

Declaration of Compliance with EN 45545-2 for Model “XNF-A9014RV” and “XNF-A8014RV”

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Reported by

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1. Objective

To declare the compliance with EN 45545-2 for a product designed by **Hanwha Vision Co., Ltd.**

2. Reference Standard

EN 45545-1:2013 – Railway applications. Fire protection on railway vehicles. General

EN 45545-2:2020+A1:2023 – Railway applications. Fire protection on railway vehicles. Requirements for fire behavior of materials and components

EN 60695-2-11:2021 – Fire hazard testing. Glowing/hot-wire based test methods. Glow-wire flammability test method for end-products (GWEPT)

3. Product Information

The product under assessment is a network camera designated **“XNF-A9014RV”** and **“XNF-A8014RV”**. These products are made by **Hanwha Vision Co., Ltd.**

The products are developed and designed for application in rolling stock. The difference between **“XNF-A9014RV”** and **“XNF-A8014RV”** is the specification of software, both models use exactly the same parts.

The enclosure is made of aluminum parts. The product contains the functional components including printed circuit boards, and other miscellaneous materials inside the enclosure.

The overall dimension is **diameter Ø160mm x 75mm height**, and the mass is **1020.52g**.

The product will be installed on the ceiling and wall of rolling stocks. Only the front face will be exposed to a passenger area. While multiple number of the products can be used in one vehicle, each product will be installed separately.

The diagram of **“XNF-A9014RV”** and **“XNF-A8014RV”** is shown in **Figure 1**. The breakdown structure of the product with the parts list is shown in **Figure 2**. The parts list with the information of each mass is shown in **Table 1**.

