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THE UNITED KINGDOM VEHICLE APPROVAL AUTHORITY

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COMMUNICATION CONCERNING THE APPROVAL GRANTED OF A TYPE OF HELMET VISOR  
TYPE PURSUANT TO UN REGULATION NO. 22.06

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Approval No: E11\*22R06/02\*2006\*00

1. Trade mark: SENA
2. Type: SENA-FF-01
3. Manufacturer's name: SENA Technologies Co., Ltd.
4. Address:  
19, Heolleung-ro 569-gil  
Gangnam-gu, Seoul  
REPUBLIC OF KOREA
5. If applicable, name of manufacturer's representative: SENA Europe GmbH
6. Address:  
Paul-Henri-Spaak-Str. 22  
51069 Köln  
GERMANY
7. Brief description of visor, and inner visor if any: Clear visor made of polycarbonate (PC) with anti-scratch and anti-fog coating and 2.4 mm thickness
8. Types of helmet to which the visor may be fitted: PHANTOM
9. Submitted for approval on: 13 MARCH 2024
10. Technical service responsible for conducting approval tests: Vehicle Certification Agency

12. Number of report issued by that service: KSB626911 (2006)

13. Remarks: None

14. Approval GRANTED

15. Place: BRISTOL

16. Date: 02 JULY 2024

17. Signature:



C McCABE  
Chief Technical and Statutory Operations Officer

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



Vehicle  
Certification  
Agency

THE UNITED KINGDOM VEHICLE APPROVAL AUTHORITY

APPROVAL NUMBER: E11\*22R06/02\*2006\*00

### INFORMATION PACKAGE CONTENTS

INDEX REVISION NUMBER: 00

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Revision Date  
&  
Office Stamp

	<b>Protective Helmet Visors</b> UN Regulation 22.06	
	Type	: SENA-FF-01
	Document No.	: SENA-FF-01_22R_00
	Date	: 24 JANUARY 2024
	Type-approval No.	: E11*22R06/02*2006*00
	Job No.	: KSB626911


# Protective Helmet Visors

UN Regulation 22.06

Type : SENA-FF-01


Total number of sheets : 05 (Five)



	<b>Protective Helmet Visors</b> UN Regulation 22.06	
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**0. GENERAL**

- 0.1. Make (trade name of manufacturer)  
: SENA
- 0.2. Type : SENA-FF-01
- 0.2.1. Commercial name(s) (if available)  
: SENA-FF-01
- 0.2.2. Variant(s) / Version(s) (if available)  
: NA
- 0.3. Location of E-mark : On the left-hand outer side of the visor
- 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, Hongrugu 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. Types of the helmets which the visor can be fitted  
: PHANTOM

	<b>Protective Helmet Visors</b>	
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**1. DISCRIPTION OF THE VISOR**

