


TEST REPORT

 CTK Co., Ltd. <small>The Power Leader of Global Regulatory Certification</small>	CTK Co., Ltd. 5 Dongbu-ro 221beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Republic of Korea Tel: +82-31-339-9970 Fax: +82-31-624-9501	Report No.: CTK-2024-01783 Page (1) / (21) pages	
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1. Applicant

◦ Name : Hanwha Vision Co., Ltd
◦ Address : 6 Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, 13488 KOREA
◦ Date of Receipt : 2024-05-31

2. Manufacturer

◦ Name : HANWHA VISION VIETNAM COMPANY LIMITED
◦ Address : Lot O-2, Que Vo Industrial Zone extended area, Nam Son
ward, Bac Ninh city, Bac Ninh province, Vietnam

3. Use of Report : Quality control

4. Test sample / Model : NETWORK CAMERA / TNV-C7013RC

5. Date(s) of test : 2024-06-03 ~ 2024-06-10

6. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing

Address: (5 Dongbu-ro 221beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Republic of Korea)

7. Test Standard (Method) used : NEMA 250-2014

Enclosures for Electrical Equipment (1000 Volts Maximum)

8. Testing Environment : Temperature: (25 ±10) °C, Humidity: (50 ±25) %R.H.
Pressure: (96 ±10) kPa

9. Test Results : Refer to each test items

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
This Test Report cannot be reproduced, except in full.


The test was conducted as one sample, and the test result does not depend on the number of samples

Affirmation	Tested by	Technical Manager
	HyungUk Jeon (Signature)	HoHyun Lee (Signature)

2024-06-21

CTK Co., Ltd



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Test item particulars.....:	Network Camera
Classification of installation and use	Outdoor (Watertight/Corrosion Resistant)
Possible test case verdicts:	
- test case does not apply to the test object	N/A
- test object does meet the requirement.....	P (Pass)
- test object does not meet the requirement	F (Fail)
- test case does not evaluated to the test object :	N/E

General remarks:	
<p>"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p> <p>Clause numbers between brackets refer to clauses in NEMA 250-2014</p>	
Name and address of factory (ies):	
<p>1. HANWHA VISION VIETNAM COMPANY LIMITED Lot O-2, Que Vo Industrial Zone extended area, Nam Son ward, Bac Ninh city, Bac Ninh province, Vietnam</p> <p>2. D-TECH CO., LTD. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do, Korea (Suwon Industrial Complex)</p>	
Type 4X	<p>Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); that provides an increased level of protection against corrosion; and that will be undamaged by the external formation of ice on the enclosure.</p>

Table 2-1
Comparison of Specific Applications of Enclosures for Indoor Nonhazardous (Unclassified) Locations

Provides a Degree of Protection against the Following Conditions	Type of Enclosure									
	1	2	4	4X	5	6	6P	12	12K	13
Access to hazardous parts	X	X	X	X	X	X	X	X	X	X
Ingress of solid foreign objects (falling dirt)	X	X	X	X	X	X	X	X	X	X
Ingress of water (dripping and light splashing)	...	X	X	X	X	X	X	X	X	X
Ingress of solid foreign objects (circulating dust, lint, fibers, and flyings **)	X	X	...	X	X	X	X	X
Ingress of solid foreign objects (settling airborne dust, lint, fibers, and flyings **)	X	X	X	X	X	X	X	X
Ingress of water (hosedown and splashing water)	X	X	...	X	X	...	...	...
Oil and coolant seepage	X	X	X
Oil or coolant spraying and splashing	X
Corrosive agents	X	...	...	X	...	...	...
Ingress of water (occasional temporary submersion)	X	X	...	...	...
Ingress of water (occasional prolonged submersion)	X	...	...	...

** These fibers and flyings are not considered Class III type ignitable fibers or combustible flyings. For Class III type ignitable fibers or flyings see the *National Electrical Code®*, Article 500.5(D).

Table 2-2
Comparison of Specific Applications of Enclosures for Indoor & Outdoor Nonhazardous (Unclassified) Locations

Provides a Degree of Protection Against the Following Conditions	Type of Enclosure									
	3	3X	3R	3RX	3S	3SX	4	4X	6	6P
Access to hazardous parts	X	X	X	X	X	X	X	X	X	X
Ingress of solid foreign objects (falling dirt)	X	X	X	X	X	X	X	X	X	X
Ingress of water (dripping and light splashing)	X	X	X	X	X	X	X	X	X	X
Ingress of water (rain, snow, and sleet **)	X	X	X	X	X	X	X	X	X	X
Sleet ***	...	...	...	...	X	X	...	...	...	...
Ingress of solid foreign objects (windblown dust, lint, fibers, and flyings****)	X	X	...	...	X	X	X	X	X	X
Ingress of water (hosedown and splashing water)	...	...	...	...	...	...	X	X	X	X
Corrosive agents	...	X	...	X	...	X	...	X	...	X
Ingress of water (occasional temporary submersion)	...	...	...	...	...	...	...	...	X	X
Ingress of water (occasional prolonged submersion)	...	...	...	...	...	...	...	...	...	X

** External operating mechanisms are not required to be operable when the enclosure is ice covered.

*** External operating mechanisms are operable when the enclosure is ice covered. See subsection 5.6.

**** These fibers and flyings are not considered Class III type ignitable fibers or combustible flyings. For Class III type ignitable fibers or flyings see the *National Electrical Code®*, Article 500.5(D).

