



THE UNITED KINGDOM VEHICLE APPROVAL AUTHORITY

COMMUNICATION CONCERNING THE APPROVAL GRANTED ⁽¹⁾ / APPROVAL EXTENDED ⁽¹⁾ /
APPROVAL REFUSED ⁽¹⁾ / APPROVAL WITHDRAWN ⁽¹⁾ / PRODUCTION DEFINITELY
DISCONTINUED ⁽¹⁾ OF A TYPE OF PROTECTIVE HELMET WITHOUT / WITH ⁽¹⁾ ONE / MORE ⁽¹⁾
SPECIFIC ACCESSORY TYPE(S) PURSUANT TO UN REGULATION NO. 22.06



Approval No: E11*22R06/02*1067*01

Reason(s) for extension:

- Modification of Variant(s)/Version(s)
- Addition of commercial names
- Addition of sun shield
- Addition of weight of the helmet
- Change of the shell material description
- Correction of item number 6.3. of the information document
- Correction of item numbering of the information document
- Modification of the approval label drawing
- Change of "Brief description of helmet"
- Correction of "Accessories included in the helmet homologation and functionality"

1. Trade mark: SENA
2. Type: PHANTOM
3. Sizes: XXL, XL, L, M, S
4. Manufacturer's name: SENA Technologies Co., Ltd.
5. Address:
19, Heolleung-ro 569-gil
Gangnam-gu, Seoul
REPUBLIC OF KOREA
6. If applicable, name of manufacturer's representative: SENA Europe GmbH

7. Address:
Paul-Henri-Spaak-Str. 22
51069 Koln
GERMANY
8. Brief description of helmet:
PHANTOM PRO: Full face helmet with one visor type
PHANTOM: Full face helmet with one visor type and one sun shield type
9. ~~Helmet without lower face cover (J) / with protective lower face cover (P) / with non-protective lower face cover (NP) / with detachable or movable lower face cover (P/J)~~ ⁽¹⁾
10. Type of visor or visors: SENA-FF-01 (E11 062006)
11. Brief description of visor or visors and inner visor if any: Clear visor made of polycarbonate (PC) with anti-scratch and anti-fog coating and 2.4 mm thickness
12. ~~Helmet ready for specific accessory (SA) / ready for universal accessories (UA)~~ ⁽¹⁾
13. Accessories included in the helmet homologation and functionality: SP149 (SA) (Bluetooth system)
14. If UA helmet, speakers (S or S45) / Microphone (M) / Front mounting (F) / Side mounting (L), Rear mounting (R) ⁽¹⁾: Not applicable
15. Submitted for approval on: As before (14 MARCH 2024) and 05 AUGUST 2024
16. Technical service responsible for conducting approval tests: Vehicle Certification Agency
17. Date of report issued by that service: As before (14 MARCH 2024) and 05 AUGUST 2024, 06 AUGUST 2024
18. Number of report issued by that service: As before (KSB625781 (1067/P)) and KSC631198 (1067/P ext.01), KSC631198 (SENA-I/V-01)
19. Comments: None
20. Approval ~~GRANTED~~ / EXTENDED / REFUSED / WITHDRAWN ⁽¹⁾
21. Place: BRISTOL

22. Date: 28 AUGUST 2024

23. Signature:

A handwritten signature in black ink, appearing to read 'C McCabe', is written over a horizontal line.

C McCABE
Chief Technical and Statutory Operations Officer

24. The following documents, bearing the approval number shown above, are available on request

(1) Strike out what does not apply



Vehicle
Certification
Agency

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APPROVAL NUMBER: E11*22R06/02*1067*01

INFORMATION PACKAGE CONTENTS

INDEX REVISION NUMBER: 00

Conformity of Production (COP) Declaration COP Confirmed

Assessment Method COP Audit

Date of Initial Clearance August 2023

Date of Last Clearance August 2023

Total number of sheets: 24 (Twenty-four)

Reasons for Revision: Not applicable

Revision Date
&
Office Stamp



SENA	Protective Helmets	
	UN Regulation 22.06	
	Type	: PHANTOM
	Document No.	: PHANTOM_22R_01
	Date	: 05 JULY 2024
	Type-approval No.	: E11*22R06/02*1067*01
Job No.	: KSC631198	

Protective Helmets

UN Regulation 22.06

Type : PHANTOM

Request for extension to:

- E11*22R06/02*1067*00

Reason(s) for extension:

- Modification of Variant(s)/Version(s)
- Addition of commercial names
- Addition of sun shield
- Addition of weight of the helmet
- Change of the shell material description
- Correction of item number 6.3. of the information document
- Correction of item numbering of the information document
- Modification of the approval label drawing

Total number of sheets : 24 (Twenty-four)



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	Job No.	: KSC631198

0. GENERAL

0.1. Make (trade name of manufacturer)

: SENA

0.2. Type

: PHANTOM

0.2.1. Commercial name(s) (if available)

: PHANTOM, PHANTOM ANC, PHANTOM CAM,
PHANTOM PRO,

0.2.2. Variant(s)/Version(s) (if available)

Variant	Commercial name
PHANTOM PRO	PHANTOM PRO
PHANTOM	PHANTOM, PHANTOM ANC, PHANTOM CAM

0.3. Location of E-mark

: On the label sewn to the retention system

0.4. Company name and address of manufacturer

: SENA Technologies Co., Ltd.
19, Heolleung-ro 569-gil, Gangnam-gu, Seoul
Republic of Korea

0.5. Name(s) and address(es) of assembly plant(s)

: Qingyuan SENA Smart Helmets, LLC.
Plant No.61, Hongrungu Science and Technology
Industrial Park, No.21, 253 Provincial Road
Longtang Town, Qingcheng District, Qingyuan City
Guangdong Province
China

0.6. Name and address of the manufacturer's representative (if any)

: SENA Europe GmbH
Paul-Henri-Spaak-Str. 22, 51069 Koln
Germany

0.7. Number of visor types which can be fitted

: 1

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1. DISRIPTION OF THE HELMET

- 1.1. Style of helmet : Full face
- 1.2. Category of helmet : "P" with protective lower face cover
- 1.3. Sizes
 - Large Shell : XXL (63-64), XL (61-62)
 - Medium Shell : L (59-60),
 - Small Shell : M (57-58), S (55-56)

1.4. Weight

PHANTOM PRO

SIZE	XXL	XL	L	M	S
WEIGHT	1700g±50		1650g±50	1600g±50	

PHANTOM

SIZE	XXL	XL	L	M	S
WEIGHT	1750g±50		1700g±50	1650g±50	

- 1.5. Helmet ready for : Specific Accessory (SA)
- 1.6. Helmet prepared for (if UA helmet) : NA

2. SHELL

- 2.1. Material : **Fiberglass Composite**
- 2.2. Composition of the border joint on the shell
 - : PVC Gasket
- 2.3. Ventilation system
 - 2.3.1. Number of ventilations : 3
 - 2.3.2. Positioning on the shell : Front of Crown (Crown), Rear of Crown, Chin guard (Center)

3. RETENTION SYSTEM

- 3.1. Chin strap
 - 3.1.1. Material : Nylon webbing
 - 3.1.2. Width : 24mm
- 3.2. Comfort padding of retention system
 - : Polyester
- 3.3. Strap retainer : Double D ring
- 3.4. Anchorages : Secured to shell by means of a single rivet to each side of helmet shell

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4. PROTECTIVE PADDING

4.1. Composition

	S-M Density (g/cm ³)	L Density (g/cm ³)	XL-XXL Density (g/cm ³)
TOP	22±5	22±5	22±5
HEAD	33±5	33±5	33±5
Chin	55±5	55±5	55±5
Mouth	55±5	55±5	55±5

5. COMFORT PADDING

5.1. Composition and material

Comfort padding	: Sponge
Comfort tissue	: Polyester
Neck curtain	: Polyurethane

6. VISOR

6.1. Make (trade name of manufacturer)

: SENA

6.2. Type

: SENA-FF-01

6.3. **ECE type-approval mark**

: **E11 062006-XXXXXXX**

6.4. Company name and address of manufacturer

: SENA Technologies Co., Ltd.
19, Heolleung-ro 569-gil, Gangnam-gu, Seoul,
Republic of Korea

6.5. Material : Polycarbonate

6.6. Surface treatment : Anti-scratch / Anti-fog coating

6.7. Thickness : 2.4mm

6.8. Colour : Clear

6.9. Manufacturing method : Injection moulding

6.10. Transmittance : ≥80%

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7. SUN SHIELD

- 7.1. Make (trade name of manufacturer) : **SENA**
- 7.2. Type : **SENA-I/V-01**
- 7.2.1. Commercial name(s) (if available) : NA
- 7.3. Company name and address of manufacturer : **SENA Technologies Co., Ltd.**
19, Heolleung-ro 569-gil, Gangnam-gu, Seoul,
Republic of Korea
- 7.4. Material : **Polycarbonate**
- 7.5. Surface treatment : **Anti-scratch coating**
- 7.6. Thickness : **1.6mm**
- 7.7. Colour : **Smoke**
- 7.8. Manufacturing method : **Injection moulding**
- 7.9. Transmittance : **≥20%**

8. SPECIFIC ACCESSORY

- 8.1. Make (trade name of manufacturer) : SENA
- 8.2. Type : SP149
- 8.3. ECE type-approval mark : NA
- 8.4. Company name and address of manufacturer : Shenzhen SENA Technologies, LLC.
4G, Quanzhi Science & Technology Bldg 4
HeBinNan-lu, Baoan-qu, Shenzhen
China
- 8.5. Material : ABS
- 8.6. Weight : 192g±5
- 8.7. Means of attachment : Glued
- 8.8. Composition : Speaker, Microphone, Bluetooth intercom,
Reading lamp

9. ADDITIONAL FEATURES

- 9.1. Detachable peak : NA
- 9.1.1. Material : NA
- 9.2. Information for wearers : Placed in helmet retail box

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PHANTOM/22R-10	Drawing of the sun shield (SENA-I/V-01)	1
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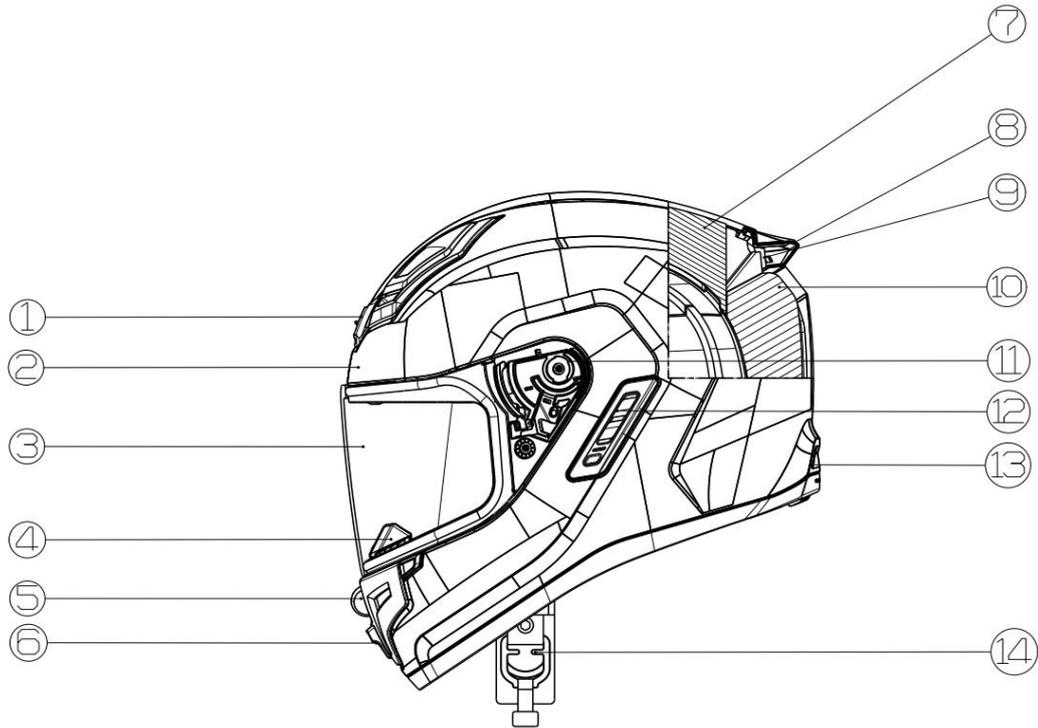
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Drawing no. PHANTOM/22R-01-01

Description General view of the helmet **PHANTOM PRO**



14	CHINSTRAP L/R	-		1set	
13	SMART BODY MAIN	-		1set	
12	SMART UI UNIT L/R	-		1set	
11	RATCHET	PC & POM		1set	
10	HEAD EPS	EPS		1	
9	TAIL LIGHT L/R	-		1set	
8	SPOILER VENT	PC/ABS		1	
7	TOP EPS	EPS		1	
6	MOUTH VENT	PC/ABS, POM		1set	
5	FLASH LIGHT	-		1set	
4	NOSEGUARD	TPU		1	
3	VISOR	PC		1	
2	SHELL	FRP		1	
1	TOP VENT	PC/ABS, POM		1set	
NO	PART NAME	MATERIAL	PART NO.	Q'TY	REMARKS

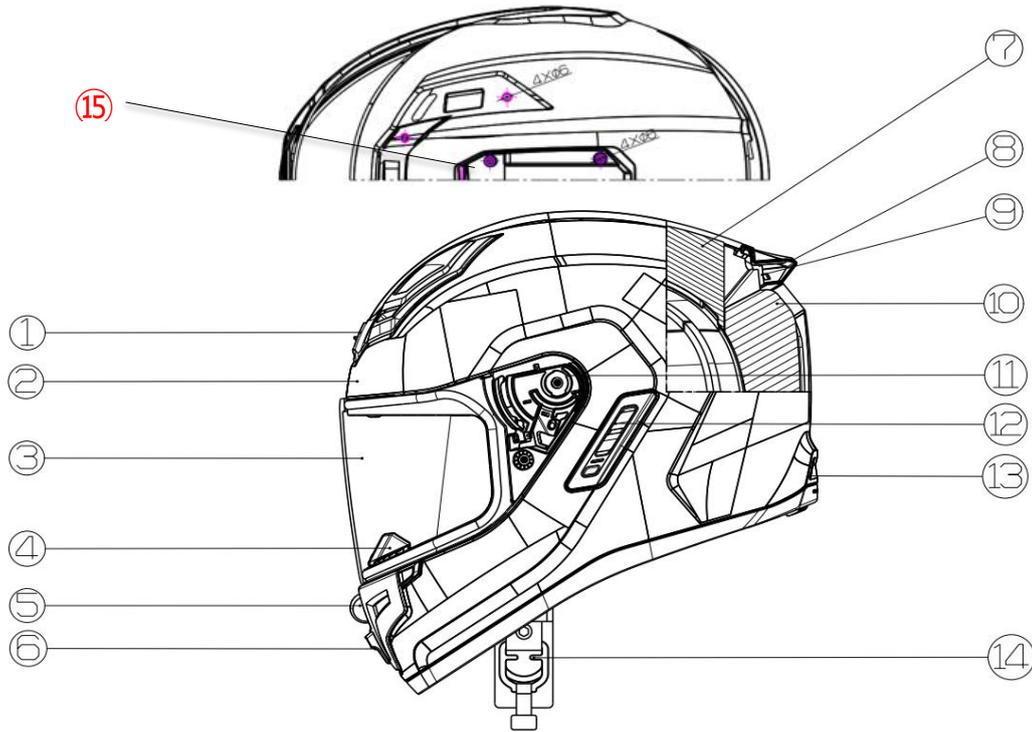
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Drawing no. **PHANTOM/22R-01-02**