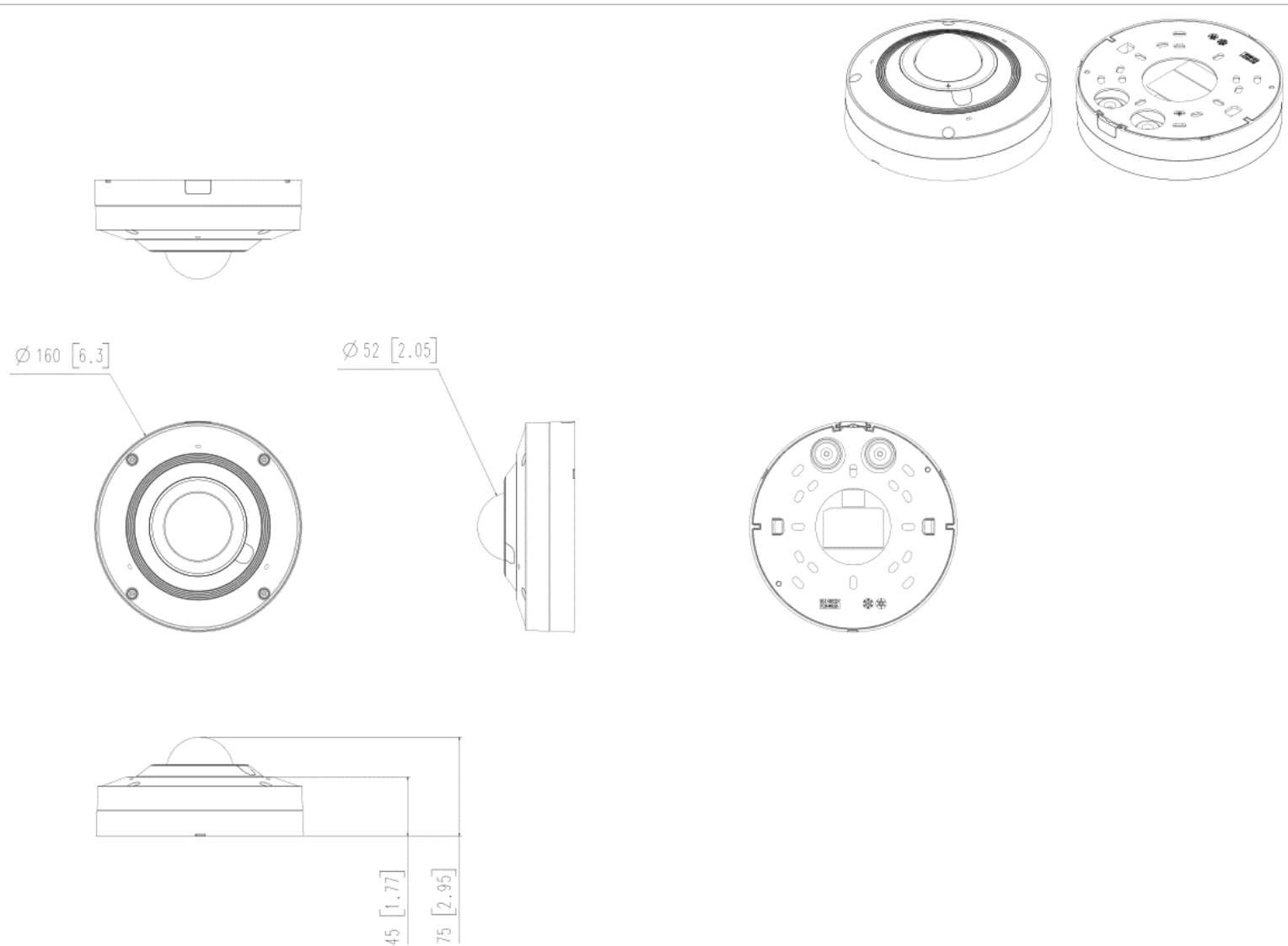


Figure 1: Diagram of “XNF-A9014RV” and “XNF-A8014RV”

No.	Part Code	Part name	ea
1	FC18-004000A	SCREW-SPECIAL:PH,TR20,M4,L7+5	6
2	FC15-012305A	COVER-GLASS_IR_XNF-A9014R;PC	1
3	FC29-018500A	CASE-DOME_XNF-A9014RV;ADC12	1
4	HP07-002083A	GASKET-CASE-DOME_XNF-A9014RV	1
5	FC15-012305A	COVER-GLASS_IR_XNF-A9014R;PC	1
6	FC09-018801A	BRACKET-DOME_XNF-A9014R;SECC	1
7	Z6001055901A	SCREW-MACHINE:PW,+,M3,L4,WHT	7
8	FC29-018418A	CASE-TOP-XNF-A9014R;ADC12	1
9	FC36-001015	SHEET-GORE-ACOUSTIC-GAW3250408P	3
10	FC10-001329A	RUBBER-MIC-XNF-A9014R;RUBBER,-	1
11	HP07-001567A	GASKET-CASE_TOP_XNF-9010RV	1
12	FC09-011731A	BRACKET-CASE_TOP_XNF-9010RV	1
13	AM06-012089A	ASSY,PCB-XNF-A9014RV_MIC	1
14	FC15-012163A	COVER-MIC-XNF-A9014R;ADC,-	1
15	Z6001055201A	SCREW-MACHINE:6001-001708,BH,+,M2,L5,ZP	12
16	Z6001053501A	SCREW-MACHINE:6001-001476,BH,+,M3,L6,Ni	8
17	FC28-004251A	REFLECTOR-IR_XNF-A9014R,-,PC	1
18	AM06-012091A	ASSY,PCB-XNF-A9014RV_IR	1
19	FC36-001597A	SHEET-COVER-FRAME_XNF-A9014RV;PC SHEET	1
20	FC39-008057A	FRAME-MAIN-XNF-A9014R;ADC12	1
21	AM07-018056A	ASSY-MODULE-XNF-A9014R_FISHEYE	1
22	FC28-004148A	PAD-THERMAL-14X10XT2,7W/M-K	1
23	FC29-018417A	HOLDER-SENSOR-XNF-A9014R;ADC12	1
24	AM06-012093A	ASSY,PCB-XNF-A9014RV_SD	1
25	AM06-012095A	ASSY,FPCB-XNF-A9014RV_MIC	1
26	FC38-001385A	SPRING,COM-PNV-A9082RZ:SUS304	2
27	FC18-005594A	SCREW,ETC-SHOULDER;0.5,-,PW,WH,M3	2
28	FC28-003323A	PAD-THERMAL-42X20XT2,K=7W/M-K	1
29	AM06-012045A	ASSY,PCB-XNF-A9014RV MAIN	1
30	FC28-004148A	PAD-THERMAL-14X10XT2,7W/M-K	1
31	FC28-002488A	PAD-THERMAL-17X17XT2,2W/M-K	1
32	FC28-004202A	PAD-THERMAL-49X20XT2,K=7.0W/M-K	1
33	HP07-001568A	GASKET-BOTTOM_XNF-9010RV	1
34	FC29-018433A	CASE-BOTTOM-XNF-A9014R;ADC12	1
35	FC15-007735A	COVER-CABLE_XNF-9010RV;-	1
36	MC06-001203A	BUSHING-CABLE-FLEXIBLE:SILICON,TUBE T0.5	2
37	FC18-001116A	SCREW-MACHINE:PH,T20,M4,L6,SUS,FP	1
38	FC39-006226C	MOUNT-PLATE_XNF-A9014RV;ADC12	1