Table 5-1A
Degrees of Protection Against Access to Hazardous Parts

Enclosure Type	Test Conditions	Degree of Protection		Corresponding IP First Characteristic Numeral
		Brief Description	Definition	
4X	5.7	Protected against access to hazardous parts with a wire	An access probe of 1.0 mm shall not penetrate	6

Table 5-1B
Degrees of Protection Against Solid Foreign Objects


Enclosure Type	Test Conditions	Degree of Protection		Corresponding IP First Characteristic Numeral
		Brief Description	Definition	
4X	<u>Non-vented</u> 5.7	Windblown dust protected	No ingress of dust	6
	<u>Vented</u> 5.5.1 Dust Blast Method			

Table 5-1C
Degrees of Protection against Water

Enclosure Type	Test Conditions	Degree of Protection		Corresponding IP Second Characteristic Numeral
		Brief Description	Definition	
4X	5.7	Protected against hose directed water	Water projected against the enclosure in any direction shall not enter	6 No Ingress Allowed*

Table 5-1D
Additional Protection

Enclosure Type	Test Conditions	Additional Protection		Corresponding IP Second Characteristic Numeral
		Brief Description	Definition	
4X	5.6 5.9 5.10	Special corrosion protection and undamaged by the external formation of ice	Enclosure provides increased corrosion protection and is not damaged by ice that forms on the outside	None


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NEMA 250-2014			
Clause	Requirement + Test	Result - Remark	Verdict

3	CONSTRUCTION		
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3.1	General		P
3.2	Units of Measurement		P
3.3	Materials-General	Enclosures are made of metal or polymeric materials	P
3.4	Materials-Polymeric	More than 650 mm ² (1 in ²) in area Polymeric Materials used is declared as Min. V-2 Used to UL certified material. (See the attachment 2)	N/E
3.5	Corrosion Protection	Stainless steel and/or aluminium are declared as the materials used (See the attachment 2)	N/E
3.6	Openings	No openings in Product	N/A
3.7	Mounting	Mounting means are external to the equipment cavity (See the attachment 1)	P
3.8	Conduit Connection	No conduit connection (See the attachment 1)	N/A
3.9	Hubs and Fittings	No Hubs and Fittings	N/A
3.10	Knockouts	No Knockouts	N/A
3.11	External Operating Mechanisms	No External Operating Mechanisms	N/A
3.12	Access to Interior	Needs tool to open unit	P
3.13	Closing Hardware	No closing Hardware	N/A
3.14	Gaskets	Gaskets made of a silicone Sponge Rubber (no Elastomeric or Thermoplastic used) (See clause 5.14 and the attachment 2)	P
3.15	Observation Windows	No Observation Window	N/A


4	MARKING		
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NEMA 250-2014			
Clause	Requirement + Test	Result - Remark	Verdict
4.1	Type Designations	"Type 4X" Marking is declared to be on the product before on the market	P
4.2	Supplemental Markings	Supplemental Marking (watertight/ corrosion resistant) is declared to be used when it is on the market. The required marking shall be added on the product)	P
4.3	Location of Markings	See the Attachment 3	P
4.4	Enclosure Orientation	No Particular Mounting Orientation	N/A
4.5	Conduit Hubs and Closure Plates	No Conduit Hubs and Closure Plates	N/A
4.6	Equipment Openings	No Openings on Unit	N/A
4.7	Drainage Openings	No Drain Openings	N/A

5	DESIGN TESTS	
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5.1	General	See Table 5-1A to 5-1D and 5.1.5 in the General product information	P
5.2	Tests For Protection Against Access to Hazardous Parts	Rated 4X	N/A
5.3	Tests for Protection Against Ingress of Water (Dripping and Light Splashing)	Rated 4X	N/A
5.4	Tests for Protection Against Ingress of Water (Rain)	Rated 4X	N/A
5.5	Tests for Protection Against Ingress of Solid Foreign Objects (Setting Airborne Dust, Lint, Fibers, And Flings)	Non-vented (See clause 5.7)	N/A
5.6	External Icing Test	No external cavities to trap water when mounted in the normal position.	N/A
5.7	Tests for Protection Against Ingress of Water (Hosedown)	No entry of water See the test information	P
5.8	Indoor Corrosion Protection (Rust-Resistance Test (24-Hour Salt Spray Test))	See clause 3.5	N/E
5.9	Outdoor Corrosion Protection	See clause 3.5	N/E
5.10	Corrosion Protection-Type 3X, 3RX, 3SX, 4X Or 6P Enclosures	See clause 3.5	N/E

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NEMA 250-2014			
Clause	Requirement + Test	Result - Remark	Verdict
5.11	Test for Protection Against Ingress of Water (Temporary Submersion)	Rated 4X	N/A
5.12	Test for Protection Against Ingress of Water (Prolonged Submersion)	Rated 4X	N/A
5.13	Oil Exclusion Test	Rated 4X	N/A
5.14	GASKET MATERIAL TESTS	The product itself(including gaskets) was conditioned at 70 °C for 168 hrs according to 5.14.3(Alternate Evaluation) before performing relevant required tests.	P
5.15	Test for Sharpness of Edges	No sharp edges	P