Description **General view of the helmet (PHANTOM)**



15	SUNSHIELD LEVER	PC/ABS		1SET	
14	CHINSTRAP L/R	-		1set	
13	SMART BODY MAIN	-		1set	
12	SMART UI UNIT L/R	-		1set	
11	RATCHET	PC & POM		1set	
10	HEAD EPS	EPS		1	
9	TAIL LIGHT L/R	-		1set	
8	SPOILER VENT	PC/ABS		1	
7	TOP EPS	EPS		1	
6	MOUTH VENT	PC/ABS, POM		1set	
5	FLASH LIGHT	-		1set	
4	NOSEGUARD	TPU		1	
3	VISOR	PC		1	
2	SHELL	FRP		1	
1	TOP VENT	PC/ABS, POM		1set	
NO	PART NAME	MATERIAL	PART NO.	Q'TY	REMARKS

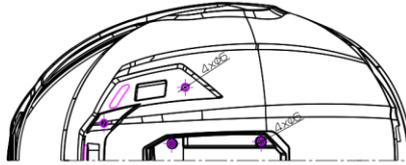
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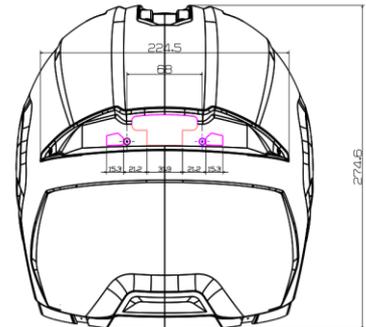
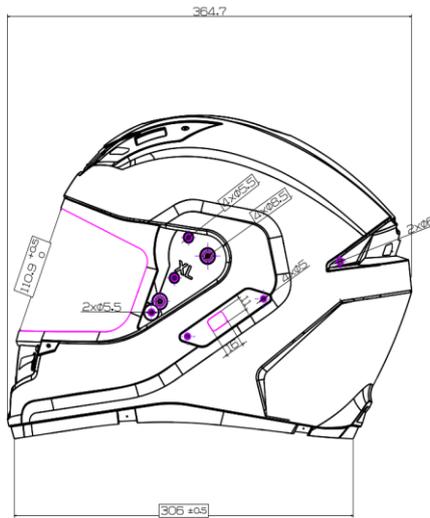
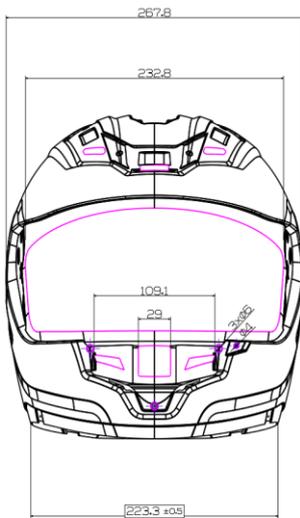
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Drawing no. **PHANTOM/22R-02-02**

Description **Drawing of the shell (Large size) (PHANTOM)**



NOTE
1. □ 는 중심관리 치수임.
2. 치수는 금형마감을 기준으로 할 것.
3. 미지정 치수는 3D data를 참고 할 것.



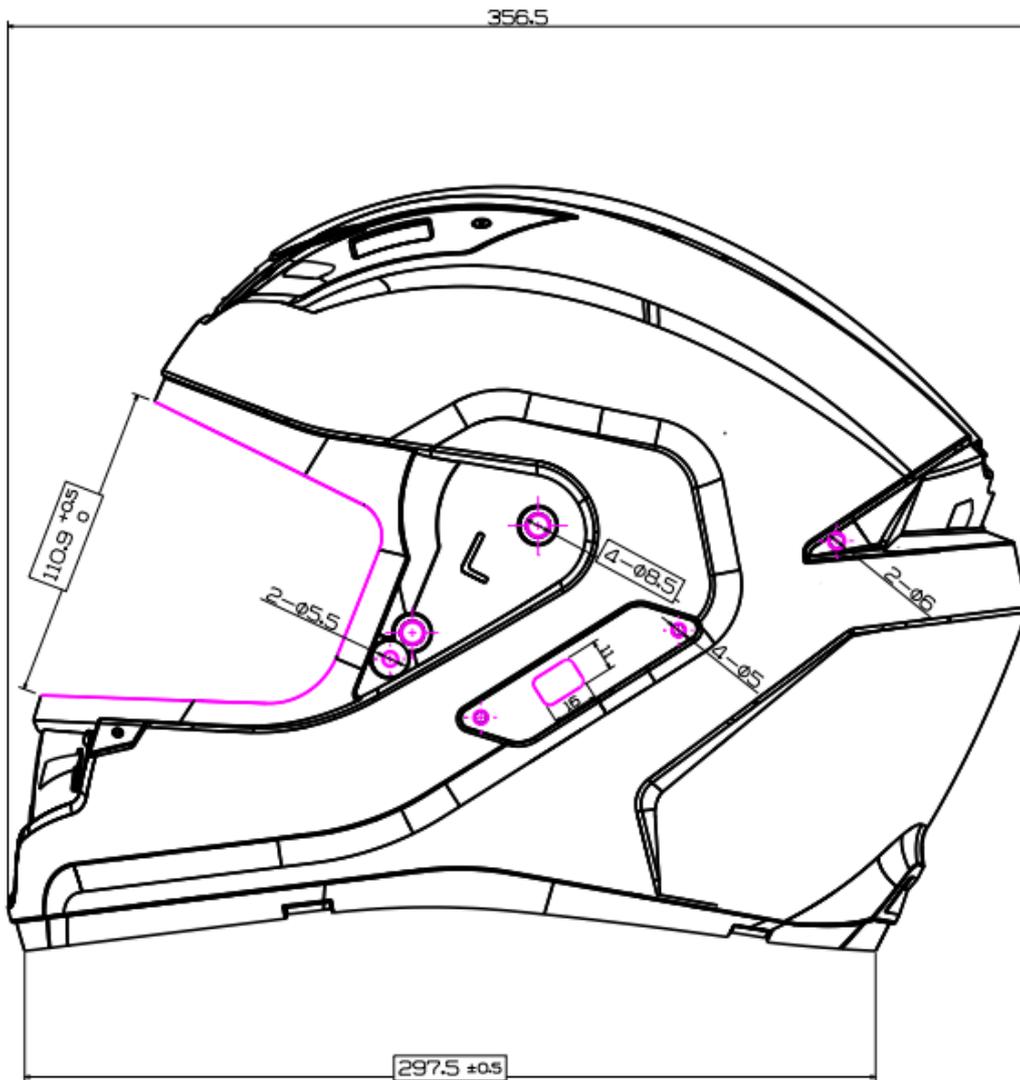
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Drawing no. PHANTOM/22R-03-01

Description Drawing of the shell (Medium size) **PHANTOM PRO**



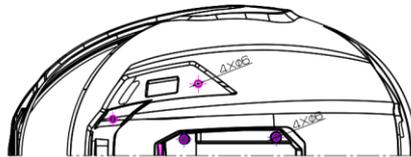
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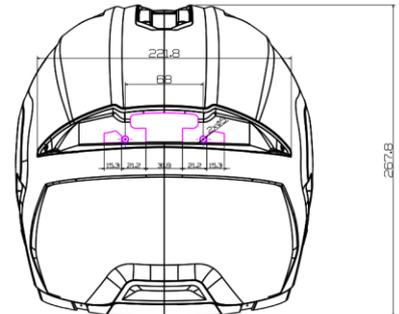
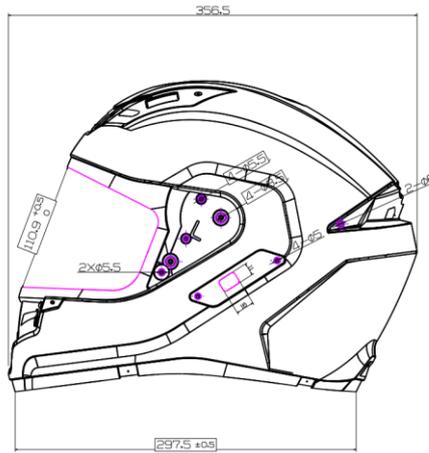
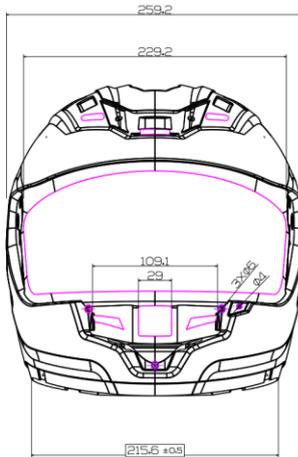
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Drawing no. **PHANTOM/22R-03-02**

Description **Drawing of the shell (Medium size) (PHANTOM)**



- NOTE
1. □ 는 중심관리 치수임.
 2. 치장은 금형대칭을 기준으로 할 것.
 3. 미지정 치수는 3D data를 참고 할 것.



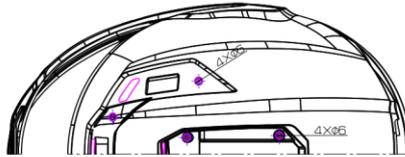
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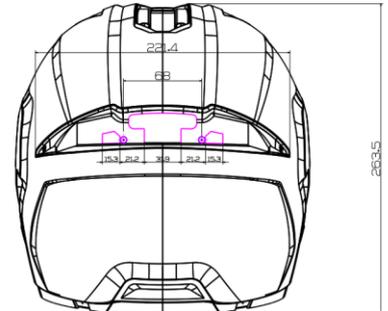
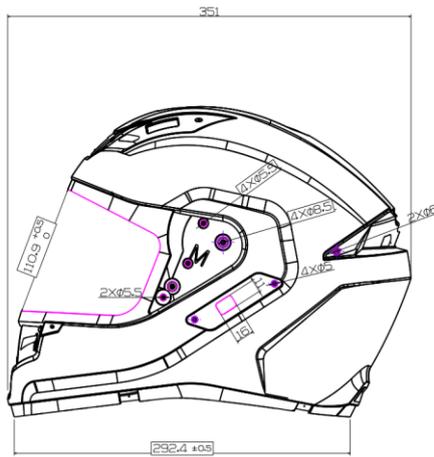
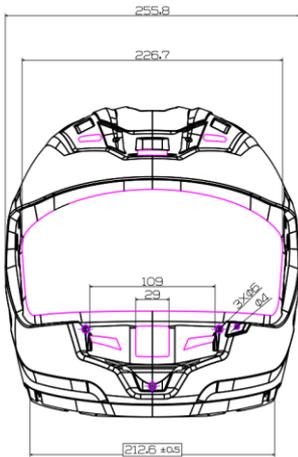
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Drawing no. **PHANTOM/22R-04-02**

Description **Drawing of the shell (Small size) (PHANTOM)**



- NOTE
1. □ 는 옵션관리 치수임.
 2. 시상은 금형마킹을 기준으로 할 것.
 3. 미지칭 치수는 3D data를 참고 할 것.



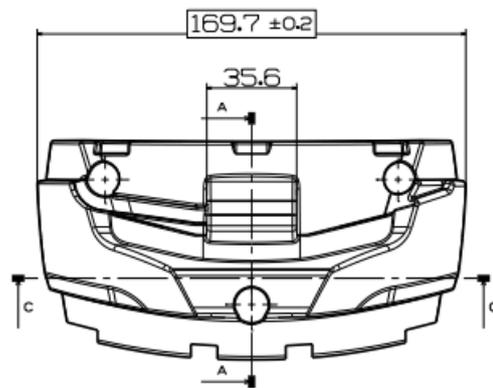
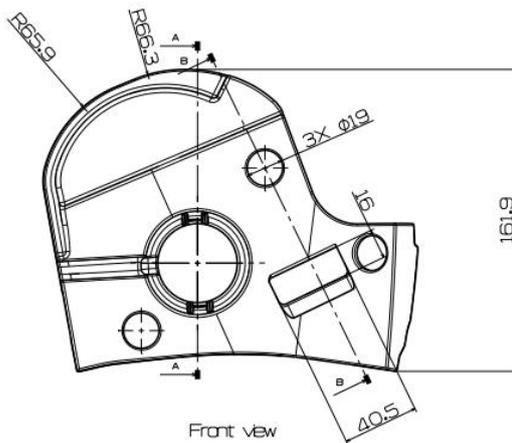
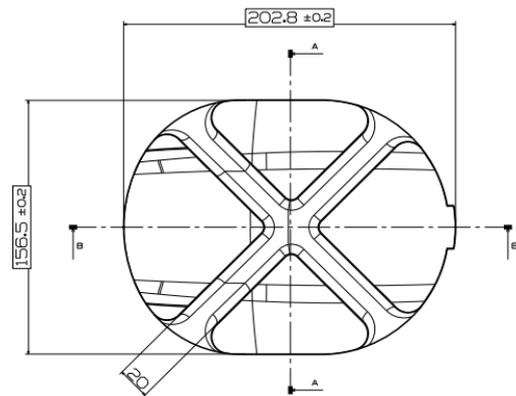
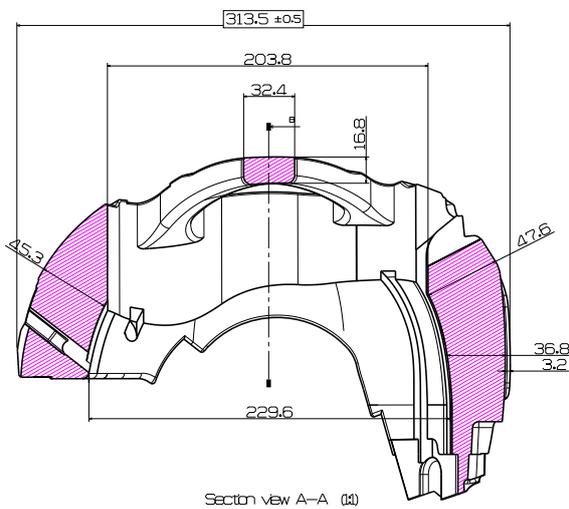
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Drawing no. PHANTOM/22R-05-01

Description Drawing of the protective padding (Large size) **PHANTOM PRO**



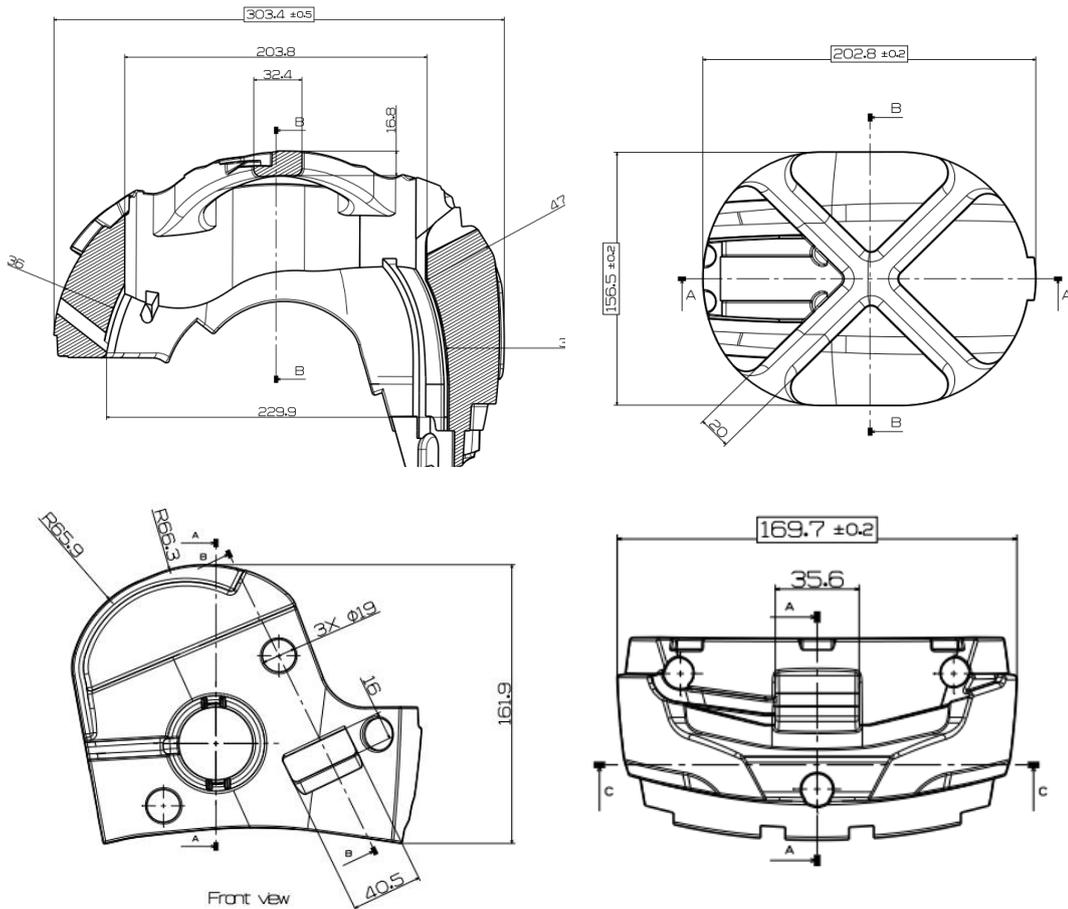
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Drawing no. **PHANTOM/22R-05-02**