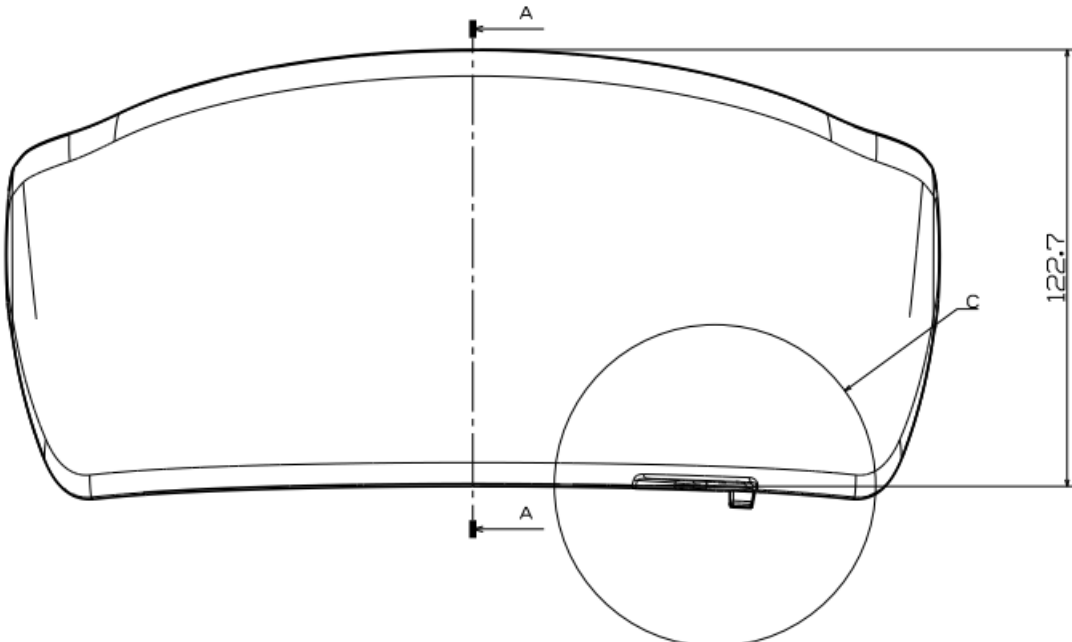
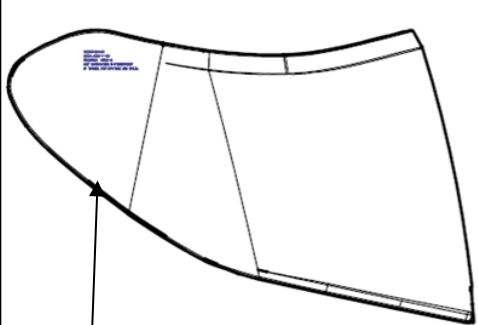
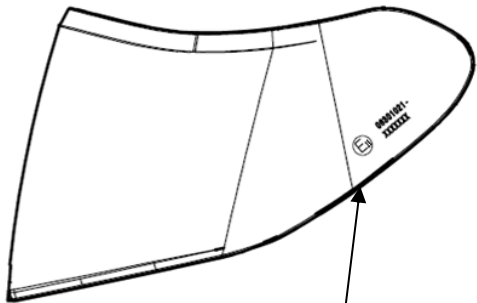
- 1.1. Material : Polycarbonate
- 1.2. Surface treatment : Anti-scratch / Anti-fog coating
- 1.3. Thickness : 2.4mm
- 1.4. Colour : Clear
- 1.5. Manufacturing method : Injection moulding
- 1.6. Transmittance : ≥80%

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## LIST OF DRAWINGS

Drawing No.	Descriptions	Page
SENA-FF-01/22R-01	Drawing of the visor	1

	<b>Protective Helmet Visors</b> UN Regulation 22.06	
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	Job No.	: KSB626911

Drawing no.	SENA -FF-01/22R-01
Description	Drawing of the visor
<div>  </div> <div>  <div> MODEL: SENA-FF-01  EXCEEDS VESC-8  NOT WARRANTED SHATTERPROOF  IF TINTED DAYTIME USE ONLY </div> </div> <div>  <div> E11 062006 -  XXXXXXX </div> </div>	





## 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:	13 - 14 March 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 -FF-01
Commercial Description:	SENA -FF-01
Category:	Visor

### 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:	14 March 2024

### List of Annexes

Annex	No of Pages	Subject
I	1	Test Photos
II		
III		



## Issue Record

Issue 0 is original report

## Worst Case Rationale

Full test performed for new visor type approval.

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

List of helmets to which the visor may be fitted:	PHANTOM
Structure of visor:	Clear visor with anti-scratch and anti-fog coating and 2.4 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.





## 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

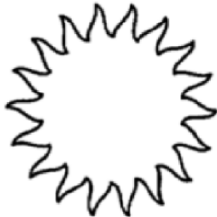
Description	Make	Model	Serial number	Calibration due date*
Penetration Test Equipment	-	-	A005	06/12/2023 +1 year
Optical Test Bench	AD Engineering	12SBDBP1046/ PLUS/CAM	OBP17/015-03	13/10/2023 + 1 year
Light transmission Test Equipment	AD Engineering	UV-M51	UVM51- HE1805009	13/10/2023 + 1 year
Light diffusion Test Machine	AD Engineering	12SBLDM1060/C PLUS/HP	LDM 17/059	13/10/2023 + 1 year
Sand Abrader Machine	AD Engineering	SSE1064 II	CT-007	06/12/2023 +1 year
High Speed Cannon Test Equipment	Shenzhen Xiangrui Detection Instrument	-	SYS-01	01/03/2024 + 1 year
Temperature Conditioning Chamber	Teelong	-	19514	18/10/2023 + 1 year

