • • • • • • • • • • • • • • • • • •	•	YES	NO 🔀	N/A 📗
YES × / NO	•			
	— • —			
Inspection Notes/Comments: No trace of water deposits within	No trace of water deposits within			
Inspection Notes/Comments:	i	Subject to agreement) EUT is continuously immersed in water in condimanufacturer and are more severe than IPX7. 60 minutes 1 meter Horizontal NUS-4X Sec. 14.3 (Acceptance conditions) It is the responsibility of the relevant technical amount of water which may be allowed to entered of a dielectric strength test, if any. In general, if any water has entered, it shall note be sufficient to interfere with the correct of impair safety; • deposit on insulation parts where it could be creepage distances; • reach live parts or windings not designed to accumulate near the cable end or enter the lifthe enclosure is provided with drain-holes, it that any water which enters does not accumulate without doing any harm to the equipment. For enclosures without drain-holes, the relevant the acceptance conditions if water can accumulate the EUT? If ere with correct operation or impair safety? If on parts which could reduce creep age distances? It is continuously immersed in water in conditions? Compliance:	subject to agreement) EUT is continuously immersed in water in conditions which manufacturer and are more severe than IPX7. 60 minutes 1 meter Horizontal NUS-4X Sec. 14.3 (Acceptance conditions) It is the responsibility of the relevant technical committee amount of water which may be allowed to enter the enclo 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 impair safety; • deposit on insulation parts where it could lead to track creepage distances; • reach live parts or windings not designed to operate weighted and if the enclosure is provided with drain-holes, it should be get that any water which enters does not accumulate and that without doing any harm to the equipment. For enclosures without drain-holes, the relevant product state acceptance conditions if water can accumulate to react deals the EUT? fere with correct operation or impair safety? on parts which could reduce creep age distances? YES compliance: YES YES Tobble end or entered the cable if any?	subject to agreement) EUT is continuously immersed in water in conditions which are set by manufacturer and are more severe than IPX7. 60 minutes 1 meter Horizontal NUS-4X Sec. 14.3 (Acceptance conditions) It is the responsibility of the relevant technical committee to specify t amount of water which may be allowed to enter the enclosure and the 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 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 in that any water which enters does not accumulate and that it drains and without doing any harm to the equipment. For enclosures without drain-holes, the relevant product standard shat the acceptance conditions if water can accumulate to reach live parts de the EUT? YES NO Compliance: YES NO Compliance: YES NO NO Compliance: YES NO NO Compliance: YES NO NO Compliance: YES NO NO Compliance:



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Test Photos:





Figure 1: EUT View

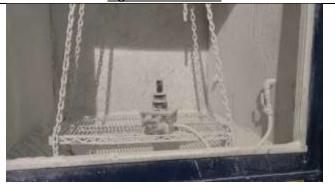


Figure 2: EUT View

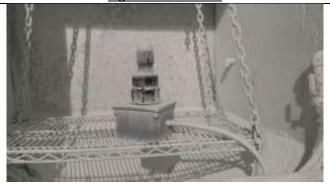


Figure 3: EUT Dust Test

Figure 4: EUT Dust Test



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Figure 5: EUT Inspection



Figure 6: EUT Inspection



Figure 7: EUT Hosedown

Figure 8: EUT Hosedown



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Figure 9: EUT Hosedown



Figure 11: EUT Inspection

Figure 10: EUT Immersion



Figure 12: EUT Inspection



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Figure 13: EUT Inspection



Figure 15: EUT Inspection

Figure 14: EUT Inspection



Figure 16: EUT Inspection



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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 25% to 75% **Relative Humidity**

Environmental Testing Lab Conditions

27.2° C Air Temperature 53.5% **Relative Humidity**

Date:

Calibrated Test Equipment

A 1 11	Table Comment	N.A	N A1 - 111	6	California Da Data
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	1030	S10470408	10/6/2018
	Stop Water - Wet lab	Company			
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		Othe	er		
Please Rate the following:		Very D	issatisfie	d←→	Very Sa	atisfied
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		1	2	3	4	5
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
	for the same of th					
Technical/Auditing Services		-				
Professionalism of Engineering Staff		1	2	3	4	5
Ease of Reaching Engineering Staff Via Telep	hone	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, cert	tificate, etc.)	1	2	3	4	5
Timeliness of Report Issuance		1	2	3	4	5
				1		
Invoices						
Accuracy		1	2	3	4	5
Clarity		1	2	3	4	5
Timeliness of Projects Being Invoiced Upon	Their Com <mark>pletion</mark>	1	2	3	4	5
				1/-		
Compared to other agencies, how would you rate the amount of		М	ore	Same	Le	ess
paperwork that we require for a project?		1	2	3	4	5
OVERALL SATISFACTION WITH CERTIFIC	ROUP	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 disc phone number and we will contact you.	cuss personally, please write your name, title, and
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