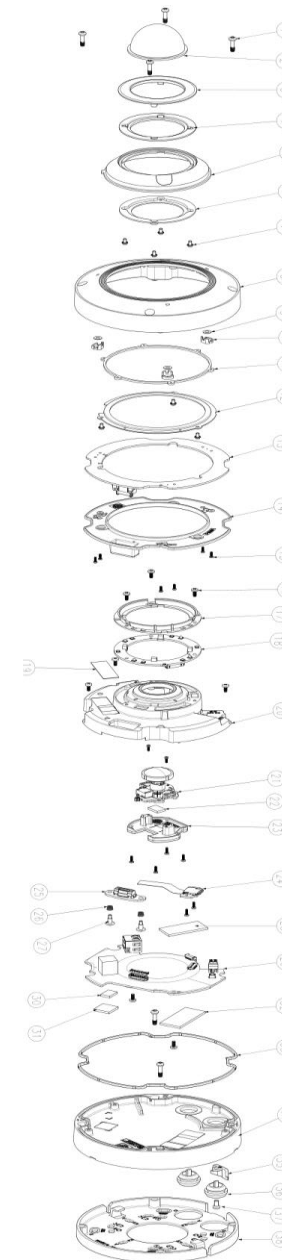


Figure 2: Breakdown Structure of “XNF-A9014RV” and “XNF-A8014RV” with Parts List

Table 1: Parts List of “XNF-A9014RV” and “XNF-A8014RV” with Information of Each Mass