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NEMA 250-2014			
Clause	Requirement + Test	Result - Remark	Verdict

Test Information

	Hose Down Test: Clause 5.7	P
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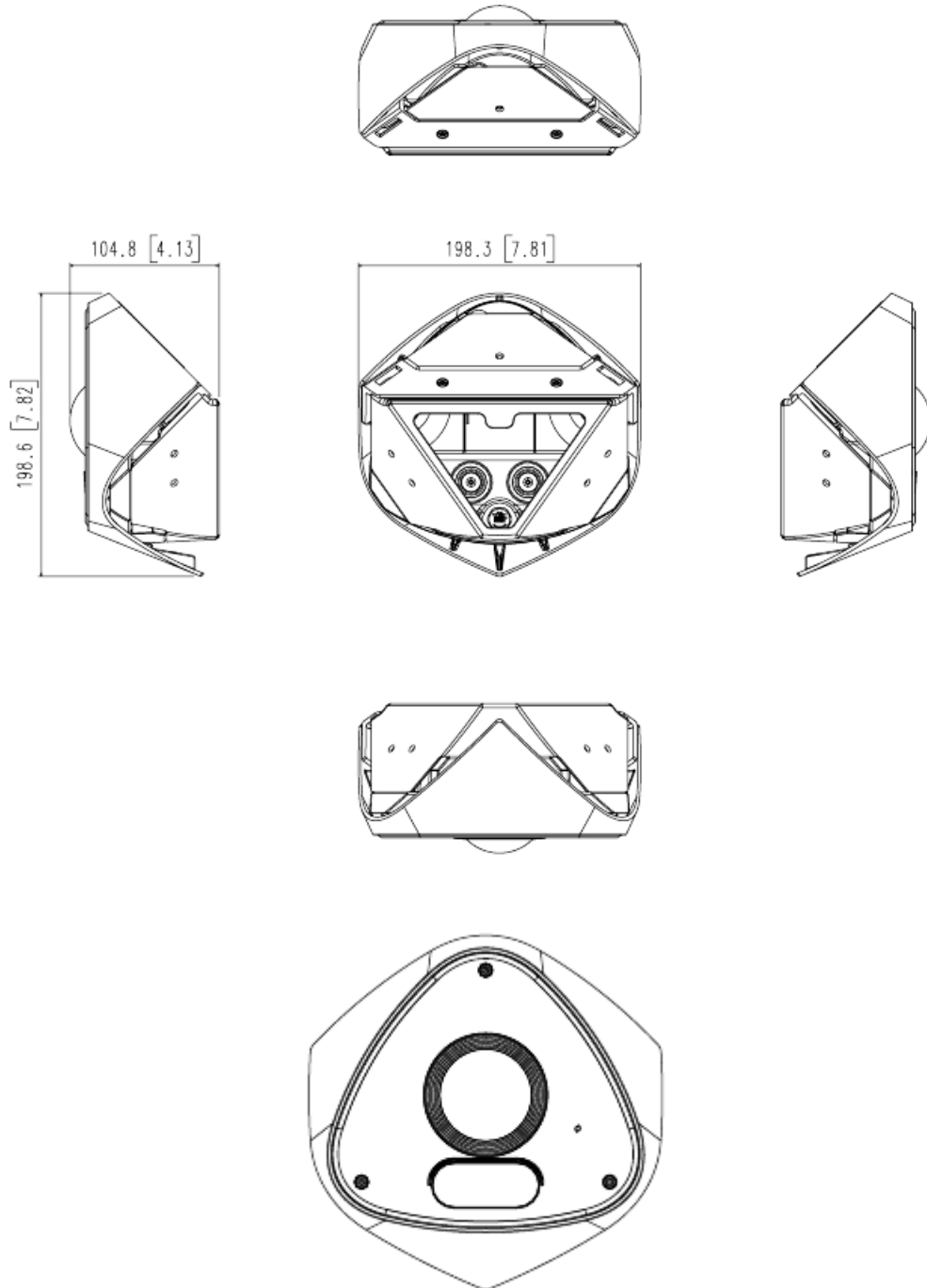
Description of Test <p>The enclosure and its external mechanisms were subjected to a stream of water from a hose that has a 25.4 mm (1 in) inside diameter nozzle and delivers at least 240 L (65 gal) per minute.</p> <p>The nozzle was held from 3.0 to 3.5 m (10 to 12 feet) from the enclosure, and the spray of water was directed at all points of potential water entry such as seams, joints, external operating mechanisms, and such. The nozzle was moved along each test point one time at a uniform rate of 6 mm/sec(1/4 in/sec).</p> <p>Sample Dimension Ø 51.5 mm by 161.71 mm, Ø 7.5 *3 mm by 70.65 mm, 170 mm, 155 mm, 155mm, 60.5 mm, 60.5 mm, 25 mm, 25 mm Test Duration = 147.23 secs</p> <p>Acceptance conditions: The enclosure shall be considered to have met the requirements if at the conclusion of the test no water has entered the enclosure</p> <p>Test Results</p> <table border="1"> <thead> <tr> <th>Sample No (Model)</th><th>Water Flow</th><th>Presence of water inside</th><th>Result</th></tr> </thead> <tbody> <tr> <td>TNV-C7013RC</td><td>240 LPM</td><td>No</td><td>Pass</td></tr> </tbody> </table>				Sample No (Model)	Water Flow	Presence of water inside	Result	TNV-C7013RC	240 LPM	No	Pass
Sample No (Model)	Water Flow	Presence of water inside	Result								
TNV-C7013RC	240 LPM	No	Pass								