Description **Drawing of the shell (Large size) (PHANTOM)**



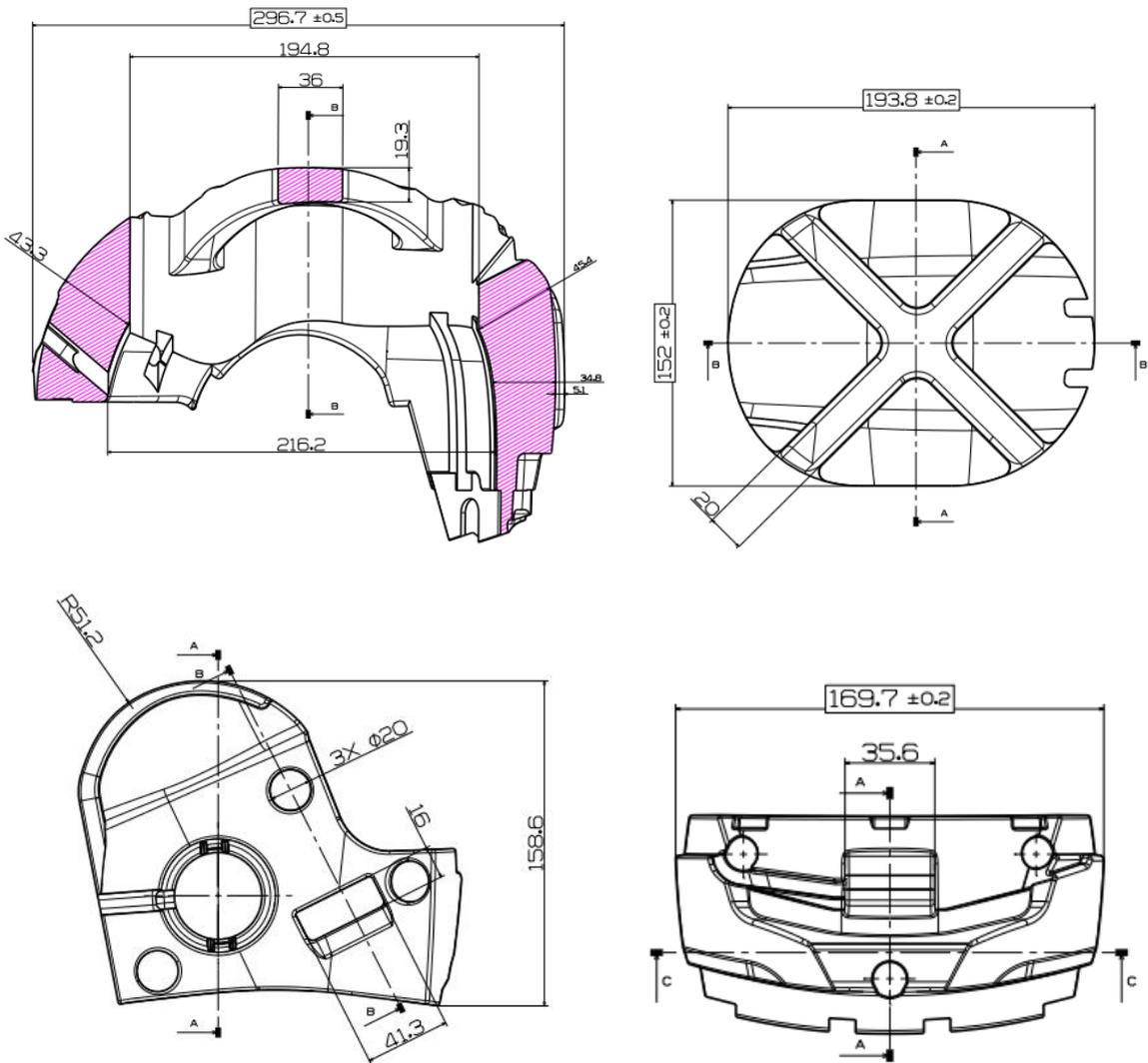
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Drawing no. PHANTOM/22R-07-01

Description Drawing of the protective padding (Small size) **PHANTOM PRO**



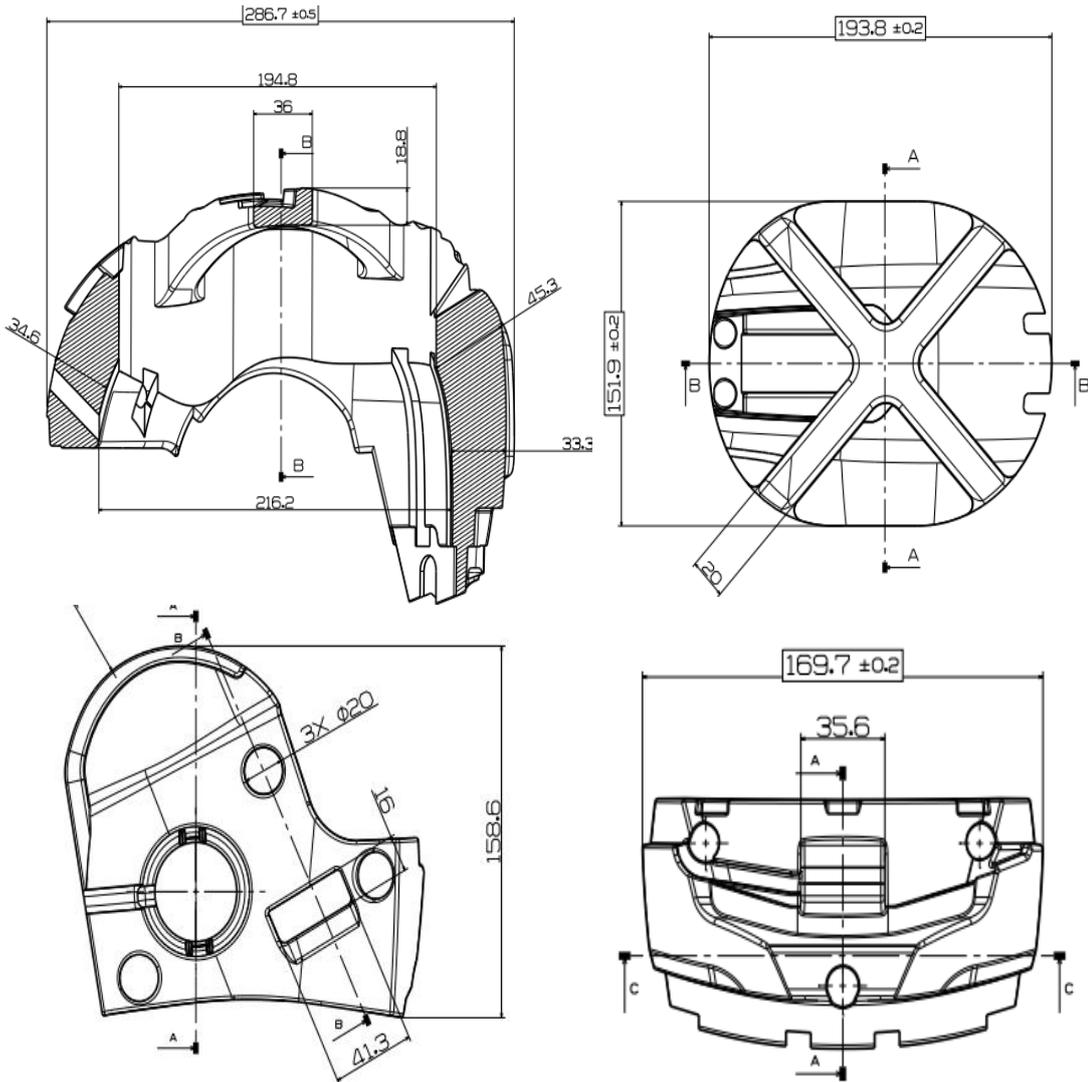
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Drawing no. **PHANTOM/22R-07-02**

Description **Drawing of the protective padding (Small size) (PHANTOM)**

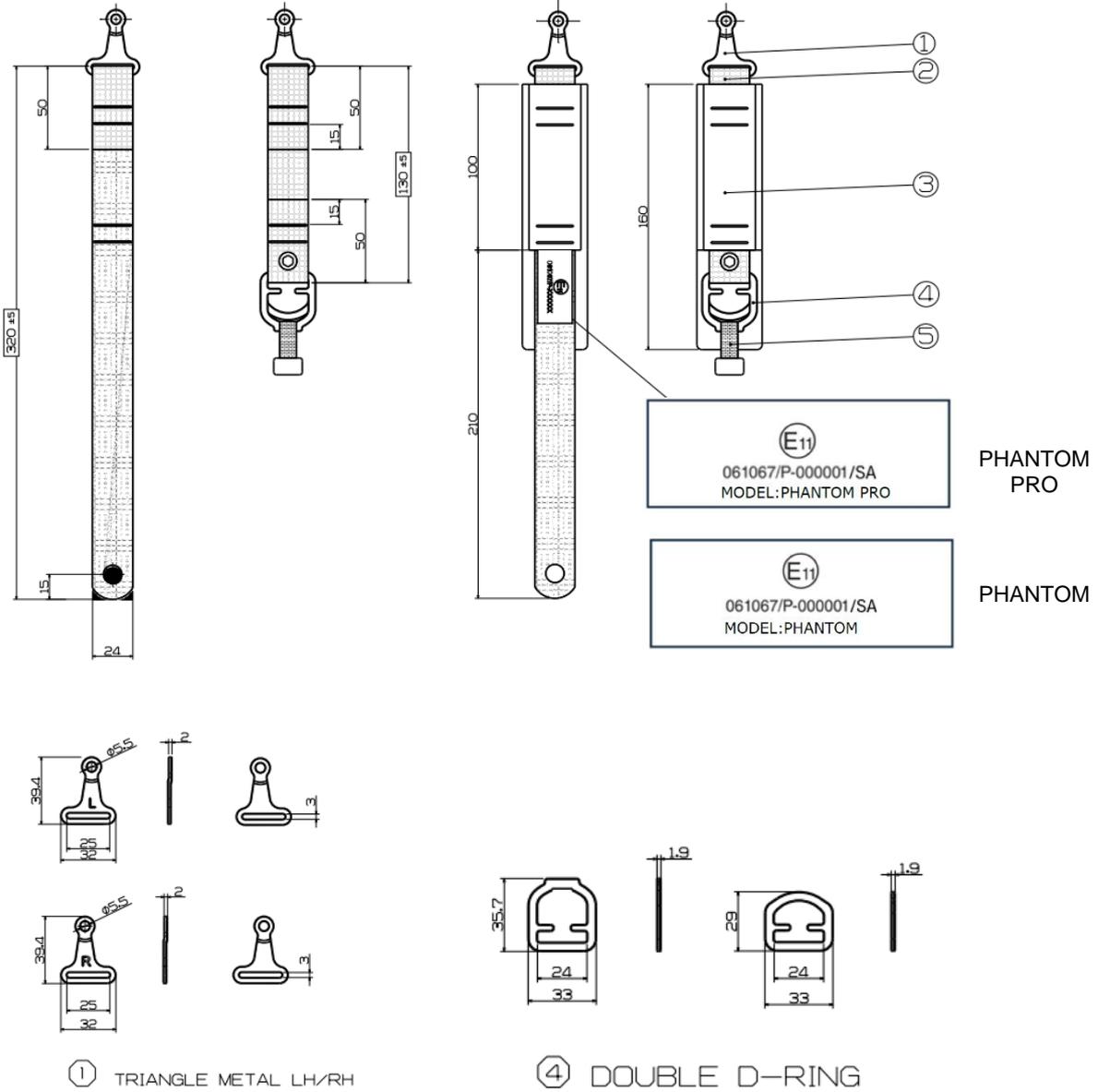


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Drawing no.	PHANTOM/22R-08
Description	Drawing of the retention system (Double D ring)



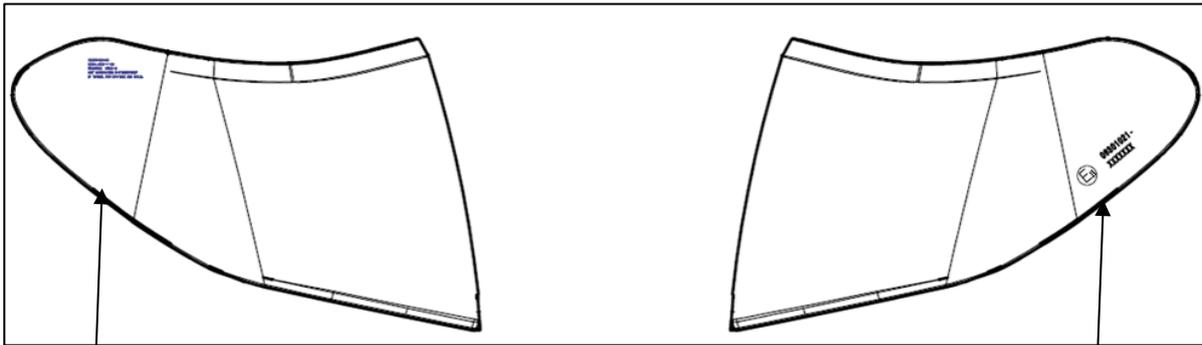
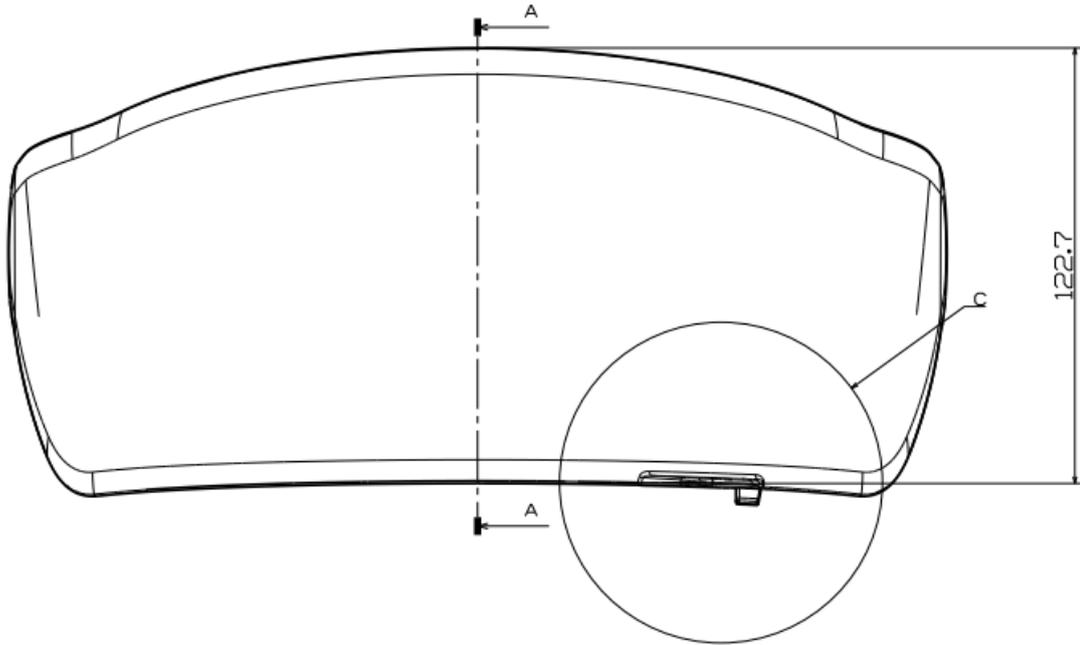
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Drawing no. PHANTOM/22R-09