No.	Level						Part Code	Part name	XNF-A9014RV XNF-A8014RV			Material type	
	1	2	3	4	5	6			ea	Unit weight (g)	Total weight (g)	Type	Details
1	O						AM08-008078A	ASSY-TOTAL-XNF-A9014RV_HANWHA	1	-		-	ASSY
2		O					AM08-008083A	ASSY-HALF-XNF-A9014RV	1	-		-	ASSY
3			O				AM08-007858A	ASSY-LENS-XNF-A9014R	1	-		-	ASSY
4				O			Z6001055201A	SCREW-MACHINE:6001-001708,BH,+.M2,L5,ZP	2	0.14	0.28	METAL	SCREW
5				O			FC29-018417A	HOLDER-SENSOR-XNF-A9014R;ADC12	1	14.07	14.07	METAL	ALUMINUM
6				O			FC28-004148A	PAD-THERMAL-14X10XT2,7W/M-K	1	0.9	0.90	RUBBER	SILICONE
7				O			AM07-018056A	ASSY-MODULE-XNF-A9014R_FISHEYE	1	26.57	26.57	COMPLEX(ELECTRIC)	COMPLEX(ELECTRIC)
8			O				Z6001053501A	SCREW-MACHINE:6001-001476,BH,+.M3,L6,Ni	3	0.55	1.65	METAL	SCREW
9			O				FC28-004251A	REFLECTOR-IR_XNF-A9014R;-PC	1	5.2	5.20	PLASTIC	PC
10			O				FC39-008057A	FRAME-MAIN-XNF-A9014R;ADC12	1	140.08	140.08	METAL	ALUMINUM
11			O				FC18-005594A	SCREW,ETC-SHOULDER;0,5,-,PWH,M3	2	1.38	2.76	METAL	SCREW
12			O				FC38-001385A	SPRING.COM-PNV-A9082RZ;SUS304	2	0.11	0.22	METAL	SUS304
13			O				Z6001055201A	SCREW-MACHINE:6001-001708,BH,+.M2,L5,ZP	6	0.14	0.84	METAL	SCREW
14			O				FC36-001597A	SHEET-COVER-FRAME_XNF-A9014RV;PC SHEET	1	0.37	0.37	PLASTIC	PC
15			O				FC28-003323A	PAD-THERMAL-42X20XT2;K=7W/M-K	1	5.48	5.48	RUBBER	SILICONE
16			O				AM06-012093A	ASSY.PCB-XNF-A9014RV_SD	1	1.78	1.78	PCB	PCB
17			O				AM06-012095A	ASSY.FPCB-XNF-A9014RV_MIC	1	2.19	2.19	PCB	PCB
18			O				EP02-005317A	HARNESS-XNP-C9310R;WIRE,12P-12P,80MM	1	2.04	2.04	CABLE	CABLE
19			O				AM06-012091A	ASSY.PCB-XNF-A9014RV_IR	1	11.07	11.07	PCB	PCB
20			O				FC28-003740A	PAD-THERMAL-9X6XT2,7W/M-K	3	0.33	0.99	RUBBER	SILICONE
21		O					AM06-012045A	ASSY.PCB-XNF-A9014RV MAIN	1	85.1	85.10	PCB	PCB
22		O					PM02-006173A	SILICAGEL-DESIKHAN-HM-5G	1	5.68	5.68	ETC	
23		O					RM04-001146A	TAPE-20X35X0.15T	1	0.05	0.05	ETC	TAPE
24		O					FC28-004148A	PAD-THERMAL-14X10XT2,7W/M-K	1	0.89	0.89	RUBBER	SILICONE
25		O					FC28-002488A	PAD-THERMAL-17X17XT2,2W/M-K	1	1.83	1.83	RUBBER	SILICONE
26		O					FC28-004202A	PAD-THERMAL-49X20XT2;K=7.0W/M-K	1	6.22	6.22	RUBBER	SILICONE