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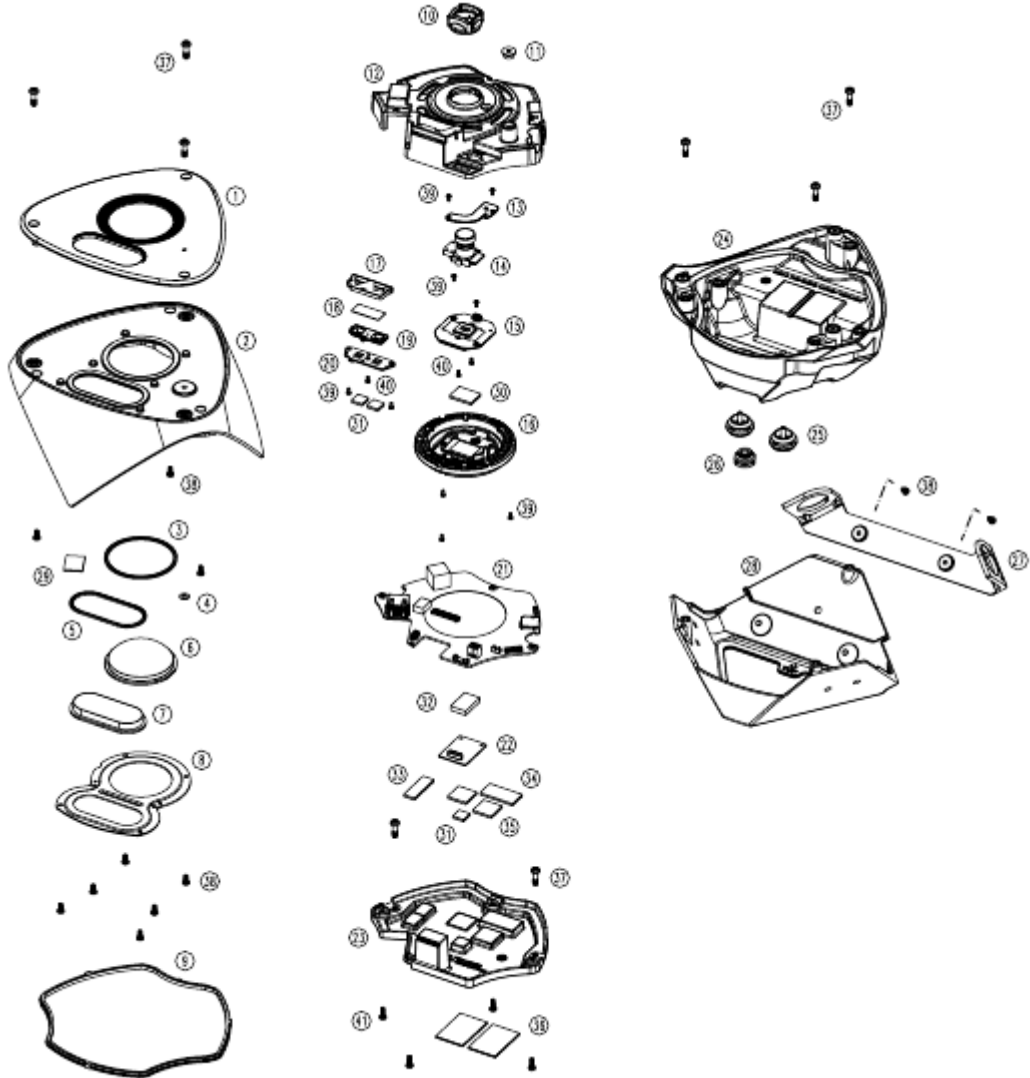
List of test equipment used:

Instr. Code	Instrument Type	Range Used	Mfr./Model	Calibration Date	
				Last	Due
S3-IP18	25.4mm Nozzle	25.4 mm	CTK/S3-IP18	-	Checked by calliper below before using
S1-SW2	Stop Watch	0.01 s	CASIO/ NONE	2024.01.23	2026.01.23
C-S1-D09	Steel Measuring Tape	5 m	KOMELON/KMC-74N	2023.02.02	2025.02.02
S3-IP23	Water flow meter	250LPM	Nuri tech/ Z-6504	2024.02.28	2025.02.28
C-S1-D02	DIGITAL VERNIER CALIPER	150 mm	MITUTOYO/150 mm	2023.07.31	2024.07.31