Description Drawing of the visor (SENA-FF-01)



MODEL: SENA-FF-01
EXCEEDS VESC-8
NOT WARRANTED SHATTERPROOF
IF TINTED DAYTIME USE ONLY

E11 062006-XXXXXXX

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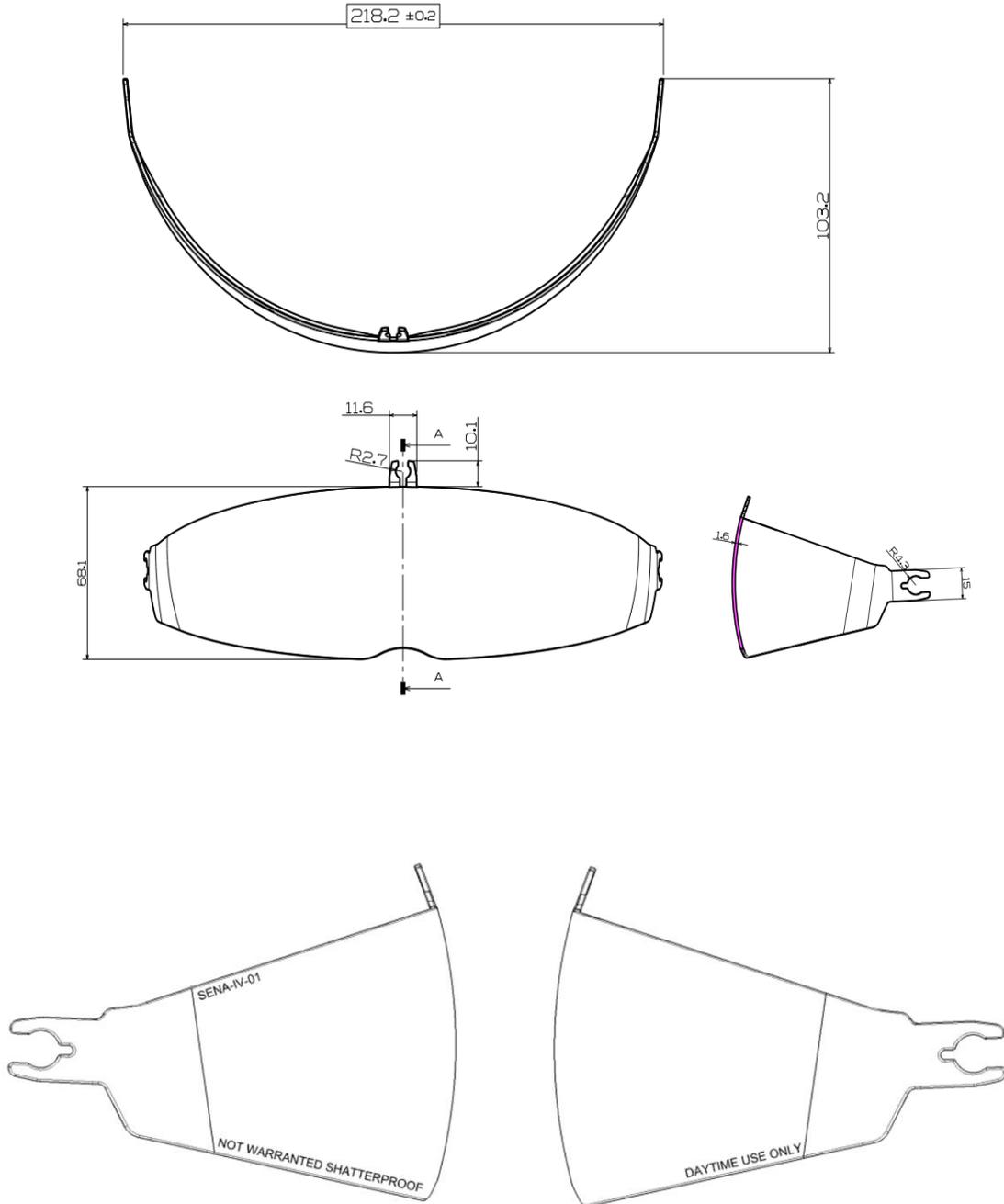
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Document No.	: PHANTOM_22R_01
Date	: 05 JULY 2024
Type-approval No.	: E11*22R06/02*1067*01
Job No.	: KSC631198

Drawing no.

PHANTOM/22R-10

Description

Drawing of the sun shield (SENA-IV-01)

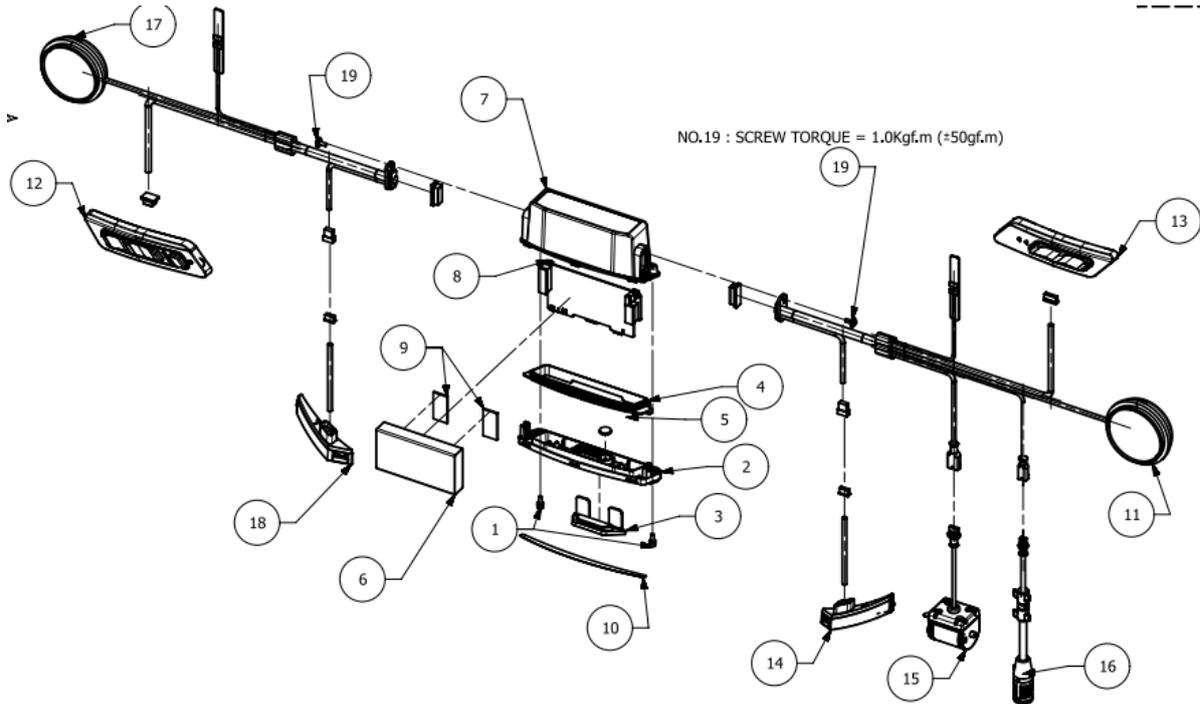


SENA

Protective Helmets
UN Regulation 22.06

Type	: PHANTOM
Document No.	: PHANTOM_22R_01
Date	: 05 JULY 2024
Type-approval No.	: E11*22R06/02*1067*01
Job No.	: KSC631198

Drawing no.	PHANTOM /22R-11
Description	Drawing of the Specific Accessory (SP149)



PC NO	PART NAME	PART NAME	QTY
[ASSY]	[SUB ASSY PHANTOM MAIN UNIT (BLACK)]	[SUB ASSY PHANTOM MAIN UNIT (WHITE)]	[1]
1	SCREW-MC-M2-L6-OD3.8-H2	SCREW-MC-M2-L6-OD3.8-H2	2
2	MOLD-COVER-MAIN	MOLD-COVER-MAIN	1
3	RUBBER-CAP-USB	RUBBER-CAP-USB	1
4	RUBBER-PACKING-BODY-MAIN	RUBBER-PACKING-BODY-MAIN	1
5	TAPE-RESET-OD7X1T	TAPE-RESET-OD7X1T	1
6	103057-1700MAH	103057-1700MAH	1
7	MOLD-BODY-MAIN	MOLD-BODY-MAIN	1
8	SUB-ASSY-PCB-MAIN-ST_HELMET	SUB-ASSY-PCB-MAIN-ST_HELMET	1
9	TAPE-20X10X1T	TAPE-20X10X1T	2
10	LABEL-BD-PHANTOM	LABEL-BD-PHANTOM	1
11	SUB-ASSY-CABLE-MAIN-R	SUB-ASSY-CABLE-MAIN-R	1
12	SUB-ASSY-UI-UNIT-L	SUB-ASSY-UI-UNIT-L	1
13	SUB-ASSY-UI-UNIT-R	SUB-ASSY-UI-UNIT-R	1
14	SUB ASSY TAILLIGHT UNIT R	SUB ASSY TAILLIGHT UNIT R	1
15	SUM-ASSY READING LAMP	SUM-ASSY-FLASHLIGHT-UNIT	1
16	SUB-ASSY-WIRED-BOOM-MIC-HARMAN	SUB-ASSY-WIRED-BOOM-MIC-HARMAN	1
17	SUB-ASSY-CABLE-MAIN-L	SUB-ASSY-CABLE-MAIN-L	1
18	SUB ASSY TAILLIGHT UNIT L	SUB ASSY TAILLIGHT UNIT L	1
19	SCREW-TAPPING-M2-L5-PW-OD6-T1_5	SCREW-TAPPING-M2-L5-PW-OD6-T1_5	2



Inspection/Test Report: Protective Helmets and their Visors for Drivers and Passengers of Motorcycles and Mopeds

Legislation

UNECE Regulation 22.06 (Revision 4 Amendment 3)

Inspection/Test Details

Location of Inspection/Test: Qingyuan SENA Smart Helmets, China
Date of Inspection/Test: 5 - 6 August 2024
VCA Representative(s): Donghwa Woo
Inspectors Home Office Location: VCA Korea
Manufacturer's Representative(s): Suhan Kim
Reason for Test Report: Extension of approval

Manufacturer Details

Name and Address: SENA Technologies Co., Ltd.
19, Heolleung-ro 569-gil
Gangnam-gu, Seoul
REPUBLIC OF KOREA
Type: PHANTOM
Commercial Description: PHANTOM, PHANTOM PRO, PHANTOM-ANC, PHANTOM-CAM
Category: "P" with protective lower face cover

Conclusion

The above mentioned component was tested in accordance with the above mentioned legislation and was found to comply in all respects. This report relates only to the items tested

Witness Engineer Signature:

Name: Donghwa Woo
Position: Type Approval Engineer
Date: 6 August 2024

List of Annexes

Annex	No of Pages	Subject
I		
II		





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Issue Record

Issue 0 is original report

Worst Case Rationale

Test carried out to cover the addition of a variant (PHANTOM) under the conditions as follows:

Test	Shell Size Consumer Size Headform Size	Number of samples tested				
		Large		Medium	Small	
		XXL	XL	L	M	S
General Specifications check				1		
Impact Absorption	5					
Impact Absorption Extra Point		2				
Hi/Low Energy Impact		2				
Projection and Surface Friction				1		
Rigidity	2					
Tests for Oblique impact and measurement of rotational acceleration	2					

Following impact points considered affected by the installation of the sun shield were tested:

- Impact Absorption, Hi/Low Energy Impact: B, P
- Impact Absorption Extra Point: BP, BXL, BXR, BXPL, BXPR

Note: Include information on variants and versions this report covers, as applicable. Supporting documents may be annexed to this report

Significant Interpretations, Alternative Test Methods, New Technologies

NA

Inspection/Tests Required

Yes, NA, See Report ... / Approval ... / Annex ...

- Markings:
- General Specifications:
- Impact Absorption:
- Projection and Surface Friction:
- Rigidity:
- Retention System (Dynamic):
- Retention (Detaching):
- Micro-slip of the Chin Strap:
- Resistance to Abrasion of the Chin Strap:
- Retention Systems Relying on Quick Release Mechanism:
- Tests for Oblique impact and measurement of rotational

NA
Yes
Yes
Yes
NA
Yes





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acceleration:

Helmet Specification

Style of Helmet:

Full face

Size

Shell Size:

Consumer Size:

Weight:

Materials

Shell:

Padding:

Liner:

Chin Strap:

Retention System

Type:

Buckle:

Strap Retainer:

Anchorage:

Large		Medium	Small	
XXL	XL	L	M	S
1750g±50		1700g±50	1650g±50	

Fibreglass Composite

Polyester, Sponge

EPS (Expanded Polystyrene type foam)

Nylon

Two section system

Double-D ring

Plastic press stud

Secured to shell by means of a single rivet to each side of helmet shell

Ventilation System:

Type of Shell Edging:

Accessories:

Reflecting Band:

Conspicuity marking:

Additional Features:

Number of ventilations: 3
Front of Crown (Crown), Rear of Crown, Chin guard (Centre)

PVC gasket

Visor (Type: SENA -FF-01)

Sun shield (Type: SENA-I/V-01)

Specific Accessory (Type: SP149)

NA

NA

NA

Manufacturer's Documentation

Manufacturer's documentation is complete and reflects the agreed specification for the component tested, and covers all variants and versions agreed in the worst case rationale. Information document uploaded to job folder and identified by job number.

Yes

Facility and Equipment Checks

Facility Appraisal reference and date (*Reference and date if formal; state if ad-hoc appraisal*).

FAK178 and KXB612469
30 August 2023

Calibration certificates checked and valid, recorded in the following table:

Yes

Equipment

Description	Make	Model	Serial number	Calibration due date*
Head Form #1	CADEX	100_01_HFM	8817	-





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Head Form #2	CADEX	100_01_HFM	8795	-
Head Form #3	CADEX	100_01_HFM	8828	-
Head Form #4	CADEX	100_01_HFM	8788	-
Head Form #5	CADEX	100_01_HFM	8815	-
Head Form #6	CADEX	100_01_HFM	8789	-
Accelerometer (Twin Wire Impact Test Machine)	SHANGHAI B&W SEINSING TECHNOLOGY	356B21	LW347346	19/09/2023 + 1 year
UV Aging chamber	HOTOTECH	HT-6014	HB22430	06/08/2023 + 1 year
Moisture conditioning unit	CADEX	1000-07-CRM4	052423-03	18/09/2023 + 1 year
Heat conditioning unit	HOTOTECH	HT-5012	HB22431	06/08/2023 + 1 year
Low temperature conditioning unit	HOTOTECH	HT-5013	HB22432	06/08/2023 + 1 year
Projection & Surface Friction test apparatus	CADEX	1000-04-PSF01	050123-10	18/09/2023 + 1 year
Rigidity test apparatus	CADEX	1000-09-RTCSM	050123-09	18/09/2023 + 1 year
Field of Vision Gauge Kit	CADEX	-	-	19/09/2023 + 1 year

*Specify calibrated date + (interval) or calibration due date.