27		O					FC39-006226C	MOUNT-PLATE_XNF-A9014RV;ADC12	1	113.84	113.84	METAL	ALUMINUM
28		O					Z6001049601A	SCREW-MACHINE:6001-000128,BH,+.M3,L6,Ni	5	0.55	2.75	METAL	SCREW
29		O					AM08-007861A	ASSY-CASE BOTTOM-XNF-A9014R	1	-		-	ASSY
30			O				FC15-007735A	COVER-CABLE_XNF-9010RV;-	1	1.95	1.95	METAL	ALUMINUM
31			O				FC18-001116A	SCREW-MACHINE:PH,T20,M4,L6,SUS,FP	1	0.99	0.99	METAL	SCREW
32			O				FC18-004000A	SCREW-SPECIAL:PH,TR20,M4,L7+5,SUS,FP	2	1.48	2.96	METAL	SCREW
33			O				HP07-001568A	GASKET-BOTTOM_XNF-9010RV	1	2.6	2.60	RUBBER	SILICONE
34			O				MC06-001203A	BUSHING-CABLE-FLEXIBLE;SILICON,TUBE To.5	2	1.99	3.98	RUBBER	SILICONE
35			O				FC29-018433A	CASE-BOTTOM-XNF-A9014R;ADC12	1	203.81	203.81	METAL	ALUMINUM
36		O					AM08-007881A	ASSY-CASE-TOP-XNF-A9014RV	1	-		-	ASSY
37			O				HP07-002083A	GASKET-CASE-DOME_XNF-A9014R;RUBBER	1	3.41	3.41	RUBBER	RUBBER
38			O				FC09-018801A	BRACKET-DOME_XNF-A9014R;SECC	1	17.78	17.78	METAL	SECC
39			O				FC15-012305A	COVER-GLASS_IR_XNF-A9014R;PC,-	1	17.14	17.14	PLASTIC	PC
40			O				FC29-018500A	CASE-DOME_XNF-A9014RV;ADC12	1	12.44	12.44	METAL	ALUMINUM
41			O				FC15-012338A	COVER-DOME_FISHEYE_52PI;-	1	10.52	10.52	PLASTIC	PC
42			O				FC36-001052A	SHEET-PROTECT-DOME-4748	1	1.5	1.50	ETC	
43			O				FC18-004000A	SCREW-SPECIAL:PH,TR20,M4,L7+5,SUS,FP	4	1.48	5.92	METAL	SCREW
44			O				Z6001055201A	SCREW-MACHINE:6001-001708,BH,+.M2,L5,ZP	6	0.14	0.84	METAL	SCREW
45			O				Z6001055901A	SCREW-MACHINE:PWH,+.M3,L4,WHT,FP	7	0.41	2.87	METAL	SCREW
46			O				FC36-001015	SHEET-GORE-ACOUSTIC-GAW3250408P	3	0.05	0.15	ETC	
47			O				FC15-012163A	COVER-MIC-XNF-A9014R;ADC,-	1	36.59	36.59	METAL	ALUMINUM
48			O				FC10-001329A	RUBBER-MIC-XNF-A9014R;RUBBER,-	3	0.19	0.57	RUBBER	RUBBER
49			O				FC29-018418A	CASE-TOP-XNF-A9014R;ADC12	1	211.71	211.71	METAL	ALUMINUM
50			O				HP07-001567A	GASKET-CASE_TOP_XNF-9010RV	1	1.55	1.55	RUBBER	RUBBER
51			O				FC09-011731A	BRACKET-CASE_TOP_XNF-9010RV	1	24.44	24.44	METAL	SECC
52			O				AM06-012089A	ASSY.PCB-XNF-A9014RV_MIC	1	23.95	23.95	PCB	PCB
SUM=											1020.52		