Attachment 1 – Construction Diagram and installation method



Attachment 1 – Construction Diagram and installation method





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Attachment 2 – Parts List

No.	Part Name	Part Code	Spec	Q'ty
1	COVER-WINDOW TOP;ADC12,TNV-C7013RC,BLK	FC15-010433A	ADC12	1
2	CASE-TOP;ADC12,WHT,TNV-C7013RC,SET	FC29-015568B	ADC12	1
3	GASKET-DOME;SILICONE,XNV-6011,BLK	HP07-000254B	SILICONE	1
4	SHEET-GORE-ACOUSTIC-GAW3250408P	FC36-001015		1
5	GASKET-WINDOW;SILICON,TNV-C7013RC,BLK	HP07-001773A	SILICONE	1
6	COVER-DOME;PC V2,TRP,T2.0,TNV-8010C	FC15-007871A	PC V2	1
7	COVER-WINDOW IR;PC V2,TNV-C7013RC,BLK	FC15-009388A	PC V2	1
8	BRACKET-TOP;SECC TI.2,TNV-C7013RC	FC09-014633A	SECC	1
9	GASKET-TOP;SILICON,TNV-C7013RC,BLK	HP07-001772A	SILICONE	1
10	COVER-LENS;PC V0,TNV-C7013RC,BLK	FC15-009386A	PC V0	1
11	MODULE,ELECTRONIC-UGH06035CW-50-A28J-510	EPI0-001257A		1
12	FRAME-MAIN;ADC12,TNV-C7013RC,BLK	FC39-007240A	ADC12	1
13	ASSY,PCB-TNV-C7013RC_FRONT	AM06-010935A		1
14	LENS-E3435F;FIXED	EPI4-001220		1
15	ASSY,PCB-TNV-C7013RC_SENSOR	AM06-010931A		1
16	HOLDER-LENS;TNV-C7013RC,BLK,ADC12	FC29-015571A	ADC12	1
17	SPACER-FILTER;SILICON,TNV-C7013RC,BLK	FC18-006691A	SILICONE	1
18	FILTER-LENS-VISIBLE CUT-TNV-7010RC-;FILT	HP04-001137		1
19	REFLECTOR-IR;TNV-C7013RC,BLK,PC V0	FC28-003618A	PC V0	1
20	ASSY,PCB-TNV-C7013RC_IR	AM06-010936A		1
21	ASSY,PCB-TNV-C7013RC_NETWORK	AM06-010928A		1
22	ASSY,PCB-KL720_MODULE	AM06-009943A		1
23	CASE-BOTTOM;ADC12,BLK,TNV-C7013RC	FC29-015570A	ADC12	1
24	CASE-BODY;ADC12,WHT,TNV-C7013RC	FC29-015569A	ADC12	1
25	BUSHING-CABLE FLEXIBLE;SILICONE,GRAY	MC06-001188A	SILICONE	2
26	VENT-GORE_PMF100319;MEMBRANE,SCREW IN	HP06-001350		1
27	HOLDER-CONDUIT;TNV-C7013RC,WHT,ADC12	FC29-015793A	ADC12	1
28	MOUNT-BRACKET;ADC12,TNV-C7013RC,WHT	FC39-007239A	ADC12	1
29	PAD-THERMAL;PET,20*15*TI,K=7W/M-K	FC28-003652A		1
30	PAD-THERMAL;20X15XT2,K=3W/M-K	FC28-003770A		1
31	3080_HEAT_PAD	Z6209004001A		3
32	PAD-THERMAL;22X14XT4,K=7W/M-K	FC28-003771A		1
33	PAD-THERMAL-30X10XT2,K=7W/M-K	FC28-003061A		1
34	PAD-THERMAL_PAD_GP_3000S30_30X15X2;GP_30	FC28-000762A		1
35	PAD-THERMAL_I717T2_V6430BNH	FC28-002488A		2
36	PAD-THERMAL-PET-38X25XT1,K=7W/M-K	FC28-002823A		2
37	SCREW-BUILT IN;TORX20,0.7,15,N0,4,BLK	FC18-004000C		8
38	SCREW-MACHINE:PH,+,M3,L6,BLK,FP	Z9642306007		11
39	SCREW-MACHINE:6001-001707,BH,+,M2,L4,ZP	Z6001055101A		9
40	SCREW-TAPTITE:PL,+,M2,L4,WHT,B-TYPE	Z6003019801A		3
41	SCREW-MACHINE : PH,+,M3,L8,WHT,FP	Z9642308001		4



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Attachment 2 – Parts List



Component - Plastics

File Number: E115797

LOTTE CHEMICAL CORPORATION
56 GOSAN-RO
UIWANG-SI, GYEONGGI-DO 16073 Republic of Korea



INFINO: HN-1068(+)(f1)

Polycarbonate (PC), pellets


(+) - May be replaced by one, two, or three numbers and/or letter(s)

(f1) - Suitable for outdoor use with respect to exposure to Ultraviolet Light, Water Exposure and Immersion in accordance with UL 746C.