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Inspection/Test Requirements	Complies Yes / NA
------------------------------	----------------------

Markings: Not applicable; section removed for clarity

General Specifications

6.1.	Basic construction of the helmet is in the form of a hard outer shell, containing additional means of absorbing impact energy and a retention system.	NA
------	---	----

6.2.	Protective helmet may be fitted with ear flaps and a neck curtain. It may also have a detachable peak, a visor, additional sun shield, electronic equipment or accessories and a lower face cover. If fitted with a non-protective lower face cover, the outer surface of the cover is marked 'Does not protect chin from impacts' and/or with the symbol shown in Figure 1 below, indicating the unsuitability of the lower face cover to offer any protection against impacts to the chin.	NA
------	--	----



Note: this symbol or indication must be visible and extend over at least 2 cm²

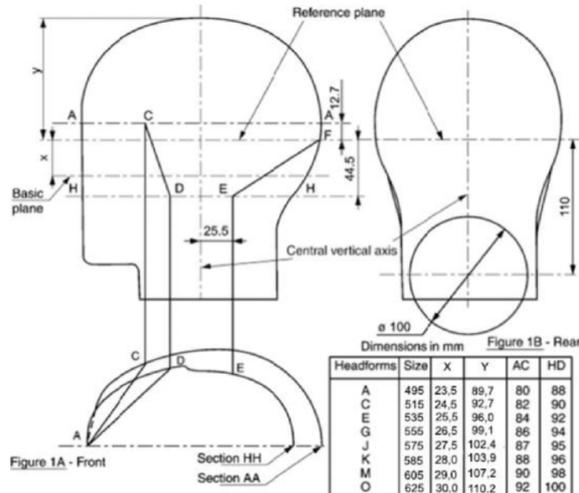
6.3.	No component or device is fitted to or incorporated in the protective helmet, unless it is designed in such a way that it will not cause injury and that, when it is fitted to or incorporated in the protective helmet, the helmet still complies with the requirements of this regulation.	NA
------	--	----

6.4.1.	Shell covers all areas above plane AA' and extends downwards at least as far as the lines 'CDEF' on both sides of the headform. <i>Note: See Annex 4, Figure 1A.</i>	NA
--------	---	----





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- 6.4.2. At the rear, the rigid parts and, in particular, the shell, are not within a cylinder, defined as follows:
- Diameter: 100 mm;
 - Axis situated at the intersection of the medium plane of symmetry of the headform and of a plane parallel to and 110 mm below the reference plane.
- Note: See Annex 4, Figure 1B.
- 6.4.3. Protective padding covers all the areas defined in paragraph 6.4.1, with account being taken of the requirements of paragraph 6.5.
- 6.5. Helmet does not dangerously affect the wearer's ability to hear.
- 6.5. Temperature in the space between the head and the shell does not rise inordinately.
- Note: To prevent this, ventilation holes may be provided in the shell.
- 6.5. Where means for attaching a visor are not provided, the profile at the front edge does not prevent the wearing of goggles.
- 6.6. All projections from, or irregularities in the outer surface of the shell greater than 2 mm, are tested for shear assessment according to paragraphs 7.4.1 or 7.4.2. The outer surface of the helmet is tested for friction assessment, according to paragraphs 7.4.1 or 7.4.2. This applies in particular to a movable lower face cover in all positions intended by the manufacturer.
- 6.7. All external projections are radiused and any external projections other than press-fasteners are smooth and adequately faired.
- 6.7.1. All external projections not more than 2 mm above the outer surface of the shell (e.g. rivet heads) have a radius of a minimum of 1 mm.
- 6.7.2. All external projections more than 2 mm above the outer surface of

NA

NA

NA

NA

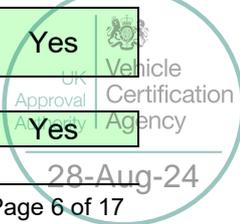
NA

Yes

Yes

Yes

Yes





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the shell have a radius of a minimum of 2 mm.

Note: Latter specific requirements do not apply if a projection satisfies the requirements in paragraphs 7.4.1 or 7.4.2 below.

6.8. There are no inward-facing sharp edges on the inside of the helmet; rigid, projecting internal parts are covered with padding so that any stresses transmitted to the head are not highly concentrated.

NA

6.9. Various components of the protective helmet are so assembled that they are not liable to become easily detached as a result of an impact.

Yes

6.9. In the case of visor and movable or detachable lower face cover, only when in not protective position, the detachment is acceptable provided that it is complete and not to cause possible injuries to the user

NA

6.10. Retention systems are protected from abrasion.

NA

6.11. Helmet is held in place on the wearer's head by means of a retention system, which is secured under the lower jaw. All parts of the retention system are permanently attached to the system or to the helmet.

NA

6.11.1. If the retention system includes a chin-strap, the strap is not less than 20 mm wide under a load of 150 N ± 5 N, applied under the condition prescribed in paragraph 7.6.2:

- mm

NA

6.11.2. Chin strap does not include a chin cup.

NA

6.11.3. Chin straps are fitted with a device to adjust and maintain tension in the strap.

NA

6.11.4. Chin strap fastening and tensioning devices are positioned on the straps so that:

NA

- There are no rigid parts extending more than 130 mm vertically below the headform reference plane, with the helmet mounted on the appropriate sized headform*
- The whole of the device is between the bony projections of the underside of the lower jaw*

*Strikethrough, as appropriate.

6.11.5. If the retention system includes either a double-D ring or sliding bar fastening device ("roller buckle"), then means are provided to prevent the retention system being completely undone and also to retain the free end of the strap when the retention system is adjusted. (If the retaining system can be opened completely, it must be possible only with voluntary action. To prevent any possible misuse, the helmet must be provided with detailed instructions on the

NA



28-Aug-24



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use of the buckle if required.)

[Green box]

6.11.6. Sliding bar and double-D ring fastening devices are fitted with a pulling flap to be used for releasing the retention system. Its colour is red and its minimum dimensions are 10 x 20 mm.

NA

6.11.7. If a retention system includes a quick-release mechanism, then the method of release of this mechanism is self-evident. Any levers, tabs, buttons or other components that need to be operated to release the mechanism are coloured red; those parts of the rest of the system that are visible when closed are not similarly coloured, and the mode of operation is permanently indicated.

NA

6.11.8. Retention system remains closed when the tests described in paragraphs 7.3, 7.6 and 7.7 are carried out.

NA

6.11.9. Buckle of the retention system is designed so as to preclude any possibility of incorrect manipulation. This means inter alia (among other things) that it is not possible for the buckle to be left in a partially closed position.

NA

6.12. If the lower face cover is detachable or movable, the lower face cover is fitted with a device that maintains the intended position even during the complete series of impacts and retention (detaching) test. The device is such that incorrect handling is impossible. The control/actuating device must be of red colour. The helmet must comply with the requirements for helmet categories "J", "P" or both.

NA

6.13. Characteristics of the materials used in the manufacture of helmets are known not to undergo appreciable alteration under the influence of ageing or of the circumstances of use to which the helmet is normally subjected, such as exposure to sun, extremes of temperature and rain. For those parts of the helmet coming into contact with the skin, the materials used are known not to undergo appreciable alteration through the effect of perspiration or of toilet preparations. The manufacturer does not use materials known to cause skin troubles. The suitability of a proposed new material is established by the manufacturer.

NA

6.14. After the performance of one of the prescribed tests, the protective helmet does not exhibit any breakage or deformation dangerous to the wearer. Note: As example visor sunshield and shell significant cracks or any part partially detached (spoiler, lower face cover, accessories) that can hurt the user while he's rolling on the road.

NA

Peripheral Vision

6.15.1 6.15.2 The technical service has selected from among the existing sizes of

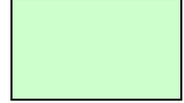
Yes





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a helmet type the size it considers likely to yield the least favourable result and helmet placed on the headform corresponding to its size by the procedure set out in Annex 5 to this Regulation;



6.15.3.

There is no occultation in the field of vision bounded by:

Yes

- Horizontally: Two segments of dihedral angles symmetrical in relation to the median longitudinal vertical plane of the headform and situated between the reference and the basic planes. Each of these dihedral angles is defined by the median longitudinal vertical plane of the headform and the vertical plane forming an angle of not less than 105° with the median longitudinal vertical plane and whose edge is the straight line LK;

6.15.3.1.

- Upwards: Dihedral angle defined by the reference plane of the headform and a plane forming an angle of not less than 7° with the reference plane and whose edge is the straight line L₁ L₂, the points L₁ and L₂ representing the eyes;

6.15.3.2.

- Downwards: Dihedral angle defined by the basic plane of the headform and a plane forming an angle of not less than 45° with the basic plane, and whose edge is the straight line K₁ K₂.

6.15.3.3.





Visors

6.16.1.	Systems of attachment of a visor to a helmet is such that the visor is removable. It is possible to manoeuvre the visor out of the field of vision with a simple movement of one hand. (However, the latter prescription may not be required for helmets which do not provide chin protection provided that a label is attached to the helmet to the effect of warning the purchaser that the visor cannot be manoeuvred.)	NA
6.16.2.	Angle opening (see annex 9) $\geq 5^\circ$: <input data-bbox="986 741 1158 779" type="text" value="-"/>	NA

Sun Shield

6.17.1	Sun shield does not restrain or prevent the movement of the visor. On opening the visor, the sun shield can pivot in the working position. By means of a simple movement the sun shield is able to be moved separately from the visor out of the visual field.	Yes
6.17.2.1	Sun shield does not restrict the field of vision given in paragraph 6.15. in the working or parking position. If the sun shield is fixed outside of the visor, the surface may include fixings or devices to make movement possible. The total surface of the fixings or devices does not exceed 2cm ² ; they can be distributed on both sides of the field of vision.	Yes

Conspicuity Marking

6.18.1.	In order to comply with national requirements for use, the helmet may be required by individual Contracting Parties to contribute to the conspicuity of the user both during the daytime and at night from the front, rear, right and left, by means of parts made of reflective materials that conform to the specifications laid down in paragraphs 6.16.2 to 16.6.6 of this regulation.	NA
6.18.1.	It is allowed that the helmet is equipped with reflective materials in the box, with proper indications to the user on where and how to apply them on the helmet. <i>Note: Mandating of conspicuity marks is left to the discretion of individual Contracting Parties. Article 3 of the Agreement to which this regulation is annexed does not prevent the Contracting Parties from prohibiting the use of helmets not meeting the conspicuity requirements.</i>	NA

6.18.2 Reflective Parts

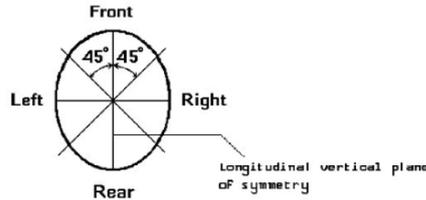
6.18.2.1.	Total surface area and shape of the reflective part used is such that in each direction, corresponding to one of the areas defined in the figure below, visibility is ensured by a surface area of at least 18 cm ²	NA
-----------	--	----





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of simple shape and measured by application on a plane.



6.18.2.1. In each surface area of minimum 18 cm², it is possible to mark either a:
- Circle of 40 mm diameter*
- Rectangle of at least 12.5 cm² in surface area and at least 20 mm in width*

NA

6.18.2.1. Each of these surfaces are situated as near as possible to the point of contact with the shell of a vertical plane parallel to the longitudinal vertical plane of symmetry, to the right and to the left, and as near as possible to the point of contact with the shell of a vertical plane perpendicular to the longitudinal plane of symmetry, to the front and to the rear.

NA

6.18.3. Each of the retro-reflective areas emit white light when it is illuminated with standard illuminant A, with an observation angle of 1/3° and an illumination angle $\beta_1 = \beta_2 = 0^\circ$ (or $\beta_1 = \pm 5^\circ, \beta_2 = 0^\circ$).

NA

6.18.4. Minimum value of the luminous intensity coefficient of a surface area of 18 cm² of material, when revolved, is not less than the values specified in the table below, expressed in millicandelas per lux.

NA

Angle of Divergence (')	Angle of Illumination (°)		
	0	20	40
20	100	60	25

6.18.5. After each conditioning as described in paragraph 7.2, the helmet is visually inspected. There are no signs of cracking or appreciable distortion of the retro-reflective material.

NA

6.18.6. Neither the adhesive nor the retro-reflective material affects the mechanical performance of the helmet according to the related tests in this regulation.

NA



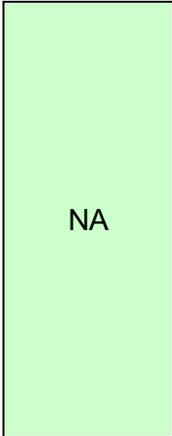


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Tests

Each helmet type, fitted with its visor if placed on the market with a visor, conditioned as shown below.

Test	Number of helmets to be conditioned				Total
	ambient-temperature and hygrometry conditioning	Heat conditioning	low-temperature conditioning	ultra- violet radiation conditioning and moisture conditioning	
Impact absorption	2	1	1	1	5
Imp. Abs. extra point	2				2
Hi/Low energy impact	2				2
Rotational	2				2
Projection and surface friction	1				1
Rigidity	2				2
Retention system	1				1
					15



7.1

Testing Notes:

The largest size of each combination shell size and protective padding of each helmet type shall be tested for impact absorption, rotational and rigidity. For impact absorption on extra point, Hi and Low energy impacts and tests of the retention system, helmet sizes shall be chosen such that the helmet to be tested shall be that offering the likely least favorable conditions (such as thickest padding, etc).

7.1

All the types of retention systems available for the helmet must be tested. Supplementary samples could be necessary. Additionally, for each smaller headform size within the size range of the helmet type two helmets shall undergo the impact absorption test. One helmet shall be heat conditioned, and the other low temperature conditioned. The conditioned helmets shall be impacted against either anvil, in equal numbers if possible, at the choice of the laboratory.

Types of Conditioning

7.2

Prior to any type of further conditioning for mechanical tests, as specified in paragraph 7.1., each helmet shall be subject:

7.2.1.

Ambient-temperature and hygrometry conditioning:

The helmet shall be exposed to a temperature of 25 °C ± 5 °C and a relative humidity of 50 per cent ± 10 per cent for at least 4 hours.



7.2.2.

Heat conditioning:

The helmet shall be exposed to a temperature of 50 °C ± 2 °C for not less than 4 hours and not more than 8 hours.