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



Inspection/Test Requirements		Complies Yes / NA
<b>Markings</b>		
4.2.	The visors submitted for approval in conformity with paragraph 3.2. above shall bear the applicant's trade name or mark and, if appropriate, an indication of the unsuitability of the visor for use during the hours of darkness or in conditions of poor visibility.	Yes
4.3.	Marking is not placed within the main visibility area.	Yes
4.4.	The marking shall be clearly legible, resistant to wear and in readily accessible place.	Yes
<b>General Specifications</b>		
6.16.1.	The systems of attachment of a visor to a helmet shall be such that the visor is removable.	Yes
	It must be possible to manoeuvre the visor out of the field of vision with a simple movement of one hand.	Yes
	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.	Yes
6.16.2.	Angle opening (See Annex 9)	Yes
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.	Yes
	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.	Yes
6.16.3.1.	The surface of the visor in the peripheral field of vision of the helmet may however include:	Yes
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.	Yes
(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	Yes



	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 <sup>2</sup> 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)	
(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 be manoeuvred does not exceed 2 cm <sup>2</sup> , possibly distributed on each side of the field of vision.	Yes
6.16.3.4.	Luminous transmittance.	
	Visors shall have a luminous transmittance $\tau_v \geq 80\%$ , relative to the standard illuminant D65.	Yes
	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".	NA
		
	Figure 2: Symbol "Daytime use only"	
	Note: this symbol or indication must be visible and extend over at least 1 cm <sup>2</sup>	
	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.	NA
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.	Yes
	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.	Yes



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.

Yes

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.

Yes

The relative visual attenuation quotient (Q) shall not be less than:

(Q) ≥ 0.80 for red signal lights;  
(Q) ≥ 0.60 for yellow signal light;  
(Q) ≥ 0.60 for green signal light;  
(Q) ≥ 0.60 for blue signal light.

Yes

Yes

Yes

Yes

The relative attenuation quotient shall be measured by the method given in paragraph 7.8.3.2.1.1., before the abrasion test.

Yes

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  $\tau_v$ .

Yes

The spectral transmittance shall be measured before the abrasion test.

Yes

6.16.3.8

Permissible Refractive Power values for visors:

Spherical effect :  $(D_1 + D_2)/2 = \pm 0.12 \text{ m}^{-1}$   
Astigmatic effect :  $|D_1 - D_2| = 0.12 \text{ m}^{-1}$

Yes

Yes

Prismatic effect difference

Horizontal Base Out : = 1.00 cm/m  
Horizontal Base In : = 0.25 cm/m  
Vertical : = 0.25 cm/m

Yes

Yes

Yes

The refractive powers shall be measured according to method specified in annex 15.

Yes

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

6.17.1.	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. By means of a simple movement the sun shield shall be able to be moved separately from the visor out of the visual field.	NA
6.17.2.	Field of vision Sun shield shall not restrict the field of vision given in paragraph 6.15. in the working or parking position.	NA
6.17.2.1.	(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 <sup>2</sup> ; they can be distributed on both sides of the field of vision.)	NA
6.17.2.2.	Sun shield shall have a luminous transmittance $\tau_v \geq 20\%$ , relative to the standard illuminant D65.	NA
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.	NA
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:	NA
	(Q) $\geq 0.80$ for red signal lights;	NA
	(Q) $\geq 0.60$ for yellow signal light;	NA
	(Q) $\geq 0.60$ for green signal light;	NA
	(Q) $\geq 0.60$ for blue signal light.	NA
	The relative attenuation quotient shall be measured by the method given in paragraph 7.8.3.2.1.1	NA
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 $0.2 \tau_v$ .	NA
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.	NA



Spherical effect :  $(D1+D2)/2 = +/- 0.12 \text{ m}^{-1}$   
Astigmatic effect :  $|D1-D2| = 0.12 \text{ m}^{-1}$   
Prismatic effect difference  
Horizontal Base Out : = 1.00 cm/m  
Horizontal Base In : = 0.25 cm/m  
Vertical : = 0.25 cm/m  
The refractive powers shall be measured according to method  
specified in annex 15.

NA
NA
NA
NA
NA
NA
NA

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

Yes
-----

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.

Yes
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#### 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.