Flammability	Value	Test Method
Flame Rating		UL 94
1.5 mm, ALL	V-0	IEC 60695-11-10, -20
3.0 mm, ALL	V-0	
Glow Wire Flammability Index		IEC 60695-2-12
1.5 mm	960 °C	
3.0 mm	960 °C	
Glow Wire Ignition Temperature		IEC 60695-2-13
1.5 mm	825 °C	
3.0 mm	825 °C	
Electrical	Value	Test Method
Hot-wire Ignition (HWI) (1.5 mm)	PLC 3	UL 746
High Amp Arc Ignition (HAI) (1.5 mm)	PLC 3	UL 746
Comparative Tracking Index (CTI)	PLC 3	UL 746
Dielectric Strength	32 kV/mm	ASTM D149 IEC 60243-1
Volume Resistivity	1.0E+17 ohms-cm	ASTM D257 IEC 60093
Thermal	Value	Test Method
RTI Elec		UL 746
1.5 mm	130 °C	
3.0 mm	130 °C	
RTI Imp		UL 746
1.5 mm	130 °C	
3.0 mm	130 °C	
RTI Str		UL 746
1.5 mm	130 °C	
3.0 mm	130 °C	
Ball Pressure Test (130°C, 3.00 mm)	Pass	IEC 60695-10-2
Physical	Value	Test Method
Outdoor Suitability	f1	UL 746C

Attachment 2 – Parts List


<div>  <div> Component - Plastics File Number: E115797 </div> </div>		
<div> <div> <div> LOTTE CHEMICAL CORPORATION 56 GOSAN-RO UIWANG-SI, GYEONGGI-DO 16073 Republic of Korea </div> <div>  </div> </div> <div> INFINO: QC-122(+)(f1) Polycarbonate (PC), pellets </div> <div> (+) - May be replaced by one, two, or three numbers and/or letter(s) (f1) - Suitable for outdoor use with respect to exposure to Ultraviolet Light, Water Exposure and Immersion in accordance with UL 746C. </div> </div>		
Flammability	Value	Test Method
Flame Rating		UL 94
1.0 mm, ALL	V-2	
1.6 mm, ALL	V-2	
3.2 mm, ALL	V-2	
Flammability Classification		IEC 60695-11-10, -20
1.0 mm, ALL	V-2	
1.6 mm, ALL	V-2	
3.2 mm, ALL	V-2	
Glow Wire Flammability Index		IEC 60695-2-12
1.0 mm	850 °C	
1.6 mm	850 °C	
3.2 mm	850 °C	
Glow Wire Ignition Temperature		IEC 60695-2-13
1.0 mm	875 °C	
1.6 mm	900 °C	
3.2 mm	875 °C	
Electrical	Value	Test Method
Hot-wire Ignition (HWI)		UL 746A
1.0 mm	PLC 0	
1.6 mm	PLC 3	
3.2 mm	PLC 2	
High Amp Arc Ignition (HAI)		UL 746A
1.0 mm	PLC 0	
1.6 mm	PLC 0	
3.2 mm	PLC 0	
Comparative Tracking Index (CTI)	PLC 0	UL 746A
High Voltage Arc Tracking Rate (HVTR)	PLC 2	UL 746A
Volume Resistivity	1.0E+16 ohms-cm	ASTM D257
Volume Resistivity	1.0E+16 ohms-cm	IEC 60093
Arc Resistance	PLC 5	ASTM D495
Thermal	Value	Test Method
RTI Elec		UL 746B
1.0 mm	80.0 °C	
1.6 mm	130 °C	
3.2 mm	130 °C	

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Component - Plastics

File Number: E115797



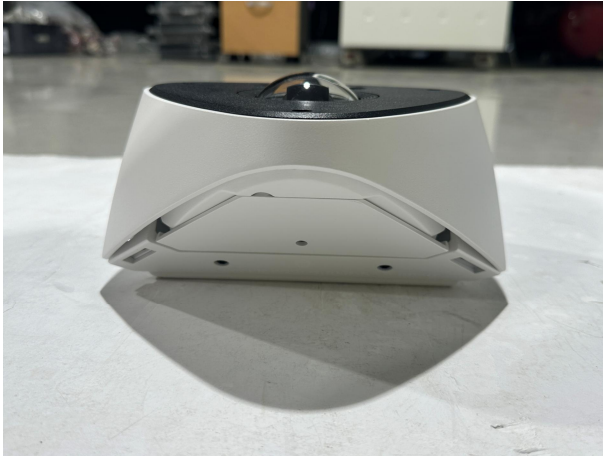
Thermal	Value	Test Method
RTI Imp		UL 746B
1.0 mm	80.0 °C	
1.6 mm	125 °C	
3.2 mm	130 °C	
RTI Str		UL 746B
1.0 mm	80.0 °C	
1.6 mm	125 °C	
3.2 mm	130 °C	
Physical	Value	Test Method
Outdoor Suitability	f1	UL 746C