28-Aug-24



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7.2.3.	Low-temperature conditioning: The helmet shall be exposed to a temperature of -10 °C ± 2 °C for not less than 4 hours.	Yes
7.2.4.	Ultraviolet-radiation conditioning and moisture conditioning. The outer surface of the protective helmet shall be exposed successively to: ultraviolet irradiation by a 150-watt xenon-filled quartz lamp for 48 hours at a range of 25 cm; spraying for 4 to 8 hours with water at ambient temperature at the rate of 1 litre per minute.	Yes

Test Results

Impact Absorption Tests

7.3.1.4.	The tests completed not more than five minutes after the helmet is taken from the conditioning chamber.	Yes
----------	---	-----

7.3. Helmet size: XXL

Helmet ID Number	H.F. Size Number	Impact Point	Anvil*	Cond. (°C)	Speed (m/s)	HIC (≤ 2,400)	Deceleration (≤ 275 g)
XXL-26	O	B	F	AMB	7.54	1385	174
		X	F		-	-	-
		P	F		7.56	1836	224
		R	F		-	-	-
XXL-25	O	B	K	AMB	7.51	1083	149
		X	K		-	-	-
		P	K		7.57	1460	203
		R	K		-	-	-
XXL-24	O	B	F	-10	7.58	1384	174
		X	F		-	-	-
		P	F		7.59	1966	215
		R	F		-	-	-
		S	F		-	-	-
XXL-23	O	B	K	+50	7.55	1030	145
		X	K		-	-	-
		P	K		7.50	1425	200
		R	K		-	-	-
XXL-27	O	B	K	UV + H2O	7.55	994	142
		X	K		-	-	-
		P	K		7.60	1435	198
		R	K		-	-	-

*F = Flat; K = Kerbstone





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7.3. Helmet size:

XL

Extra Impact points:

Helmet ID Number	H.F. Size Number	Impact Point	Anvil ¹	Cond. (°C)	Required Speed (m/s)	Measured Speed (m/s)	HIC requirement	Measured HIC	Decel requirement	Measured Decel
XL-1	O	(Extra point): BP ²	F	AMB	7.5	7.54	≤ 2,400	1608	≤ 275 g	185
		(Extra point): BXL ²	F		7.5	7.55	≤ 2,400	1259	≤ 275 g	165
		(Extra point): BXPR ²	F		7.5	7.54	≤ 2,400	1324	≤ 275 g	161
XL-2	O	(Extra point): BP ²	K		7.5	7.54	≤ 2,400	1097	≤ 275 g	166
		(Extra point): BXR ²	K		7.5	7.55	≤ 2,400	599	≤ 275 g	119
		(Extra point): BXPL ²	K		7.5	7.53	≤ 2,400	959	≤ 275 g	161

¹ : F = Flat; K = Kerbstone

² : Extra test locations to be selected from the 12 listed in section 7.3.4.2.1

7.3. Helmet size:

XL

Hi/Low Energy Impact points:

Helmet ID Number	H.F. Size Number	Impact Point	Anvil ¹	Cond. (°C)	Required Speed (m/s)	Measured Speed (m/s)	HIC requirement	Measured HIC	Decel requirement	Measured Decel
XL-3	O	(Hi Energy): B	F	AMB	8.2	8.24	≤ 2,880	1858	≤ 275 g	197
		(Hi Energy): X	F		8.2	-	≤ 2,880	-	≤ 275 g	-
		(Hi Energy): P	F		8.2	8.21	≤ 2,880	2166	≤ 275 g	230
		(Hi Energy): R	F		8.2	-	≤ 2,880	-	≤ 275 g	-
XL-4	O	(Low Energy): B	F		6.0	6.00	≤ 1,300	692	≤ 180 g	129
		(Low Energy): X	F		6.0	-	≤ 1,300	-	≤ 180 g	-
		(Low Energy): P	F		6.0	6.08	≤ 1,300	602	≤ 180 g	153
		(Low Energy): R	F		6.0	-	≤ 1,300	-	≤ 180 g	-

¹ F = Flat; K = Kerbstone



28-Aug-24



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Test for Projection and Surface Friction (Method B)

	Helmet ID Number	Test	Tested Point	Results
7.4.2.1.3.1.	L-21	Projection	Top sun shield lever	Pass
7.4.2.1.3.2.	L-21	Surface	Top sun shield lever	Pass

Test for projections of the category P/J with movable lower face cover: Not applicable; section removed for clarity

Rigidity Tests

7.5.1. The test helmets have undergone ambient-temperature and hygrometry conditioning.

Yes

Helmet ID Number	Helmet Size	Load Direction	Deformation (mm)		
			Initial (load 30 N)	Max (load 630 N) (≤ 40 mm)	Final (load 30 N) (≤ 15 mm)
XXL-21	XXL	Longitudinal	1	13	5
XXL-22	XXL	Transversal	1	10	4

Dynamic Test of the Retention System: Not applicable; section removed for clarity

Retention (Detaching) Test: Not applicable; section removed for clarity

Micro-slip Test of the Chin Strap: Not applicable; section removed for clarity

Note: See Annex 8, Figure 4)

Test for Resistance to Abrasion of the Chin Strap: Not applicable; section removed for clarity

Note: See Annex 8, Figure 5.

Tests for Retention Systems Relying on Quick Release Mechanism: Not applicable; section removed for clarity

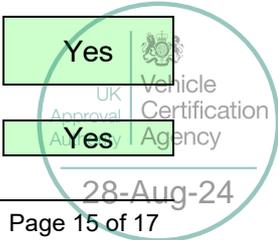
Tests for Oblique impact and measurement of rotational acceleration

7.13 The test helmets have undergone ambient-temperature and hygrometry conditioning.

Yes

Annex 7, 2.4. Coefficient of friction (m) 0.3 ± 0.05 between the outer surface of the

Yes





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	head form and the common fabric used in the comfort padding of the helmet.	
Annex 7, 2.5.	Chin strap force controller "Tightened as for normal use". (This means that the helmet must be tightened before each test after having applied below the chin a rigid cylinder 10 mm diameter at least 30 mm long that will be removed before the test. According paragraph 7.3.1.3.)	Yes
Annex 7, 2.6.	Instrumentation for measuring the head kinematics during impact calibrated in line with Annex 7, 2.6.	Yes
Annex 7, 2.7.	Headform coefficient of friction calibrated in line with Annex 7, 2.7.	Yes
Annex 7, 3.1	Helmet placed on a headform of appropriate size in accordance with the requirements of Annex 5. Helmet positioned in accordance to the HPI (helmet positioning index) provided by the manufacturer. If it is not available, the helmet shall be tipped towards the rear so that the front edge of the helmet in the median plane is displaced by 25 mm.	Yes
Annex 7, 3.2.2	Anvil (A) as per Annex 7, 3.2.2 and figure 2	Yes
Annex 7, 3.	Test method in accordance with Annex 7, 3.	Yes

Helmet ID Number	H.F. Size Number	Impact Point	Cond. (°C)	Speed (8.0m/s)	Peak Resultant Acceleration (PRA) $\leq 10,400 \text{ rad/s}^2$	Brain Injury Criterion (BrIC) ≤ 0.78
XXL-28	O	Front lateral right (45°)	AMB	8.01	2498	0.39
		Rear (180°)		8.04	4184	0.02
		Lateral left (270°)		8.03	3791	0.04
XXL-29	O	Front (0°)	AMB	8.02	3033	0.42
		Rear-lateral right (135°)		8.01	4261	0.32



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written approval of the technical service.

Photographs



Remarks

None

Note: VCA apply measurement uncertainty to calibrated items but not test results.



Inspection/Test Report: Protective Helmets and their Visors for Drivers and Passengers of Motorcycles and Mopeds

Legislation

UNECE Regulation 22.06 (Revision 4 Amendment 3)

Inspection/Test Details

Location of Inspection/Test: Qingyuan SENA Smart Helmets, China
Date of Inspection/Test: 6 August 2024
VCA Representative(s): Donghwa Woo
Inspectors Home Office Location: VCA Korea
Manufacturer's Representative(s): Suhan Kim
Reason for Test Report: Production Qualification

Manufacturer Details

Name and Address: SENA Technologies Co., Ltd.
19, Heolleung-ro 569-gil
Gangnam-gu, Seoul
REPUBLIC OF KOREA
Type: PHANTOM
Commercial Description: PHANTOM, PHANTOM PRO, PHANTOM-ANC, PHANTOM-CAM
Category: "P" with protective lower face cover

Conclusion

The above mentioned component was tested in accordance with the above mentioned legislation and was found to comply in all respects. This report relates only to the items tested

Witness Engineer Signature:

Name: Donghwa Woo
Position: Type Approval Engineer
Date: 6 August 2024

List of Annexes

Annex	No of Pages	Subject
I		
II		





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Issue Record

Issue 0 is original report

Worst Case Rationale

Additional PQ Test carried out to verify the impact absorption performance of the variant (PHANTOM).
This test is considered Batch Test No. 1.

Note: Include information on variants and versions this report covers, as applicable. Supporting documents may be annexed to this report

Significant Interpretations, Alternative Test Methods, New Technologies

NA

Inspection/Tests Required

Yes, NA, See Report ... / Approval ... / Annex ...

Information for wearers:	Yes
Impact Absorption Tests:	Yes
Dynamic Test of the Retention System:	Yes

Specification

Number of Samples

Shell Size:	Large	Medium	Small
Consumer Size:	XXL	L	M
Sample Quantity:	20	20	20
Production Batch Quantity:	3200		
Production Batch Serial Number:	1 - 3200		

Materials

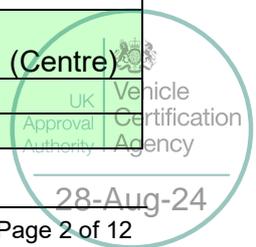
Shell:	Fibreglass Composite
Padding:	Polyester, Sponge
Liner:	EPS (Expanded Polystyrene type foam)
Chin Strap:	Nylon

Retention System

Type:	Two section system
Buckle:	Double-D ring
Strap Retainer:	Plastic press stud
Anchorage:	Secured to shell by means of a single rivet to each side of helmet shell

Ventilation System:

Type of Shell Edging:	Number of ventilations: 3 Front of Crown (Crown), Rear of Crown, Chin guard (Centre)
Accessories:	PVC gasket Visor (Type: SENA -FF-01)





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Reflecting Band:
Additional Feature:

Sun shield (Type: SENA-I/V-01) Specific Accessory (Type: SP149)
NA
NA

Manufacturer's Documentation

Manufacturer's documentation is complete and reflects the agreed specification for the component tested, and covers all variants and versions agreed in the worst case rationale. Information document uploaded to job folder and identified by job number.

Yes

Facility and Equipment Checks

Facility Appraisal reference and date (*Reference and date if formal; state if ad-hoc appraisal*).

FAK178 and KXB612469
30 August 2023

Calibration certificates checked and valid, recorded in the following table:

Yes

Equipment

Description	Make	Model	Serial number	Calibration due date*
Head Form #1	CADEX	100_01_HFM	8817	-
Head Form #2	CADEX	100_01_HFM	8795	-
Head Form #3	CADEX	100_01_HFM	8828	-
Head Form #4	CADEX	100_01_HFM	8788	-
Head Form #5	CADEX	100_01_HFM	8815	-
Head Form #6	CADEX	100_01_HFM	8789	-
Accelerometer (Twin Wire Impact Test Machine)	SHANGHAI B&W SEINSING TECHNOLOGY	356B21	LW347346	19/09/2023 + 1 year
Heat conditioning unit	HOTOTECH	HT-5012	HB22431	06/08/2023 + 1 year
Low temperature conditioning unit	HOTOTECH	HT-5013	HB22432	06/08/2023 + 1 year

*Specify calibrated date + (interval) or calibration due date.





Qualifying the Production of Helmets

The production of each new approved type of helmet must be subjected to production qualification tests.

9.2

The first batch is considered to be the production of the first tranche containing a minimum of 200 helmets and a maximum of 3,200 helmets.

- Random sample of helmets taken from the first batch, divided into homogenous lots of 10, choosing the biggest helmet sizes for each shell size. Yes

- At least two lots among those subjected to the shock-absorption test shall consist of maximum size helmets. Yes

9.2.1. Test on the system of retention

9.2.1.1. The 10 helmets of the smallest size of each shell subjected to the test of the retention system described in paragraph 7.6. NA

- All the types of retention system available for the helmet checked. NA

9.2.2. Shock absorption test

- From every shell size of helmet type take two groups each with 10 helmets of the largest size. Yes

9.2.2.2. All of the helmets in a group subjected to the same conditioning treatment and then subjected to the shock absorption test described in paragraph 7.3. at the same point of impact. Yes

- The conditioning and the anvil for each group chosen by the technical service which conducted the approval tests. Yes

- The location of the points must be the same for all the helmets of the same batch. Yes

- The helmets of the same batch can be submitted to test up to three different impact point. Yes

9.2.2.3. All the shell sizes of a type of helmet submitted to standard linear impact test on the BXPR and S points if present. NA





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Information for wearers

14.1.	<p>Every protective helmet placed on the market shall bear a clearly visible label with the following inscription in the national language, or at least one of the national languages of the country of destination.</p> <p>This information shall contain: "For adequate protection, this helmet must fit closely and be securely attached. Any helmet that has sustained a violent impact should be replaced"</p> <p>and, if fitted with a non-protective lower face cover: "Does not protect chin from impacts" together with the symbol indicating the unsuitability of the lower face cover to offer any protection against impacts to the chin.</p>	NA
14.2.	<p>Additionally where hydrocarbons, cleaning fluids, paints, transfers or other extraneous additions affect the shell material adversely a separate and specific warning shall be emphasized in the above-mentioned label and worded as follows: " 'Warning' - Do not apply paint, stickers, petrol or other solvents to this helmet".</p>	NA
14.3.	<p>Every protective helmet shall be clearly marked with its size and its maximum weight, to the nearest 50 grams, as placed on the market. The maximum weight quoted should include all the accessories that are supplied with the helmets, within the packaging, as it is placed on the market, whether or not those accessories have actually been fitted to the helmet.</p>	NA
14.4.	<p>Every protective helmet offered for sale shall bear a label showing the type or types of visor that have been approved at the manufacturer's request.</p>	NA





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Inspection/Test Results

Impact Absorption Tests

7.3. Helmet size:

XXL

Group	Sample Number	H.F. Size Number	Impact Point	Anvil*	Cond. (°C)	Speed (m/s)	HIC (≤ 2,640)	Deceleration (≤ 302.5 g)
1	XXL-1	O	B	F	-10	7.55	1844	204
	XXL-2		B	F		7.53	1276	167
	XXL-3		B	F		7.61	1371	170
	XXL-4		B	F		7.50	1414	171
	XXL-5		B	F		7.53	1529	184
	XXL-11		B	F		7.51	1694	195
	XXL-12		B	F		7.53	1737	197
	XXL-13		B	F		7.54	1612	184
	XXL-14		B	F		7.53	1524	184
	XXL-15		B	F		7.51	1671	193
2	-	O	X	K	+50	-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
3	XXL-1	O	P	F	-10	7.51	1897	218
	XXL-2		P	F		7.55	1975	221
	XXL-3		P	F		7.61	1903	217
	XXL-4		P	F		7.56	1989	223
	XXL-5		P	F		7.56	1931	223
	XXL-11		P	F		7.50	1842	211
	XXL-12		P	F		7.53	1954	220
	XXL-13		P	F		7.52	1894	223
	XXL-14		P	F		7.52	2095	229
	XXL-15		P	F		7.51	1949	222

*F = Flat; K = Kerbstone



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Helmet size:

XXL

Group	Sample Number	H.F. Size Number	Impact Point	Anvil*	Cond. (°C)	Speed (m/s)	HIC (≤ 2,640)	Deceleration (≤ 302.5 g)
4	-	O	R	K	+50	-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
5	-	O	S	F	-10	-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-

*F = Flat; K = Kerbstone

Statistical Analysis

Group	Sample Number	Impact Point	S (Standard deviation of the values)	2.4 S	X (Mean of the values)	X + 2.4 S
1	XXL-1 - 5, XXL-11 - 15	B	11.9	28.6	184.9	213.5
2	-	X	-	-	-	-
3	XXL-1 - 5, XXL-11 - 15	P	4.5	10.8	220.7	231.5
4	-	R	-	-	-	-
5	-	S	-	-	-	-





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7.3. Helmet size:

L

Group	Sample Number	H.F. Size Number	Impact Point	Anvil*	Cond. (°C)	Speed (m/s)	HIC (≤ 2,640)	Deceleration (≤ 302.5 g)
1	L-1	M	B	F	-10	7.50	1368	177
	L-2		B	F		7.52	1814	209
	L-3		B	F		7.51	1399	187
	L-4		B	F		7.52	1850	213
	L-5		B	F		7.55	1753	205
	L-11		B	F		7.66	1616	191
	L-12		B	F		7.54	1684	196
	L-13		B	F		7.54	1626	196
	L-14		B	F		7.64	1690	201
	L-15		B	F		7.53	1547	192
2	-	M	X	K	+50	-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
3	L-1	M	P	F	-10	7.54	1930	220
	L-2		P	F		7.51	2078	228
	L-3		P	F		7.52	1967	224
	L-4		P	F		7.56	1984	223
	L-5		P	F		7.52	2021	225
	L-11		P	F		7.64	2053	222
	L-12		P	F		7.53	1599	200
	L-13		P	F		7.64	2041	231
	L-14		P	F		7.62	2039	223
	L-15		P	F		7.57	1915	216