Yes
-----

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

Yes
-----

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

Yes
-----

##### 7.8.2.2.2. When the drop-hammer falls from a height of $1 + 0.005 \text{ m}$ , 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 $60^\circ$ shall be considered as a sharp splinter.)

Yes	
02-Jul-24	





7.8.2.3. High Speed particle test

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

- Annex 17, 2.1.* Appropriate headform, as defined in 7.3.3.  
*Annex 17, 2.2.* Propulsion equipment as per Annex 17, 2.2.  
*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;  
- 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.  
- Sheet of carbon paper on top of a sheet of white paper, between the eye-protector and the head-form inserted.  
- 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.  
- Project the steel ball at 60 m/s. The points of impact are (L1 and L2).  
- (a) Left eye frontal;  
- (b) Right eye frontal;  
- The impact of the steel ball on the goggles within 30 s after the removal of the sample from the corresponding atmosphere;  
- Test made at an ambient temperature of (23 ± 5) °C;  
- New specimens shall be used for this test and each specimen shall only be subjected to two impacts.

Yes
Yes
Yes
Yes
Yes
Yes
Yes
Yes
Yes
Yes

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;  
(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;  
(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.

Yes
Yes
Yes

7.8.3. Optical qualities and scratch resistance

7.8.3.1 Test procedure:





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.	
7.8.3.1.2	The test piece shall undergo ambient-temperature and hygrometry conditioning in accordance with paragraph 7.2.2. Test sequence of operations is as follows:	Yes
7.8.3.1.3	- 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.	Yes
7.8.3.1.3.1	- 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.	
7.8.3.1.3.2	- 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.	
7.8.3.1.3.3	- Following the test, the test piece shall again be cleaned in accordance with paragraph 7.8.3.1.3.1.	
7.8.3.1.3.4	- 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	
7.8.3.1.3.5		
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.	Yes
7.8.3.2.1.2.	The light diffusion shall not exceed the following values for each method:	
	Before abrasion: 0.65/m <sup>2</sup> /l (a/ c/), 2.5 % (b/)	Yes
	After abrasion: 5.0/m <sup>2</sup> /l (a/ c/), 10 % (b/)	Yes
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	NA
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.	NA
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 $\tau_{v0}$ and in darkened state $\tau_{v1}$ achieved after 15 min irradiation according with the method specified in Annex 18.	NA
7.14.1	For photochromic visors, $\tau_{v0}/\tau_{v1} \geq 1.25$ .	NA
7.14.2.	Visors tested in accordance with the method specified in Annex 18.	NA
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



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

## TABLES

**Tab 1 – SAMPLING AND USE OF SAMPLES (7.8.1)**

Paragraph	Test	1	2	3	4	5	6	7	8	9	10	11-14	Total
If optional test													
6.16.3.	Field of vision of the visor	X						R					1
6.16.3.4.	Luminous transmittance	X	X	X				E					3
6.16.3.5.	Light diffusion							T					
6.16.3.6.	Recognition signal lights							A					
6.16.3.7.	Spectral transmittance							I					
6.16.3.8.	Refractive powers				X	X	X	N					3
6.16.3.9.	Mist retardant visor (opt.)							E	X	X	X		3
7.8.2.	Mechanical character				X	X	X	D				X	7
7.8.3.	Optical quality and scratch res.	X	X	X									3

**Tab 2 – VISOR MECHANICAL CHARACTERISTICS (7.8.2)**

Sample ID Number	Conditioning (°C)	Splinters	Sharp splinters	Note
4	-10	No	No	
5	-10	No	No	
6	-10	No	No	

### VISOR HIGH SPEED PARTICLE TEST (7.8.2.3.)

Sample ID Number	Conditioning (°C)	Test temperature (23 ± 5) °C;	Defects type 'a'	Defects type 'b'	Defects type 'c'	Note
7	50	Yes	No	No	No	
8	50	Yes	No	No	No	
9	-10	Yes	No	No	No	
10	-10	Yes	No	No	No	

**Tab 3 – VISOR OPTICAL QUALITIES AND SCRATCH RESISTANCE (7.8.3)**

Sample ID Number	Conditioning (°C)	Luminous transmittance	Light diffusion		Note
		Before Abrasion $\tau_v \geq 80 \%$	Before Abrasion < 0.65 cd/m <sup>2</sup> /l	After Abrasion < 5.0 cd/m <sup>2</sup> /l	
1	Amb	89.05	0.08	1.83	(1)
2	Amb	89.45	0.06	2.94	(1)
3	Amb	89.35	0.06	1.58	(1)