Notice of Disclaimer

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Attachment 3 – Photographs

Test Unit



Front



Rear



Left side



Right side



Top



Bottom



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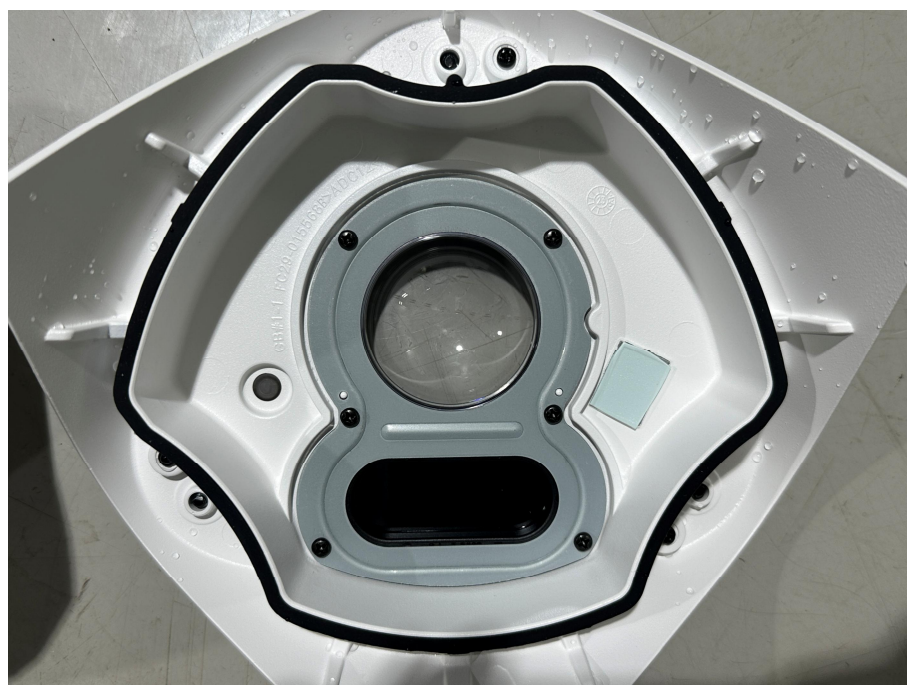
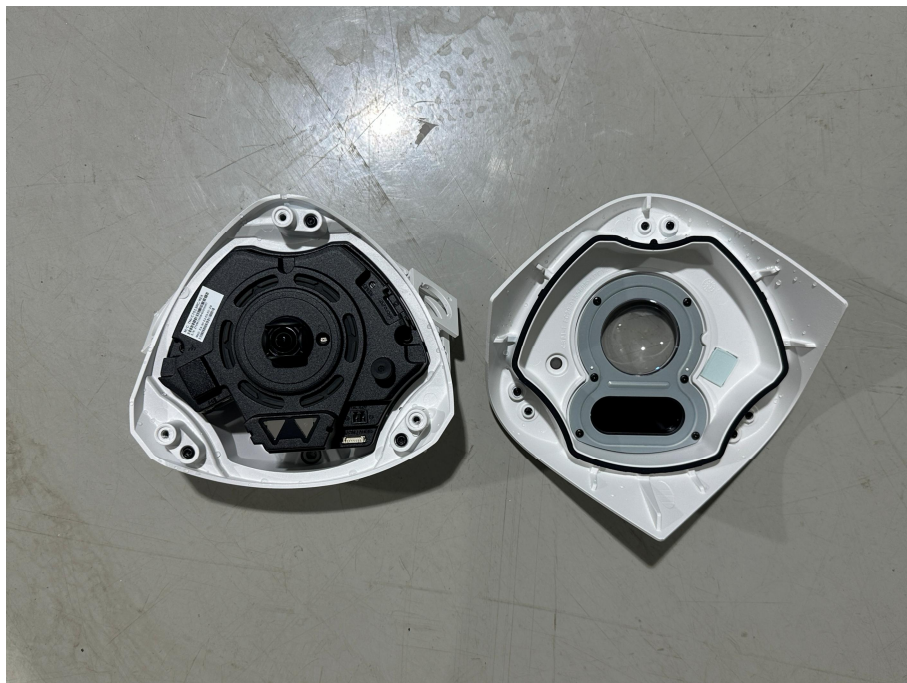
Attachment 3 – Photographs