*F = Flat; K = Kerbstone





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Helmet size:

L

Group	Sample Number	H.F. Size Number	Impact Point	Anvil*	Cond. (°C)	Speed (m/s)	HIC (≤ 2,640)	Deceleration (≤ 302.5 g)
4	-	M	R	K	+50	-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
5	-	M	S	F	-10	-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-

*F = Flat; K = Kerbstone

Statistical Analysis

Group	Sample Number	Impact Point	S (Standard deviation of the values)	2.4 S	X (Mean of the values)	X + 2.4 S
1	L-1 - 5, L-11 - 15	B	10.2	24.5	196.7	221.2
2	-	X	-	-	-	-
3	L-1 - 5, L-11 - 15	P	8.1	19.3	221.2	240.5
4	-	R	-	-	-	-
5	-	S	-	-	-	-





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7.3. Helmet size:

M

Group	Sample Number	H.F. Size Number	Impact Point	Anvil*	Cond. (°C)	Speed (m/s)	HIC (≤ 2,640)	Deceleration (≤ 302.5 g)
1	M-1	J	B	F	-10	7.56	1536	193
	M-2		B	F		7.55	1439	185
	M-3		B	F		7.52	1669	201
	M-4		B	F		7.54	1713	204
	M-5		B	F		7.55	1603	198
	M-11		B	F		7.53	1668	201
	M-12		B	F		7.56	1506	194
	M-13		B	F		7.50	1720	210
	M-14		B	F		7.50	1842	213
	M-15		B	F		7.53	1732	206
2	-	J	X	K	+50	-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
	-		X	K		-	-	-
3	M-1	J	P	F	-10	7.56	2000	229
	M-2		P	F		7.51	2024	226
	M-3		P	F		7.54	1972	224
	M-4		P	F		7.53	2035	228
	M-5		P	F		7.52	2094	236
	M-11		P	F		7.54	1740	214
	M-12		P	F		7.51	2055	232
	M-13		P	F		7.53	1827	213
	M-14		P	F		7.54	1927	218
	M-15		P	F		7.50	1832	212

*F = Flat; K = Kerbstone





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Helmet size:

M

Group	Sample Number	H.F. Size Number	Impact Point	Anvil*	Cond. (°C)	Speed (m/s)	HIC (≤ 2,640)	Deceleration (≤ 302.5 g)
4	-	J	R	K	+50	-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
	-		R	K		-	-	-
5	-	J	S	F	-10	-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-
	-		S	F		-	-	-

*F = Flat; K = Kerbstone

Statistical Analysis

Group	Sample Number	Impact Point	S (Standard deviation of the values)	2.4 S	X (Mean of the values)	X + 2.4 S
1	M-1 - 5, M-11 - 15	B	8.0	19.1	200.5	219.6
2	-	X	-	-	-	-
3	M-1 - 5, M-11 - 15	P	8.0	19.3	223.2	242.5
4	-	R	-	-	-	-
5	-	S	-	-	-	-





This test report shall not be reproduced except in full, without
written approval of the technical service.

Dynamic Test of the Retention System: Not applicable; section removed for clarity

Note: See Annex 8, Figure 2.

Remarks

None

Note: VCA apply measurement uncertainty to calibrated items but not test results.





Inspection/Test Report: Approval of a Visor Type for Protective Helmets for Drivers and Passengers of Motorcycles and Mopeds

Legislation

UNECE Regulation 22.06 (Revision 4 Amendment 3)

Inspection/Test Details

Location of Inspection/Test: Guangzhou Botai Optical Technology, China
Date of Inspection/Test: 5 August 2024
VCA Representative(s): Donghwa Woo
Inspectors Home Office Location: VCA Korea
Manufacturer's Representative(s): Suhan Kim
Reason for Test: New approval

Manufacturer Details

Name and Address: SENA Technologies Co., Ltd.
19, Heolleung-ro 569-gil
Gangnam-gu, Seoul
REPUBLIC OF KOREA
Type: SENA-IV-01
Commercial Description: NA
Category: Sun Shield

Conclusion

The above mentioned component was tested in accordance with the above mentioned legislation and was found to comply in all respects. This report relates only to the items tested.

Witness Engineer Signature:

Name: Donghwa Woo
Position: Type Approval Engineer
Date: 5 August 2024

List of Annexes

Annex	No of Pages	Subject
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This test report shall not be reproduced except in full, without written approval of the technical service.

Issue Record

Issue 0 is original report

Worst Case Rationale

Full test carried out to cover the addition of new sun shield for helmet type PHANTOM.

All test equipment was calibrated by an ISO/IEC 17025 accredited calibration laboratory CNAS L1071.

Note: Include information on variants and versions this report covers, as applicable. Supporting documents may be annexed to this report

Significant Interpretations, Alternative Test Methods, New Technologies

NA

Inspection/Tests Required

Yes, NA, See Report ... / Approval ... / Annex ...

Markings:	NA
General Specifications:	Yes
Field of vision of the visor:	Yes
Luminous transmittance:	Yes
Light diffusion:	NA
Recognition of signal lights:	Yes
Spectral transmittance:	Yes
Refractive powers:	Yes
Mechanical characteristics:	NA
Optical quality and scratch resistance:	NA
Mist retardant visor (optional)	NA
Sun Shield	Yes
Photochromic visors, liquid crystal or equivalent visors	NA

List of helmets to which the visor may be fitted:	PHANTOM
Structure of visor:	Tinted sun shield with 1.6 mm thickness
Material of visor:	Polycarbonate

Manufacturer's Documentation

Manufacturer's documentation is complete and reflects the agreed specification for the component tested, and covers all variants and versions agreed in the worst case rationale. Information document uploaded to job folder and identified by job number.





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Facility and Equipment Checks

Facility Appraisal reference and date (*Reference and date if formal; state if ad-hoc appraisal*).

Facilities suitable

Calibration certificates checked and valid, recorded in the following table:

Yes

Equipment

Description	Make	Model	Serial number	Calibration due date*
Optical Test Bench	AD Engineering	12SBDBP1046/ PLUS/CAM	OBP17/015-03	13/10/2023 + 1 year
Light transmission Test Equipment	AD Engineering	UV-M51	UVM51- HE1805009	13/10/2023 + 1 year

*Specify calibrated date + (interval) or calibration due date.

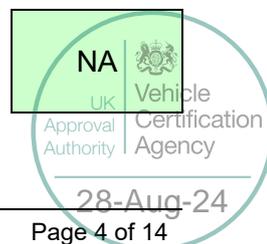


Inspection/Test Requirements	Complies Yes / NA
------------------------------	----------------------

Markings: Not applicable; section removed for clarity

General Specifications

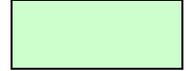
6.16.1.	The systems of attachment of a visor to a helmet shall be such that the visor is removable.	NA
	It must be possible to manoeuvre the visor out of the field of vision with a simple movement of one hand.	NA
	However, the latter prescription may not be required for helmets which do not provide chin protection provided that a label is attached to the helmet to the effect of warning the purchaser that the visor cannot be manoeuvred.	NA
6.16.2.	Angle opening (See Annex 9)	NA
6.16.3.	Field of vision	
6.16.3.1.	The visor shall not comprise any part liable to impair the user's peripheral vision as defined in paragraph 6.15. when the visor is in the totally opened position.	NA
	Furthermore, the lower edge of the visor shall not be situated in the downward field of vision of the user as defined in paragraph 6.15. when the visor is in closed position.	NA
6.16.3.1.	The surface of the visor in the peripheral field of vision of the helmet may however include:	NA
6.16.3.1. (i)	The lower edge of the visor, provided that it is made of a material with at least the same transmittance as the rest of the visor.	NA
(ii)	A device to allow the visor to be manoeuvred or locked in the closed position. (However, if this device is situated within the field of vision of the visor defined in paragraph 6.16.3.2. It shall be at the lower edge and present a maximum height (h) of 10 mm and its width (l) shall be such that the product (h x l) at the most is equal to 1.5 cm ² if bigger it must be made of a material with at least the same transmittance as the visor and it must be free of any engraving, paint or other covering feature)	NA
(iii)	Fixings and devices to allow the visor to be manoeuvred if they are situated outside of the field of vision of the visor and if the total surface of these parts, including devices, if any, to allow the visor to	NA





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be manoeuvred does not exceed 2 cm², possibly distributed on each side of the field of vision.



6.16.3.4. Luminous transmittance.

Visors shall have a luminous transmittance $\tau_v \geq 80\%$, relative to the standard illuminant D65.



A luminous transmittance $80\% > \tau_v \geq 35\%$, - or 20 per cent only in case of photochromic and/or liquid crystal visor - measured by the method given in paragraph 7.8.3.2.1.1., is also permissible if the visor is marked with the symbol shown in figure 2 and/or with the English words "DAYTIME USE ONLY".

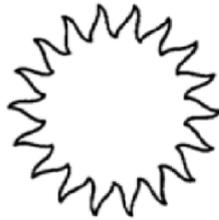
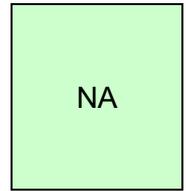
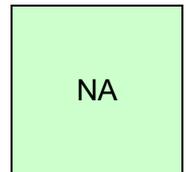


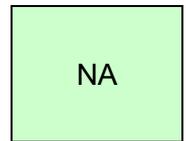
Figure 2: Symbol "Daytime use only"

Note: this symbol or indication must be visible and extend over at least 1 cm²

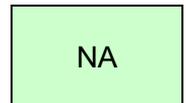
When describing the transmittance properties of photochromic, liquid crystal or equivalent visors, two values are to be considered: one corresponds to the faded state, the other to the darkened state. The luminous transmittance shall be measured before the abrasion test.



6.16.3.5. Visors shall be free from any significant defects likely to impair the vision, such as bubbles, scratches, inclusions, dull spots, holes, mould marks, scratches or other defects originating from the manufacturing process in the field of vision.



The light diffusion shall not exceed the limit in accordance with paragraph 7.8.3.2.1.2. when measured in accordance with one of the methods specified in annex 11.



If different results arise when this is assessed, the requirements on scattered light shall be measured and assessed over an area 5 mm in diameter which includes the presumed error.



6.16.3.6. Visors shall in addition be sufficiently transparent, shall not cause any noticeable distortion of object as seen through the visor, shall be resistant to abrasion, resistant to impact and shall not give rise to any confusion between the colour used in road traffic sign and signals.





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	The relative visual attenuation quotient (Q) shall not be less than:	
	(Q) ≥ 0.80 for red signal lights;	NA
	(Q) ≥ 0.60 for yellow signal light;	NA
	(Q) ≥ 0.60 for green signal light;	NA
	(Q) ≥ 0.60 for blue signal light.	NA
	The relative attenuation quotient shall be measured by the method given in paragraph 7.8.3.2.1.1., before the abrasion test.	NA
6.16.3.7	In the range 475 nm to 650 nm, the spectral transmittance, measured by the method given in paragraph 7.8.3.2.1.1., of the visor shall not be less than 0.2 τ _v .	NA
	The spectral transmittance shall be measured before the abrasion test.	NA
6.16.3.8	Permissible Refractive Power values for visors:	
	Spherical effect : (D ₁ +D ₂)/2 = +/- 0.12 m ⁻¹	NA
	Astigmatic effect : D ₁ -D ₂ = 0.12 m ⁻¹	NA
	Prismatic effect difference	
	Horizontal Base Out : = 1.00 cm/m	NA
	Horizontal Base In : = 0.25 cm/m	NA
	Vertical : = 0.25 cm/m	NA
	The refractive powers shall be measured according to method specified in annex 15.	NA
6.16.3.9	Mist Retardant Visor (Optional requirements)	
	The internal face of the visor is regarded as having a mist retardant facility if the square of the specular transmittance has not fallen below 80 per cent of the initial value without misting within 20 s when tested as described in annex 16.	NA
	Such facility may be indicated by the English words: "MIST RETARDANT"	NA
6.17	Sun Shield	
	Sun shield shall not restrain or prevent the movement of the visor. On opening the visor, the sun shield can pivot in the working position.	Yes
6.17.1.	By means of a simple movement the sun shield shall be able to be moved separately from the visor out of the visual field.	
6.17.2.	Field of vision	





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6.17.2.1.	Sun shield shall not restrict the field of vision given in paragraph 6.15. in the working or parking position. (If the sun shield is fixed outside of the visor, the surface may include fixings or devices to make movement possible. The total surface of the fixings or devices shall not exceed 2cm ² ; they can be distributed on both sides of the field of vision.)	Yes
6.17.2.2.	Sun shield shall have a luminous transmittance $\tau_v \geq 20\%$, relative to the standard illuminant D65.	Yes
6.17.2.3.	Sun shield shall be free from any significant defects likely to impair the vision, such as bubbles, scratches, inclusions, dull spots, holes, mould marks, scratches or other defects originating from the manufacturing process in the field of vision.	Yes
6.17.2.4.	Sun shield shall not cause any noticeable distortion of object as seen through the visor, resistant to impact and shall not give rise to any confusion between the colour used in road traffic sign and signals. The relative visual attenuation quotient (Q) shall not be less than:	Yes
	(Q) ≥ 0.80 for red signal lights;	Yes
	(Q) ≥ 0.60 for yellow signal light;	Yes
	(Q) ≥ 0.60 for green signal light;	Yes
	(Q) ≥ 0.60 for blue signal light.	Yes
	The relative attenuation quotient shall be measured by the method given in paragraph 7.8.3.2.1.1	Yes
6.17.2.5.	In the range 475 nm to 650 nm, the spectral transmittance, measured by the method given in paragraph 7.8.3.2.1.1., of the sun shield shall not be less than 0.2 τ_v .	Yes
6.17.2.6.	Permissible refractive powers at the sight points.	
	Permissible refractive power values for sun shields; measured without a combination with the visor.	Yes
	Spherical effect : (D1+D2)/2 = +/- 0.12 m-1	Yes
	Astigmatic effect : D1-D2 = 0.12 m-1	Yes
	Prismatic effect difference	Yes
	Horizontal Base Out : = 1.00 cm/m	Yes
	Horizontal Base In : = 0.25 cm/m	Yes
	Vertical : = 0.25 cm/m	Yes
	The refractive powers shall be measured according to method specified in annex 15.	Yes





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The requirements for the prismatic effect apply to the difference between the values at the two sight points.

TEST

7.8. VISOR TESTS

7.8.1. Sampling and use of samples

The 7 (+3 if optional test) visors are used as shown below in Tab 1

NA

The test for recognition of signal lights may be dispensed with in the case of visors with luminous transmittance $\tau_v \geq 80 \%$

NA

7.8.1.1. Prior to any type of further conditioning for mechanical or optical test, as specified in paragraph 7.8.1., each visor shall be subject to the ultraviolet conditioning in accordance with the provision of paragraph 7.2.4.1.

NA

7.8.2. Mechanical characteristics

7.8.2.1. The helmet, fitted with its visor and previously conditioned in accordance with the provisions of paragraph 7.2.3., shall be placed in accordance with the provisions of paragraph 7.3.1.3.1. on a test headform of suitable size.

NA

The test headform selected from among those shown in annex 4 shall be so placed that the basic plane is vertical.