**Tab. 4 – VISOR LUMINOUS TRANSMITTANCE (6.16.3.4)  
RELATIVE VISUAL ATTENUATION QUOTIENT (6.16.3.6)**

Sample ID Number	Luminous transmittance	Relative visual attenuation quotient				Note
	$\tau_v \geq 80\%$ General  80 % > $\tau_v \geq 35\%$ or 20% only in case of Daytime	Q Red  $\geq 0.8$	Q Yellow  $\geq 0.6$	Q Green  $\geq 0.6$	Q Blu  $\geq 0.6$	
1	89.05	0.99	1.00	1.00	1.00	(1)
2	89.45	1.01	1.00	1.00	1.00	(1)
3	89.35	1.01	1.00	1.00	1.00	(1)

**Tab 5 – VISOR SPECTRAL TRANSMITTANCE (6.16.3.7)  
LIGHT DIFFUSION (6.16.3.5)**

Sample ID Number	Spectral transmittance		Light diffusion		Note
	$\tau_f$ Results [475-650]	Limits $\tau_f > 0,2 \tau_v$	Before Abrasion  < 2,5 %	After Abrasion  < 10 %	
1	87.37	17.81	See Test Tab 3	See Test Tab 3	(1)
2	87.69	17.89	See Test Tab 3	See Test Tab 3	(1)
3	87.94	17.87	See Test Tab 3	See Test Tab 3	(1)

**Tab. 6 – VISOR REFRACTIVE POWERS (6.16.3.8)**

Sample ID Number	Side	Spherical Power  +/- 0.12 [m <sup>-1</sup> ]	Astigmatic Power  0.12 [m <sup>-1</sup> ]	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	0.01	0.02	OUT	0.00	0.00	
	Sx	0.00	0.01				
5	Dx	0.00	0.02	OUT	0.00	0.00	
	Sx	0.00	0.01				
6	Dx	0.01	0.02	OUT	0.00	0.00	
	Sx	0.01	0.02				

(1) For details see annex Laboratory Test

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



**Tab. 8 – SUN SHIELD SAMPLING AND USE OF SAMPLES (7.9.1):**  
Not applicable; section removed for clarity

**Tab. 9 – SUN SHIELD LUMINOUS TRANSMITTANCE (6.17.2.2)**  
**RELATIVE VISUAL ATTENUATION QUOTIENT (6.17.2.4) :**  
Not applicable; section removed for clarity

**Tab 10. – SUN SHIELD SPECTRAL TRANSMITTANCE (6.17.2.5):**  
Not applicable; section removed for clarity

**Tab. 11 – SUN SHIELD REFRACTIVE POWERS (6.17.2.6):**  
Not applicable; section removed for clarity

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

**Remarks**

None

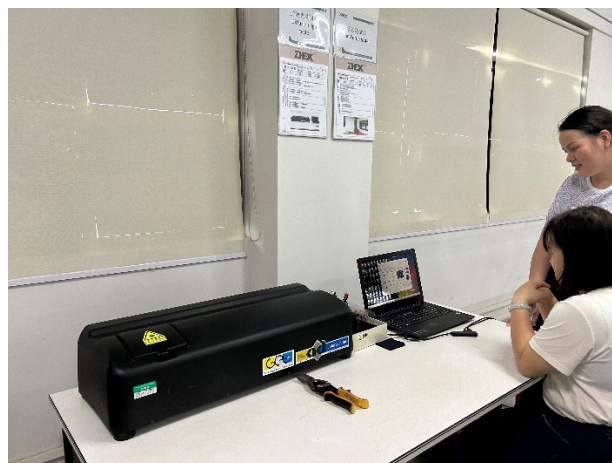
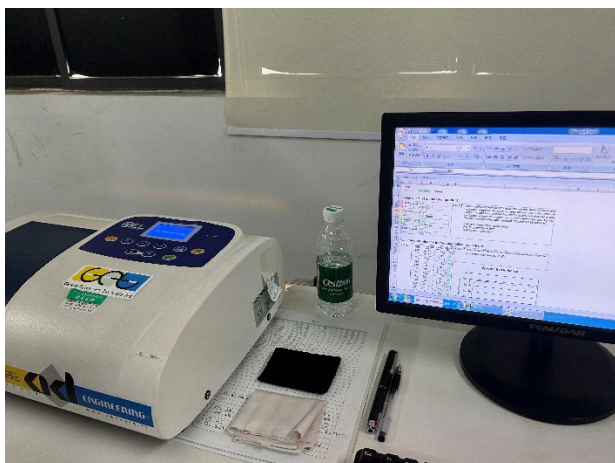
*Note: VCA apply measurement uncertainty to calibrated items but not test results.*