Hose down test

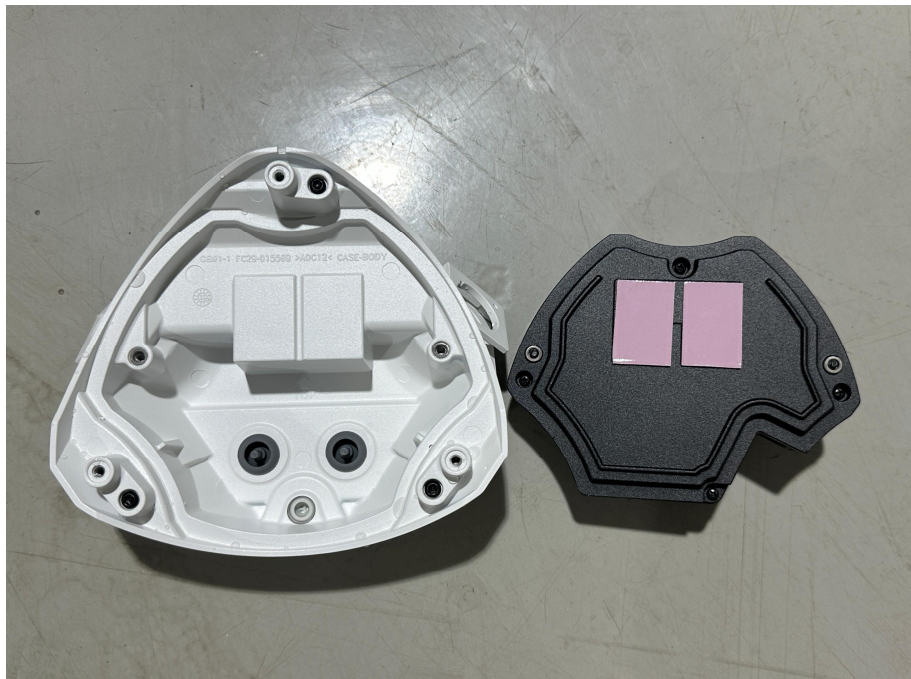



Attachment 3 – Photographs

Test Result

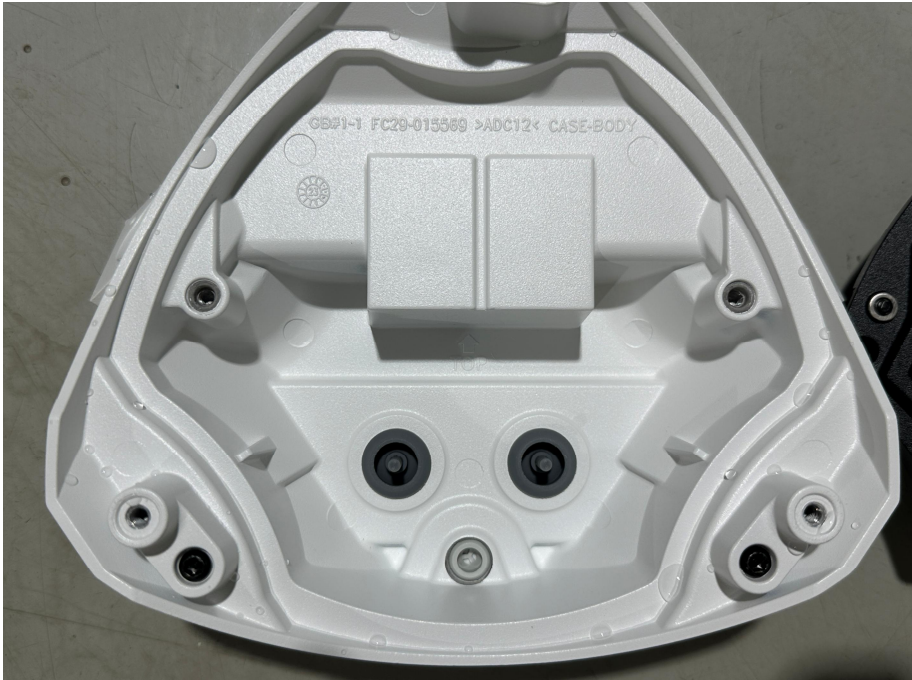
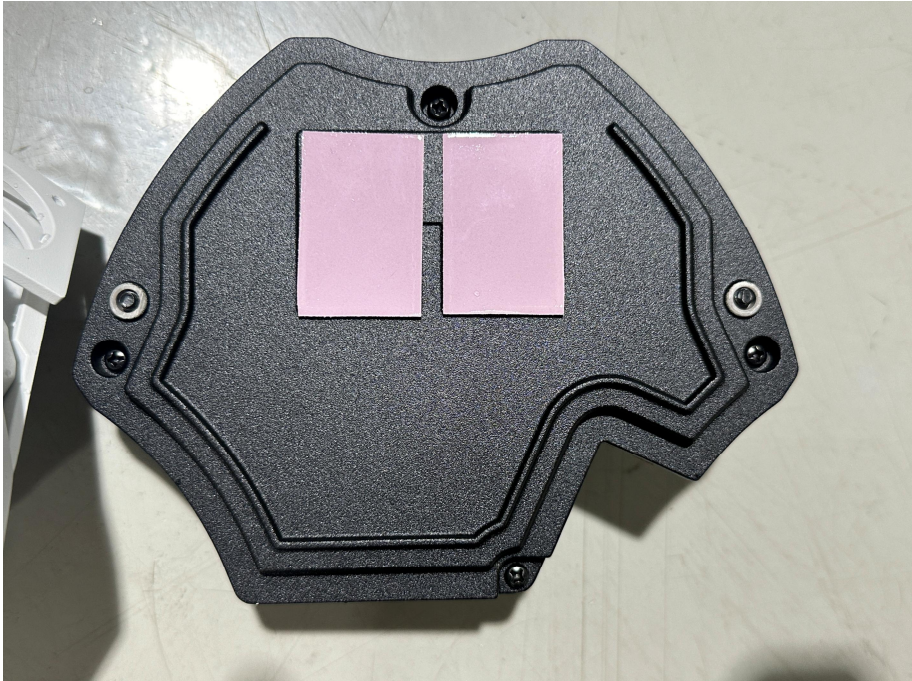


Attachment 3 – Photographs



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Attachment 3 – Photographs



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