NA

7.8.2.2.1. Test apparatus is as per 7.8.2.2. and 7.8.2.2.1.

NA

7.8.2.2.2. When the drop-hammer falls from a height of $1 + 0.005$ m, measured between the top face of the punch and the lower face of the hammer it shall be ascertained that:

7.8.2.2.3. No sharp splinters are produced if the visor is shattered. (Any segment having an angle less than 60° shall be considered as a sharp splinter.)

NA

7.8.2.3. High Speed particle test

7.8.2.3.1. Visors tested in accordance with the method specified in Annex 17

NA

Annex 17, 2.1. Appropriate headform, as defined in 7.3.3.

NA

Annex 17, 2.2. Propulsion equipment as per Annex 17, 2.2.

NA

Annex 17, 3. Two samples conditioned in air at 50°C for 2 h and two additional samples shall be conditioned in air at -10°C for 2 h;

NA

- Eye-protector to be tested placed on the headform in the position corresponding to normal use and with the tension of the headband, if fitted, adjusted according to the manufacturer's instructions.

NA





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-	Sheet of carbon paper on top of a sheet of white paper, between the eye-protector and the head-form inserted.	NA
-	Eye-protector/headform assembly positioned in front of the propulsion equipment so that the point of impact is not more than 250 mm from the exit end of the speed sensing equipment.	NA
-	Project the steel ball at 60 m/s. The points of impact are (L1 and L2).	NA
-	(a) Left eye frontal;	NA
-	(b) Right eye frontal;	NA
-	The impact of the steel ball on the goggles within 30 s after the removal of the sample from the corresponding atmosphere;	NA
-	Test made at an ambient temperature of (23 ± 5) °C;	NA
-	New specimens shall be used for this test and each specimen shall only be subjected to two impacts.	NA

7.8.2.3.2. After testing, the following defects shall not occur:

(a) Visor fracture: a visor shall be considered to have fractured if it cracks through its entire thickness into two or more pieces, or visor material becomes detached from the surface away from the one struck by the ball, or if the ball passes through the visor;	NA
(b) Visor deformation: a visor shall be considered to have been deformed if a mark appears on the white paper on the opposite side to that struck by the ball;	NA
(c) Visor housing failure: a visor housing shall be considered to have failed if it separates into two or more pieces, or if it is no longer capable of holding a visor in position.	NA

7.8.3. Optical qualities and scratch resistance

7.8.3.1	Test procedure:	NA
7.8.3.1.1	Test piece taken from the flattest part of the visor in the area specified in paragraph 6.16.3.2. and its minimum dimensions shall be 50 mm x 50 mm. The test shall be carried out on the face corresponding to the outside of the visor.	NA
7.8.3.1.2	The test piece shall undergo ambient-temperature and hygrometry conditioning in accordance with paragraph 7.2.2.	NA
7.8.3.1.3	Test sequence of operations is as follows:	NA
7.8.3.1.3.1	- The surface of the test piece shall be washed in water containing 1 per cent detergent and rinsed with distilled or demineralized water, then carefully dried with a grease-free and dust-free linen cloth.	NA
7.8.3.1.3.2		NA





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7.8.3.1.3.3	- Immediately after drying and before abrasion, the luminous transmittance shall be measured using the method given in paragraph 7.8.3.2.1.1., and the light diffusion shall be measured according to one of the methods specified in Annex 11.	[Green Box]
7.8.3.1.3.4		
7.8.3.1.3.5	- The test piece shall then be subjected to the abrasion test described in Annex 10, during which 3 kg ± 0,01 kg of abrasive material shall be projected at the sample. - Following the test, the test piece shall again be cleaned in accordance with paragraph 7.8.3.1.3.1. - Immediately after drying the light diffusion after abrasion shall be measured by using again the same method used in accordance with paragraph 7.8.3.1.3.2	
7.8.3.2.1.1.	In a parallel beam, with the test specimens being irradiated vertically, determine the spectral transmittance values between 380 nm and 780 nm and then the transmittance and the visual attenuation quotient in accordance with the equations given in annex 13.	NA
7.8.3.2.1.2.	The light diffusion shall not exceed the following values for each method: Before abrasion: 0.65/m ² /l (a/ c/), 2.5 % (b/) After abrasion: 5.0/m ² /l (a/ c/), 10 % (b/)	NA NA
7.9	Sun shield tests	
7.9.1.	Sampling and use of samples The 7 sun shield are used as shown below in Tab 8	Yes
7.9.1.1.	Prior to any type of further conditioning for optical test, as specified in paragraph 7.9.1., each sun shield shall be subject to the ultraviolet conditioning in accordance with the provision of paragraph 7.2.4.1.	Yes
7.14.	Test of photochromic visors, liquid crystal or equivalent visors	
7.14.1	The photochromic visor is characterized by its luminous transmittance that shall be determined in faded state τ_{v0} and in darkened state τ_{v1} achieved after 15 min irradiation according with the method specified in Annex 18.	NA
7.14.1	For photochromic visors, τ_{v0}/τ_{v1} is ≥ 1.25 .	NA
7.14.2.	Visors tested in accordance with the method specified in Annex 18.	NA





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Annex 18, 2.1.3

Conditioning for luminous transmittance in the faded state.

Unless the manufacturer specifies a different procedure to reach the faded state in the information supplied with the product, photochromic visors shall be conditioned as per Annex 18, 2.1.3

NA



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TABLES

Tab 1 – SAMPLING AND USE OF SAMPLES (7.8.1):
Not applicable; section removed for clarity

Tab 2 – VISOR MECHANICAL CHARACTERISTICS (7.8.2):
Not applicable; section removed for clarity

Tab 3 – VISOR OPTICAL QUALITIES AND SCRATCH RESISTANCE (7.8.3):
Not applicable; section removed for clarity

Tab. 4 – VISOR LUMINOUS TRANSMITTANCE (6.16.3.4)
RELATIVE VISUAL ATTENUATION QUOTIENT (6.16.3.6):
Not applicable; section removed for clarity

Tab 5 – VISOR SPECTRAL TRANSMITTANCE (6.16.3.7)
LIGHT DIFFUSION (6.16.3.5):
Not applicable; section removed for clarity

Tab. 6 – VISOR REFRACTIVE POWERS (6.16.3.8):
Not applicable; section removed for clarity

Tab. 7 – MIST RETARDANT VISOR (Optional requirements) (6.16.3.9)

Tab. 8 – SUN SHIELD SAMPLING AND USE OF SAMPLES (7.9.1)

Paragraph	Test	1	2	3	4	5	6	7	Total
6.17.2	Field of vision of the sun shield	X							1
6.17.2.2	Luminous transmittance	X	X	X					3
6.17.2.4	Recognition of signal lights								
6.17.2.5	Spectral transmittance								
6.17.2.6	Refractive powers				X	X	X		3



**Tab. 9 – SUN SHIELD LUMINOUS TRANSMITTANCE (6.17.2.2)
RELATIVE VISUAL ATTENUATION QUOTIENT (6.17.2.4)**

Sample ID Number	Luminous transmittance	Relative visual attenuation quotient				Note
	$\tau_v > 20 \%$	Q Red	Q Yellow	Q Green	Q Blue	
		≥ 0.8	≥ 0.6	≥ 0.6	≥ 0.6	
1	43.6	0.92	0.93	1.05	1.11	(1)
2	44.1	0.94	0.95	1.04	1.09	(1)
3	43.6	0.94	0.95	1.04	1.09	(1)

(1) For details see annex Laboratory Test

Tab 10. – SUN SHIELD SPECTRAL TRANSMITTANCE (6.17.2.5)

Sample ID Number	Spectral transmittance		Note
	τ_f Results [475-650]	Limits $\tau_f > 0,2 \tau_v$	
1	22.24	8.72	(1)
2	38.39	8.82	(1)
3	38.39	8.81	(1)

(1) For details see annex Laboratory Test

Tab. 11 – SUN SHIELD REFRACTIVE POWERS (6.17.2.6)

Sample ID Number	Side	Spherical Power +/- 0.12 [m ⁻¹]	Astigmatic Power 0.12 [m ⁻¹]	Prismatic Power			Note
				Base IN/ OUT	Horizontal Limits Base IN < 0.25 Base OUT < 1.00 [cm/m]	Vertical Limits < 0.25 [cm/m]	
4	Dx	0.03	0.10	OUT	0.25	0.00	
	Sx	-0.01	0.06				
5	Dx	0.05	0.10	OUT	0.30	0.00	
	Sx	-0.01	0.06				
6	Dx	0.04	0.10	OUT	0.30	0.00	
	Sx	-0.01	0.06				

(1) For details see annex Laboratory Test

Tab. 12 –PHOTOCHROMIC VISORS, LIQUID CRYSTAL OR EQUIVALENT (7.14): Not applicable; section removed for clarity





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Remarks

None

Note: VCA apply measurement uncertainty to calibrated items but not test results.



Inspection/Test Report: Approval of a Visor Type for Protective Helmets for Drivers and Passengers of Motorcycles and Mopeds

Legislation

UNECE Regulation 22.06 (Revision 4 Amendment 3)

Inspection/Test Details

Location of Inspection/Test:	Guangzhou Botai Optical Technology, China
Date of Inspection/Test:	6 - 7 August 2024
VCA Representative(s):	Donghwa Woo
Inspectors Home Office Location:	VCA Korea
Manufacturer's Representative(s):	Suhan Kim
Reason for Test Report:	Production Qualification

Manufacturer Details

Name and Address:	SENA Technologies Co., Ltd. 19, Heolleung-ro 569-gil Gangnam-gu, Seoul REPUBLIC OF KOREA
Type:	SENA -IV-01
Commercial Description:	NA
Category:	Sun Shield

Conclusion

The above mentioned component was tested in accordance with the above mentioned legislation and was found to comply in all respects. This report relates only to the items tested

Witness Engineer Signature:

Name:	Donghwa Woo
Position:	Type Approval Engineer
Date:	7 August 2024

List of Annexes

Annex	No of Pages	Subject
I		
II		
III		





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Issue Record

Issue 0 is original report

Worst Case Rationale

Full test carried out for production qualification.

Note: Include information on variants and versions this report covers, as applicable. Supporting documents may be annexed to this report

Significant Interpretations, Alternative Test Methods, New Technologies

NA

Inspection/Tests Required

Yes, NA, See Report ... / Approval ... / Annex ...

Table with 2 columns: Test Name, Result. Rows include Markings (NA), Luminous transmittance (Yes), Light diffusion (NA), Recognition of signal lights (Yes), Spectral transmittance (Yes), Refractive powers (Yes), Mechanical characteristics (NA), Optical quality and scratch resistance (NA), Mist retardant visor (optional) (NA).

Table with 2 columns: Test Name, Result. Rows include List of helmets to which the visor may be fitted (PHANTOM), Structure of visor (Tinted sun shield with 1.6 mm thickness), Material of visor (Polycarbonate).

Manufacturer's Documentation

Manufacturer's documentation is complete and reflects the agreed specification for the component tested, and covers all variants and versions agreed in the worst case rationale. Information document uploaded to job folder and identified by job number.

Yes

Facility and Equipment Checks

Facility Appraisal reference and date (Reference and date if formal; state if ad-hoc appraisal).

Facilities suitable

Calibration certificates checked and valid, recorded in the following table:

Yes





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Equipment

Description	Make	Model	Serial number	Calibration due date*
Optical Test Bench	AD Engineering	12SBDBP1046/ PLUS/CAM	OBP17/015-03	13/10/2023 + 1 year
Light transmission Test Equipment	AD Engineering	UV-M51	UVM51- HE1805009	13/10/2023 + 1 year

*Specify calibrated date + (interval) or calibration due date.

Inspection/Test Requirements	Complies Yes / NA
------------------------------	----------------------

Qualifying the production of visors.: Not applicable; section removed for clarity

Markings/Information for wearers.: Not applicable; section removed for clarity

Tab 1-Test sample: Not applicable; section removed for clarity

**Tab 2 – MECHANICAL CHARACTERISTICS (7.8.2):
Not applicable; section removed for clarity**

**Tab 3 – OPTICAL QUALITIES AND SCRATCH RESISTANCE (7.8.3):
Not applicable; section removed for clarity**

**Tab. 4 – LUMINOUS TRANSMITTANCE (6.15.3.4)
RELATIVE VISUAL ATTENUATION QUOTIENT (6.15.3.6):
Not applicable; section removed for clarity**

**Tab 5 – SPECTRAL TRANSMITTANCE (6.16.3.7):
LIGHT DIFFUSION (6.16.3.5):
Not applicable; section removed for clarity**

**Tab. 6 – REFRACTIVE POWERS (6.16.3.8):
Not applicable; section removed for clarity**

**Tab. 7 – MIST RETARDANT VISOR (Optional requirements) (6.16.3.9)
Not Applicable**

Tab. 8 – Sun shield test sample





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Test Group	Test	Sun shields Sample
A	Light transmission	10
	Recognition of light signals	
	Spectral transmission	
B	Refractive powers	10

**Tab. 9 – SUN SHIELD LUMINOUS TRANSMITTANCE (6.17.2.2)
RELATIVE VISUAL ATTENUATION QUOTIENT (6.17.2.4)**

Sample ID Number	Luminous transmittance	Relative visual attenuation quotient				Note
	$\tau_v > 20 \%$	Q Red ≥ 0.8	Q Yellow ≥ 0.6	Q Green ≥ 0.6	Q Blu ≥ 0.6	
1	44.1	0.94	0.95	1.04	1.09	
2	43.8	0.94	0.95	1.04	1.09	
3	44.1	0.94	0.95	1.04	1.09	
4	43.2	0.94	0.94	1.04	1.1	
5	43.3	0.95	0.94	1.04	1.09	
6	43.8	0.93	0.94	1.04	1.09	
7	43.9	0.93	0.94	1.04	1.09	
8	44.4	0.93	0.94	1.04	1.09	
9	42.8	0.93	0.94	1.04	1.09	
10	42.3	0.94	0.94	1.04	1.10	

Tab 10. – SUN SHIELD SPECTRAL TRANSMITTANCE (6.17.2.5)

Sample ID Number	Spectral transmittance		Note
	τ_f Results [475-650]	Limits $\tau_f > 0,2 \tau_v$	
1	37.03	8.58	
2	38.07	8.75	
3	38.39	8.82	
4	37.12	8.64	
5	36.70	8.65	
6	37.19	8.77	
7	37.25	8.77	
8	37.96	8.88	
9	36.99	8.57	
10	36.79	8.45	



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Tab. 11 – SUN SHIELD REFRACTIVE POWERS (6.17.2.6)

Sample ID Number	Side	Spherical Power +/- 0.12 [m ⁻¹]	Astigmatic Power 0.12 [m ⁻¹]	Prismatic Power			Note
				Base IN/ OUT	Horizontal Limits Base IN < 0.25 Base OUT < 1.00 [cm/m]	Vertical Limits < 0.25 [cm/m]	
11	Dx	0.05	0.11	OUT	0.30	0.00	
	Sx	-0.01	0.06				
12	Dx	0.06	0.11	OUT	0.30	0.00	
	Sx	-0.02	0.04				
13	Dx	0.06	0.11	OUT	0.30	0.00	
	Sx	-0.01	0.06				
14	Dx	0.05	0.11	OUT	0.30	0.00	
	Sx	-0.01	0.06				
15	Dx	0.04	0.10	OUT	0.30	0.00	
	Sx	-0.01	0.06				
16	Dx	0.04	0.10	OUT	0.30	0.00	
	Sx	-0.01	0.05				
17	Dx	0.04	0.10	OUT	0.30	0.00	
	Sx	-0.01	0.05				
18	Dx	0.03	0.11	OUT	0.30	0.00	
	Sx	-0.01	0.06				
19	Dx	0.04	0.11	OUT	0.30	0.00	
	Sx	-0.01	0.05				
20	Dx	0.05	0.10	OUT	0.30	0.00	
	Sx	-0.01	0.06				

Remarks

None

Note: VCA apply measurement uncertainty to calibrated items but not test results.