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## Annex I – Test Photos





## 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:	13 June 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 -FF-01
Commercial Description:	SENA -FF-01
Category:	Visor

### 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:	13 June 2024

### List of Annexes

Annex	No of Pages	Subject
I		
II		
III		





## Issue Record

Issue 0 is original report

## Worst Case Rationale

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 ...
Markings:	Yes
Luminous transmittance:	Yes
Light diffusion:	Yes
Recognition of signal lights:	Yes
Spectral transmittance:	Yes
Refractive powers:	Yes
Mechanical characteristics:	Yes
Optical quality and scratch resistance:	Yes
Mist retardant visor (optional)	NA
List of helmets to which the visor may be fitted:	PHANTOM
Structure of visor:	Clear visor with anti-scratch and anti-fog coating and 2.4 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



## Equipment

Description	Make	Model	Serial number	Calibration due date*
Penetration Test Equipment	-	-	A005	06/12/2023 +1 year
Optical Test Bench	AD Engineering	12SDBDP1046/ 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
Light diffusion Test Machine	AD Engineering	12SBLDM1060/C PLUS/HP	LDM 17/059	13/10/2023 + 1 year
Sand Abrader Machine	AD Engineering	SSE1064 II	CT-007	06/12/2023 +1 year
High Speed Cannon Test Equipment	Shenzhen Xiangrui Detection Instrument	-	SYS-01	01/03/2024 + 1 year
Temperature Conditioning Chamber	Teelong	-	19514	18/10/2023 + 1 year

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

## Inspection/Test Requirements

Complies  
Yes / NA

### Qualifying the production of visors.

- 9.3. The production of each new approved type of visor (approved as such or as forming part of the helmet) subjected to production qualification tests.  
For this purpose, a random sample of 20 visors (30 if the mist-retardant test is involved) will be taken from the first batch.  
  
(The first batch is considered to be the production of the first tranche containing a minimum of 200 visors and a maximum of 3,200 visors.)

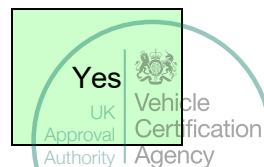
Yes

### Markings/Information for wearers.

- 14.5. Every visor offered for sale shall bear a label showing the types of protective helmet for which it has been approved.
- 14.6. Every visor placed on the market with a protective helmet shall be accompanied by information in the national language, or in at least one of the national languages, of the country of destination. This information shall contain:

Yes

Yes





14.6.1	General instruction for storage and care.	Yes
14.6.2.	Specific instructions for cleaning and their notice of use.	Yes
14.6.3.	Advice as to the suitability of the visor for use in conditions of poor visibility and during the hours of darkness.	Yes
14.6.3.1.	Visors with the marking indicating "daytime use only" are not suitable for use during the hours of darkness or in conditions of poor visibility.	NA
14.6.5.	If the visor is MIST RETARDANT approved it may be indicated.	NA

**Tab 1-Test sample**

Test Group	Test	Visors Sample
A	Light transmission	10
	Recognition of light signals	
	Spectral transmission	
	Light diffusion	
	Optical qualities and resistance to scratches	
B	Refractivity	10
	Mechanical characteristics	
C	Mist-retardant (Optional)	10

**Tab 2 – MECHANICAL CHARACTERISTICS (7.8.2)**

Sample ID Number	Conditioning (°C)	Splinters	Sharp splinters	Note
11	-10	No	No	
12	-10	No	No	
13	-10	No	No	
14	-10	No	No	
15	-10	No	No	
16	-10	No	No	
17	-10	No	No	
18	-10	No	No	
19	-10	No	No	
20	-10	No	No	