4. Assessment

4.1 Specifying Target Hazard Level

The product “XNF-A9014RV” and “XNF-A8014RV” is to be used in vehicles of all design categories and for operations corresponding to operation categories 1 to 4 specified in Section 5 of EN 45545-1. According to Clause 4.1 of EN 45545-2, the targeted Hazard Level will be “HL3”.

4.2 Evaluation of Each Material

1) Printed Circuit Board (PCB)

In accordance with Table 2 and Table 5 of EN 45545-2, PCBs are classified as “EL9” in Listed Products, then required to comply with either of Requirement Set “R24”, “R25” or “R26”. In this project, “R25” was selected. The test requirement is summarized in Table 2.

Table 2: Compliance Criteria for EN 45545-2 R25

Requirement set (used for)	Test method reference	Parameter and unit	Maximum or Minimum	HL1	HL2	HL3
R25 (EL9)	T16 EN 60695-2-11	Glow Wire Temperature °C	Minimum	850	850	850

The test result is summarized in Table 3, which demonstrated the compliance with the requirement of R25/HL3. For more detail, refer to the test reports (251646 and 231544-3) issued by Chemitox which is ISO/IEC 17025 accredited for the relevant testing (Appendix 1 and 2).

Table 3: Test result of EN 60695-2-11 for PCB

Part No.	Part name	Test Parameter	Results	Test Report No.
16	ASSY,PCB-XNF-A9014RV_SD	Glow Wire Temperature	GWEPT: 850 C R25/HL3 Compliant	251646
17	ASSY,FPCB-XNF-A9014RV_MIC			
21	ASSY,PCB-XNF-A9014RV MAIN			
52	ASSY,PCB-XNF-A9014RV_MIC			
19	ASSY,PCB-XNF-A9014RV_IR *	Glow Wire Temperature	GWEPT: 850 C R25/HL3 Compliant	231544-3

*: It was confirmed that the material and construction of this PCB are identical to those of the ‘Backbox PCB’ referred to in the relevant test report.

2) Coating of Aluminum Enclosure:

The outer enclosure parts made of aluminum are coated with organic paintings.

Although the outer enclosure is exposed to a passenger area in the way that it is installed on the ceiling and wall, the exposed area is limited to approx. **103,095.1447mm²**, which does not exceed 0.2m². See **Figure 3** for the calculation of the exposed area.

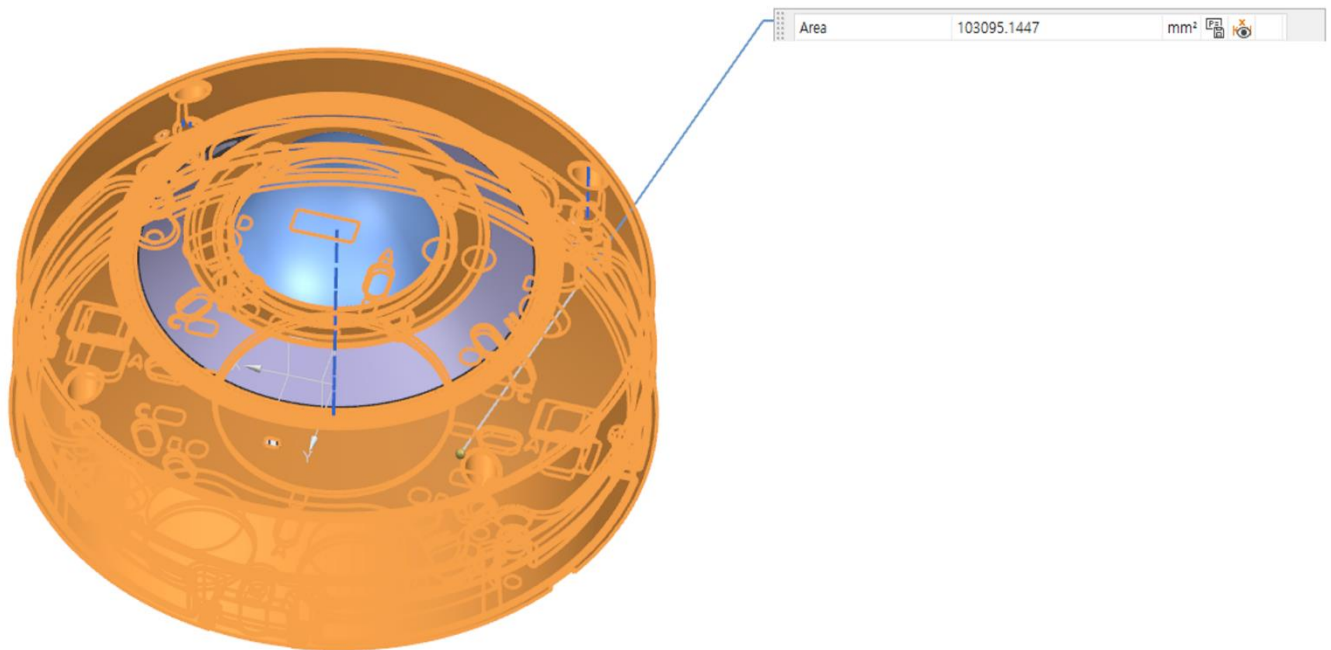


Figure 3: Calculated Result of Exposed Area of Enclosure

Two types of coating are applied to different areas of enclosure. The mass of each coating does not exceed 10g. See **Figure 4** for details of the coating locations and amounts.