**Tab 3 – OPTICAL QUALITIES AND SCRATCH RESISTANCE (7.8.3)**

Sample ID Number	Conditioning (°C)	Luminous transmittance	Light diffusion		Note
		Before Abrasion > 80 %	Before Abrasion < 0.65 cd/m <sup>2</sup> /l	After Abrasion < 5.0 cd/m <sup>2</sup> /l	
1	Amb	93.0	0.27	2.51	
2	Amb	91.7	0.01	2.40	
3	Amb	91.0	0.21	2.61	
4	Amb	91.8	0.05	3.93	
5	Amb	92.4	0.05	3.43	
6	Amb	91.4	0.08	3.33	
7	Amb	89.9	0.08	2.95	
8	Amb	91.1	0.08	3.14	
9	Amb	92.3	0.61	2.90	
10	Amb	91.3	0.62	3.22	

**Tab. 4 – LUMINOUS TRANSMITTANCE (6.15.3.4)  
RELATIVE VISUAL ATTENUATION QUOTIENT (6.15.3.6)**

Sample ID Number	Luminous transmittance	Relative visual attenuation quotient				Note
	$\tau_v \geq 50\%$ Daytime $\tau_v \geq 80\%$ General	Q Red $\geq 0.8$	Q Yellow $\geq 0.6$	Q Green $\geq 0.6$	Q Blu $\geq 0.6$	
1	93.0	1.01	1.00	1.00	1.01	
2	91.7	0.99	0.99	1.00	1.01	
3	91.0	1.00	1.00	1.00	1.00	
4	91.8	1.00	1.00	1.00	1.00	
5	92.4	1.00	1.00	1.00	1.00	
6	91.4	1.01	1.00	1.00	1.01	
7	89.9	1.01	1.00	1.00	1.01	
8	91.1	1.01	1.00	1.00	1.01	
9	92.3	0.99	1.00	1.00	1.00	
10	91.3	1.01	1.00	1.00	1.00	

**Tab 5 – SPECTRAL TRANSMITTANCE (6.16.3.7)  
LIGHT DIFFUSION (6.16.3.5)**

Sample ID Number	Spectral transmittance		Light diffusion		Note
	$\tau_f$ Results [475-650]	Limits $\tau_f > 0,2 \tau_v$	Before Abrasion < 2,5 %	After Abrasion < 10 %	
1	93.2	18.6	See Test Tab 3	See Test Tab 3	
2	90.6	18.3	See Test Tab 3	See Test Tab 3	





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3	91.8	18.2	See Test Tab 3	See Test Tab 3	
4	90.8	18.4	See Test Tab 3	See Test Tab 3	
5	92.2	18.5	See Test Tab 3	See Test Tab 3	
6	91.0	18.3	See Test Tab 3	See Test Tab 3	
7	90.1	18.0	See Test Tab 3	See Test Tab 3	
8	92.2	18.2	See Test Tab 3	See Test Tab 3	
9	91.5	18.5	See Test Tab 3	See Test Tab 3	
10	91.2	18.3	See Test Tab 3	See Test Tab 3	

**Tab. 6 – REFRACTIVE POWERS (6.16.3.8)**

Sample ID Number	Side	Spherical Power +/- 0.12 [m <sup>-1</sup> ]	Astigmatic Power 0.12 [m <sup>-1</sup> ]	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	0.00	0.01	OUT	0.00	0.00	
	Sx	0.00	0.01				
12	Dx	0.02	0.00	OUT	0.00	0.00	
	Sx	0.01	0.00				
13	Dx	0.01	0.01	OUT	0.00	0.00	
	Sx	0.02	0.01				
14	Dx	0.00	0.01	OUT	0.00	0.00	
	Sx	0.02	0.01				
15	Dx	0.01	0.02	OUT	0.00	0.00	
	Sx	0.02	0.02				
16	Dx	0.01	0.01	OUT	0.00	0.00	
	Sx	0.02	0.00				
17	Dx	0.00	0.01	OUT	0.00	0.00	
	Sx	0.00	0.01				
18	Dx	0.00	0.00	OUT	0.00	0.00	
	Sx	0.01	0.01				
19	Dx	0.02	0.01	OUT	0.00	0.00	
	Sx	0.01	0.01				
20	Dx	0.01	0.01	OUT	0.00	0.00	
	Sx	0.03	0.02				

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

Not Applicable

**Remarks**

None

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