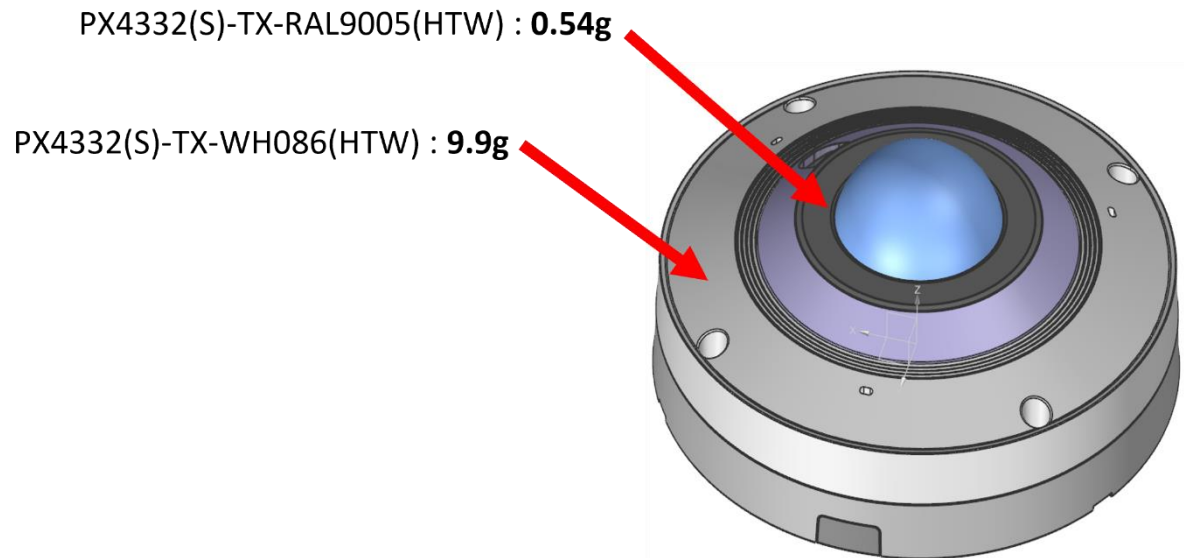


Figure 4: Coating Locations and Amounts on Enclosure

With the above information, and based on the requirement specified in Clause 4.3 and Figure 1 of EN 45545-2 (Grouping Rules), the coatings are considered as unclassified, and no additional testing will be required.

3) Other combustible materials:

All other combustible materials are very small (i.e. exposed area not exceeding 0.2m²). In accordance with the requirement specified in Clause 4.3 and Figure 1 of EN 45545-2 (Grouping Rules), these combustible materials are considered as group. The total combustible mass is **97.64g**, which does not exceed 100g as shown in **Table 4**.

Table 4: Other materials combustible mass

Material Type*	Combustible Mass
Plastic	33.23g
Complex	26.57g
Cable	2.04g
Rubber	28.42g
Other	7.38g
Total	97.64g

*: Refer to **Table 1** for the classification of material type.

In accordance with Clause 4.3.2 Rule 1, no additional testing will be required to the combustible materials of this group.

4) Verification of compliance with EN 45545-2

The assessment result detailed in Section 4 has demonstrated that the products “XNF-A9014RV” and “XNF-A8014RV” meet the requirements of the following classification;

EN 45545-2 Hazard Levels HL1 to HL3

IMPORTANT NOTE: The assessment result in this document is based on the assumption that no other non-compliant products are adjacent to the product (i.e. within 20mm horizontally, and 200mm vertically) in the end use application of railway vehicles. Depending on installation condition, additional testing may be required according to Grouping Rules specified in Clause 4.3 and Figure 1 of EN 45545-2.

Appendix 1
Test Report for Printed Circuit Board
**“ASSY,PCB-XNF-A9014RV_SD”,
“ASSY,FPCB-XNF-A9014RV_MIC”, “ASSY,PCB-XNF-A9014RV MAIN”
and “ASSY,PCB-XNF-A9014RV_MIC”**

Appendix 2
Test Report for Printed Circuit Board
“ASSY,PCB-XNF-A9014RV_IR”